REVISITING THE INDUSTRIAL TECHNOLOGIES PROGRAM (ITP): ACHIEVING INDUSTRIAL EFFICIENCY

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

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REVISITING THE INDUSTRIAL TECHNOLOGIES PROGRAM (ITP): ACHIEVING INDUSTRIAL EFFICIENCY

TUESDAY, SEPTEMBER 25, 2007

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

The Subcommittee met, pursuant to call, at 2:05 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Nick Lampson [Chairman of the Subcommittee] presiding.

BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

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ENERGY AND ENVIRONMENT SUBCOMMITTEE

HEARING ON

REVISITING THE INDUSTRIAL TECHNOLOGIES PROGRAM (ITP): ACHIEVING INDUSTRIAL EFFICIENCY

Tuesday, September 25, 2007
2:00 p.m. – 4:00 p.m.
2318 Rayburn House Office Building

WITNESSES:

Mr. Fred Moore
Global Director, Manufacturing and Technology,
Dow Chemical Company

Mr. Paul Cicio
President, Industrial Energy Consumers of America

Mr. Lawrence Kavanagh
Vice President, Manufacturing and Technology,
American Iron and Steel Institute

Mr. Malcolm E. Verdict
Associate Director, Energy Systems Laboratory,
Texas Engineering Experiment Station,
Texas A&M University

HEARING CHARTER

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

Revisiting the Industrial Technologies Program (ITP): Achieving Industrial Efficiency

TUESDAY, SEPTEMBER 25, 2007
2:00 P.M.—4:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

On September 25, 2007, the Subcommittee on Energy and Environment will hold a hearing on the Department of Energy (DOE) Industrial Technologies Program (ITP), and prospects for improving the energy efficiency and environmental performance of the country's most energy-intensive manufacturing processes through technological advancement and industrial process assessments. The hearing shall provide background for legislation in this area. A copy of the discussion draft and section by section is attached.

The hearing will examine the successes and limitations of the Industrial Technologies Program, and how the program can be improved to increase industrial energy efficiency and environmental performance in the U.S. industrial sector. It will also look at which areas of research and development should be enhanced and explored by the ITP and the Industrial Assessment Centers, and what cost-effective opportunities does a further enhancement of industrial efficiency program offer.

The Subcommittee will hear testimony from four witnesses offering perspectives from the U.S. industrial sector, industry trade associations, and university-based energy auditing centers. The witnesses will also comment on the need and timeliness of this legislation, and make recommendations for improving the legislative language.

Witnesses

- **Mr. Malcolm Verdict, C.E.M.,** is an Associate Director of the Energy Systems Laboratory within the Texas Engineering Experiment Station (TEES), the engineering research arm of the Texas A&M University System in College Station, Texas. TEES has operated one of the Department of Energy's twenty-six Industrial Assessment Centers since 1986. Previously he held positions at the Alliance to Save Energy, the Texas Public Utility Commission, and the Texas Governor's Energy Management Office.
- **Mr. Fred Moore** is the Global Director of Manufacturing and Technology for Dow Chemical's Energy Business. He is responsible for the production of power, steam, and other utilities for Dow, and for development, support and application of Energy technology globally and with Dow's major joint ventures. Mr. Moore will be testifying in his position as the Chairman of the Energy Efficiency Task Force of the National Association of Manufacturers.
- **Mr. Lawrence Kavanagh** is the Vice President of Manufacturing and Technology for the American Iron and Steel Institute (AISI). Prior to joining AISI in 1991, Mr. Kavanagh was general manager of engineering for Davy International's Automation Services Division where he was responsible for engineering, project management, installation and testing for Davy's steel plant equipment installations around the world.
- **Mr. Paul Cicio** is the President at Industrial Energy Consumers of America. Mr. Cicio's background includes over 20 years of public affairs and commercial experience in the energy and environment sector, primarily with The Dow Chemical Company where he was responsible for Dow's energy policy and legislative initiatives.

Background

An expanding economy, growing population, and rising standard of living create rapidly growing demands for energy, making energy conservation a key national goal. In the U.S. industry is responsible for more than one-third of all energy consumed, the large majority of which is consumed by certain heavy industries such as chemical, glass and metals production, mining, petroleum refining, and forest and paper products. These industries require very large amounts of energy per unit of production, making them particularly susceptible to high energy prices. These and other energy-intensive industries are ideal candidates on which to focus energy efficiency efforts and apply new technologies that not only increase efficiency, but also raise productivity, reduce wastes, and trim costs.

While the U.S. industrial sector has become much more efficient over the past 30 years, there are still ample opportunities to achieve efficiency gains. However, energy-intensive industries face enormous competitive pressures that make it difficult to make the necessary R&D investments in technology development. Energy-intensive industries tend to exhibit relatively low levels of R&D spending, and are often unwilling to accept the risks associated with undertaking complex capital-intensive technology development and implementation. Without a sustained commitment by the private and public sectors to invest in technology R&D and adopt new technologies, the ability to close the gap between U.S. energy supply and demand will be greatly limited.

The Industrial Technologies Program (ITP) works to improve the energy intensity of U.S. industry through coordinated research and development and dissemination of innovative energy efficiency technologies and practices. The ITP invests in high-risk, high-value cost-shared R&D projects to reduce industrial energy use and process waste streams, while stimulating productivity and growth. Competitive solicitations are the principal mechanism used by ITP to contract for cost-shared R&D. Solicitations reflect the priorities of the Program and selection of projects follows merit-based criteria that emphasize projected energy, environmental, and economic benefits. In addition, ITP makes available information and resources on other financial assistance and research opportunities and case studies from past ITP projects. The ITP portfolio details over 1,000 technology development projects in which ITP has been involved.

The Industrial Technologies Program claims numerous successes. ITP-sponsored technologies have won 31 *"R&D 100 Awards"* between 1991 and 2005, and ITP-sponsored R&D has yielded 156 patents since 1994. While DOE R&D has yielded many energy efficient technologies ready for market entry, the ITP in particular is considered one of the most effective DOE programs at transferring technologies, with over 170 technologies reaching the commercial market. An estimated 13,000 U.S. manufacturing plants have been improved through the ITP technology delivery effort. Nearly five quadrillion Btu of energy (equal to approximately $23 billion) of energy savings are attributed to the program since its inception, with 366 trillion Btu saved in 2004 alone.

The ITP also sponsors 26 University-Based Industrial Assessment Centers (IACs) that provide no-cost energy assessments primarily to small and medium-sized manufacturers. Assessments are conducted by teams of faculty and students, and involve examinations of potential savings from energy efficiency improvements, waste minimization and pollution prevention, and productivity improvement. The average expected savings per assessment are fifty to seventy thousand, with much larger savings possible with large operations. Companies are in turn encouraged to replicate accomplishments and share results.

By operating through university engineering programs the IACs serve as a training ground for the next-generation of energy and industrial engineers. Roughly 240 students receiving training through the program each year. When budgets for the program were higher 38 IACs operated around the country, compared to the 26 in operation today. The approximately $4 million funding for IACs is relatively small, especially given the significant economic benefits of reducing industrial energy consumption.

Brief Budget Overview

Constantly changing market conditions, energy prices, and business concerns affect the ability and willingness of industry to pursue energy efficiency opportunities. As the role of energy in industry changes, the ITP should have the resources to sustain and expand operations, adapt, and reshape its strategy where needed. However, the budget in recent years has decreased dramatically. The Fiscal Year 2007 budget request for Industrial Technologies was $45.6 million, an $11.3 million reduction from the Fiscal Year 2006 Appropriation. By comparison, appropriated levels as re-

cently as Fiscal Year 2000 were as high as $175 million. These funding levels reflect a dramatic shift in priorities away from industrial efficiency R&D.

Funding for Industrial Efficiency R&D at DOE ($ in thousands)

	FY2005 Appropriation	FY2006 Appropriation	FY2007 Request	FY2007 Continuing Resolution	FY2008 Request
Industrial Technologies	73,371	56,855	45,563	57,172	45,998

FY2007 Budget Request Industrial Technologies

	Funding ($ in thousands)		
Activity	FY2005 Appropriation	FY2006 Appropriation	FY2007 Request
Industries of the Future (Specific)- Cost Shared R&D	37,369	24,245	17,001
Industries of the Future (Crosscutting) - Cost Shared R&D	32,262	28,855	28,562
Technical/Program Management Support	3,740	3,755	0
TOTAL (IACs ~$4M)	73,371	56,855	45,563

The following represent a small portion of organizations that support, or have benefited from working with, the program:

AMMEX—The Alliance Materials Manufacturing Excellence
NAM—National Association of Manufacturers
ACEEE—American Council for an Energy Efficient Economy
ACC—American Chemistry Council
3M Company
Abbott Laboratory
Bayer Healthcare
Boeing
Caterpillar
Dow Chemical Company
DuPont
Texas Instruments
Solutia
Georgia Pacific
GlaxoSmithKline
Kaiser Aluminum

Industrial Assessment Centers are located at Colleges and Universities around the country such as: Texas A&M University, University of Washington, Iowa State, University of Michigan, West Virginia University, Georgia Institute of Technology, University of Florida, and University of Miami.

Chairman LAMPSON. This hearing will come to order. Good afternoon, and welcome to this hearing on the Department of Energy's Industrial Technologies Program, the discussion draft of my bill, the *Industrial Energy Efficiency Act of 2007.*

I want to thank our distinguished panel, all of you, for joining us today. We look forward to hearing your perspectives about your experiences with the Industrial Technologies Program as we seek to highlight and enhance its important work.

The program carries out this mission through a coordinated program of research and development and dissemination of technologies and operating practices. The Industrial Technology Program leads the Federal Government's ongoing effort to improve energy efficiency and environmental performance of the Nation's industrial sector in partnership with industry and universities. These efforts not only improve the bottom line of a wide variety of industries but enhance the quality of life for American workers, families, and communities that they serve.

Unfortunately, we have seen the budget for this program drop fairly rapidly in the last few years. The Administration's fiscal year 2008 budget request for the program is a fraction of the fiscal year 2001 appropriation.

Today our witnesses will identify opportunities to improve this important program. And my region of the country has a significant stake in this issue, to say the least. Many energy-intensive industries, especially chemical manufacturing and petroleum refining are located east of Highway 35 in Texas. That is a big area, but these industries face several challenges to their continued economic strength, and many other businesses in my area depend upon the health of these core industries.

There is significant pressure to reduce the emissions and energy use associated with their processes, while keeping costs low enough to maintain the region's attractiveness to industry. And that is a tall order when costs for natural gas, one of the primary industrial feedstocks, are among the highest in the country.

Texas has the highest percentage of large energy-intensive industries, eight percent of the U.S. total. Texas consumes 20 percent of the energy used by U.S. industry, and over half of the energy used in Texas is consumed by the industrial sector.

It is said that the cheapest energy is the energy you don't have to use at all. With energy costs as high as they are, increasing efficiency through technology advancement is key to keeping these core industries located in the United States.

Clearly, increasing energy efficiency is in everyone's interest and the Industrial Technology Program is an important avenue for achieving this important economic, national security, and environmental goals.

So I look forward to the testimony and the recommendations of our witnesses, and now I would like to recognize our distinguished Ranking Member, Mr. Inglis, of South Carolina, for his opening statement.

[The prepared statement of Chairman Lampson follows:]

PREPARED STATEMENT OF CHAIRMAN NICK LAMPSON

Good afternoon. Welcome to this hearing on the Department of Energy's Industrial Technologies Program and the discussion draft of my bill, the *Industrial Energy Efficiency Act of 2007*.

I would like to thank our distinguished panel of witnesses for joining us today. We look forward to hearing your perspectives and about your experiences with the Industrial Technology Program as we seek to highlight and enhance its important work.

The program carries out this mission through a coordinated program of research and development, and dissemination of technologies and operating practices.

The Industrial Technology Program leads the Federal Government's on-going effort to improve energy efficiency and environmental performance of the Nation's industrial sector in partnership with industry and universities. These efforts not only improve the bottom-line of a wide variety of industries, but enhance the quality of life for American workers, families, and communities they serve.

Unfortunately, we have seen the budget for this program drop rapidly in the last few years. The Administration's FY 2008 budget request for the program is a fraction of the FY 2001 appropriation.

Today our witnesses will identify opportunities to improve this important program. My region of the country has a significant stake in this issue.

Many energy-intensive industries, most especially chemical manufacturing and petroleum refining, are located east of Highway 35 in Texas. These industries face several challenges to their continued economic strength, and many other businesses in my area depend upon the health of these core industries.

There is significant pressure to reduce the emissions and energy use associated with their processes, while keeping costs low enough to maintain the region's attractiveness to industry. That's a tall order when costs for natural gas, one of the primary industrial feedstocks, are among the highest in the country.

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It is said that the cheapest energy is the energy you don't have to use at all. With energy costs as high as they are, increasing efficiency through technology advancement is key to keeping these core industries located in the U.S.

Clearly, increasing energy efficiency is in everyone's interest and the Industrial Technology Program is an important avenue for achieving this important economic, national security, and environmental goal. I look forward to the testimony and recommendations of our witnesses.

Mr. INGLIS. Thank you, Mr. Chairman. Thank you for holding this hearing to discuss the importance of improving industrial energy efficiency.

Industry as I understand it consumes about one-third of all the energy used in the United States. We pump more energy into our factories than we do into our vehicles. Increasing U.S. industrial efficiency will have many payoffs. It will reduce emissions, drive down energy costs, enabling domestic companies to compete internationally, and transfer energy cost savings to the consumer.

The Department of Energy's Industrial Technologies Program has a successful track record of helping U.S. manufacturers translate research and development into efficient, cost-saving technologies.

I look forward to hearing from the witnesses today, discussing, in discussing ways that the Industrial Technologies Program can further enable our nation's industries in their achievement of energy efficiency while remaining economically competitive.

Thank you, again, Mr. Chairman. I yield back.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Thank you, Mr. Chairman, for holding this hearing to discuss the importance of improving industrial energy efficiency.

Industry consumes about one-third of all energy used in the United States. We pump more energy into our factories than we do into our vehicles. Increasing U.S. industry efficiency will have many payoffs: reduce emissions, drive down energy costs enabling domestic companies to compete internationally, and transfer energy cost savings to the consumer.

The Department of Energy's Industrial Technologies Program (ITP) has a successful track record of helping U.S. manufacturers translate research and development into efficient, cost-saving technologies. I look forward to hearing from our witnesses today, and discussing ways the ITP can further enable our nation's industries to achieve energy efficiency while remaining economically competitive.

Thank you again, Mr. Chairman. I yield back.

Chairman LAMPSON. Thank you, Mr. Inglis. And I ask unanimous consent that all additional opening statements submitted by Subcommittee Members be included in the record. Without objection, so ordered.

[The prepared statement of Mr. Costello follows:]

PREPARED STATEMENT OF REPRESENTATIVE JERRY F. COSTELLO

Mr. Chairman, thank you for calling today's hearing to receive testimony on the Industrial Technologies Program (ITP) and legislation to support research and development of new industrial processes and technologies.

The Science and Technology Committee continues to examine energy reform, the globalization of science technology, and the competitiveness of our universities and America's overall economy. The ITP has a significant positive impact on these issues by working with U.S. industry and our university students to improve industrial energy efficiency and environmental performance.

As our nation continues to be impacted by high energy costs and environmental challenges, consumers and businesses are faced with few if any cost effective options to immediately address these problems. The ITP invests in high-risk research and development to improve industrial energy efficiency while stimulating productivity and growth. The ITP enjoys wide successes in R&D awards. Their research and development has resulted in more than 150 patents with over 170 technologies that have reached commercial markets. The ITP also sponsors 26 university-based assessment centers, which provide energy assessments to small and medium-sized businesses.

Congress continues to focus on energy reform and ways to curtail our dependence on foreign oil while maintaining a sound environment and national economy. As I have said before, one way to accomplish this goal is through the use of coal-to-liquid fuels.

The United States has an abundant supply of coal, and I firmly believe coal-to-liquids, particularly in combination with carbon capture and storage (CCS) and other technologies, is part of the solution to achieving U.S. energy independence, continued economic prosperity and improved environmental stewardship.

Coal-to-liquids plants using CCS can produce fuels with life cycle greenhouse gas emission profiles that are as good as or better than that of petroleum-derived products.

In order for CCS technology to become commercially viable, the Federal Government must show it is committed to funding the necessary research, development, and demonstration (RD&D) projects. Today, we are taking an enormous step forward in this goal as we examine legislation to establish a program in cooperation with energy industries and universities to conduct research, development, demonstration, and commercial applications.

Mr. Chairman, as you know, I have been a strong advocate for federal coal initiatives and programs. I intend to continue to work with my colleagues on both sides of the aisle to ensure we continue to advance technologies, including clean coal technology, to overcome the technical and economical challenges for coal-based power plants. I look forward to hearing from the witnesses regarding their thoughts on these issues.

These actions will affect American students, U.S. competitiveness, and our overall economy.

There have been several committee hearings in the House and Senate to discuss CCS technology. I am glad we are having today's Subcommittee hearing because With that, again, thank you Chairman Lampson—I look forward to hearing from our witnesses.

Chairman LAMPSON. It is my pleasure to introduce the excellent panel of witnesses that we have with us this afternoon. Mr. Fred Moore is the Global Director of Manufacturing and Technology for Dow Chemicals energy business. He is responsible for the production of power, steam, and other utilities for Dow and for development, support, and application of energy technology globally, and with Dow's major joint ventures. So he is also the Chairman of the Energy Efficiency Task Force of the National Association of Manufacturers.

Mr. Paul Cicio is the President of the—good Italian name, like Lampasona—is the President of the Industrial Energy Consumers of America. Mr. Cicio's background includes over 20 years of public affairs and commercial experience in the energy and environmental sector, primarily with the Dow Chemical Company, where he was responsible for Dow's Energy Policy and legislative initiatives.

Mr. Lawrence Kavanagh is the Vice President of Manufacturing and Technology for the American Iron and Steel Institute, or AISI. Prior to joining AISI in 1991, Mr. Kavanagh was the General Manager of Engineering for Davey International's Automation Services Division, where he was responsible for engineering, product management, installation and testing for Davey steel plant, equipment installations around the world.

And Mr. Malcolm Verdict is an Associate Director of the Energy Systems Laboratory within the Texas Engineering Experiment Station, TEES, in the Engineering Research Arm of Texas A&M, where my daughters went to school, in College Station, Texas. TEES has operated one of the Department of Energy's 26 industrial assessment centers since 1986. Previously he held positions at the Alliance to Save Energy, the Texas Public Utility Commission, and the Texas Governor's Energy Management Office.

And we want to welcome each and every one of you, and thank you very much for being here. You will each have five minutes for your spoken testimony, and you will notice that little black box in the middle. It works like a traffic signal. When it becomes red, I would appreciate your stopping and yielding to the next person. Your written testimony will be included in the record for the hearing, and when all four of you have completed testimony, then we will begin questions. Each Member will have five minutes to question the panel.

And Mr. Moore, we will begin with you.

STATEMENT OF MR. FREDERICK L. MOORE, GLOBAL DIRECTOR, MANUFACTURING AND TECHNOLOGY, DOW CHEMICAL COMPANY

Mr. MOORE. Good afternoon, Mr. Chairman and Members of the Subcommittee. My name is Fred Moore, and I am the Director of Manufacturing and Technology for Energy with the Dow Chemical Company. In that capacity I am responsible for assuring that Dow's use of energy is as efficient as possible.

I am here today in my capacity as Chairman of the Energy Efficiency Task Force of the National Association of Manufacturers (NAM), the largest industrial trade association in the U.S. NAM represents more than 14 million men and women in the manufacturing economy producing $1.5 trillion in revenues last year. We

are pleased to offer our views on DOE's ITP Program and how to achieve greater industrial energy efficiency.

Energy efficiency is an imperative for the American manufacturers, as well as every other sector of our economy. NAM affirmed the importance of energy efficiency with the release of its competitiveness model energy legislation earlier this year. As a nation we must begin to think of the energy we don't use as our first fuel of choice.

Natural gas prices differ widely around the world from 75 cents per million BTUs in the Middle East to the winter forecast for the U.S. of $9 per million BTUs. Our inability to pass on these energy costs in the price of our products results in manufacturing being the shock absorber for high and volatile fuel prices.

We are the leading edge of demand destruction in the face of high energy prices. The demand destruction is just a stare-all term for job loss. Nearly three million high-paying manufacturing jobs have been lost since the run-up in natural gas prices in 2000.

What are we doing about this? In Dow we are relentless in our drive to reduce the amount of energy it takes to produce each pound of product. Between 1995, and 2005, we improved our energy efficiency by 22 percent, saving nearly 900 trillion BTUs. That is enough energy to power all the residential and commercial businesses in California for an entire year. And we saved nearly $4.5 billion in the process.

Dow is committed to achieve another 25 percent improvement in energy efficiency by 2015. To underscore the impact of energy efficiency on our nation's energy security, if our entire economy in the U.S. would achieve a similar goal, assuming normal GDP growth, we could displace the oil equivalent of all of our current imports from the Persian Gulf.

We have learned much from our work with DOE's ITP Program. In addition to being an active participant in their Save Energy Now Program, we hosted 13 DOE energy assessments at our nine largest sites in the U.S. in the last two years. These joint assessments identified nearly four trillion BTUs per year of savings, with an annual amount of roughly $30 million.

In fact, just last week the Department of Energy helped us optimize one of our pumping systems at our Texas City Plant in Texas. That literally allowed us to begin saving $200,000 a year in energy costs that day. It was almost as easy as flipping a switch.

If ITP can identify additional opportunities for us, imagine what it can do for the thousands of small and medium-sized companies that have neither the internal expertise nor the resources of Dow. That is why NAM and the DOE recently signed a Memorandum of Understanding (MOU) to work together to promote energy efficiency among its 12,000-member companies. It is our joint responsibility to help them. In order to succeed, we need a strong ITP Program, because it brings together the collective expertise of business, of government, and others such as NAM to multiply its impact.

You have asked how to strengthen the program. Please consider the following suggestions. It should expand to focus on co-generation, combined heat and power, and waste heat recovery. It should increase its dialogue in involvement with a manufacturing com-

pany representatives to insure that the activities meet the needs of the manufacturing sector.

Funding should be restored to late 1990 levels to allow re-staffing of the program. Programs that reach out to small and medium manufacturers should be coordinated with other governmental activities to minimize redundancy and maximize synergy. And last, there should be close coordination with EPA's Energy Star Program to make best use of their tools.

Energy efficiency has for too long been the Rodney Dangerfield of energy policy. It gets no respect. Through our collective efforts we can assure that energy efficiency gets the respect it deserves.

Thank you, and I look forward to answering any questions.

[The prepared statement of Mr. Moore follows:]

PREPARED STATEMENT OF FREDERICK L. MOORE

The Dow Chemical Company, on behalf of the National Association of Manufacturers (NAM), appreciates the opportunity to submit these written comments concerning the Department of Energy (DOE) Industrial Technology Program (ITP).

High U.S. energy prices have spurred a significant amount of private sector action on energy efficiency. Many companies, for example, have established energy efficiency programs. In our experience, in order to be successful, a corporate energy efficiency program requires top-level commitment; an integrated approach; and a continuous effort to identify, evaluate, and prioritize among energy efficiency opportunities. To help companies achieve energy efficiency improvements, several third-party initiatives are underway, including the recent creation of the NAM Energy Efficiency Task Force.

The country currently faces significant energy challenges in the form of energy security and climate change. Given these dual and interrelated problems, promotion of energy efficiency represents the consensus first step toward a comprehensive policy solution. However, a sole reliance on private sector action is not going to solve the inter-linked problems of energy security and global climate change. A partnership between the private and public sectors will be required to promote energy efficiency, the development of renewable and alternative energy, and the development and deployment of energy-saving technologies. The DOE ITP program represents the kind of government program that is necessary to help US manufacturers identify opportunities for energy savings through efficiency. We believe this very valuable program should be strengthened in order to promote energy efficiency across the manufacturing sector.

The Dow Chemical Company

Dow was founded in Michigan in 1897 and is one of the world's leading manufacturers of chemicals and plastics. We supply more than 3,300 products to customers in 175 countries around the world, including hundreds of specialty chemicals, plastics, crop protection products, and pharmaceutical raw materials essential to life.

Dow is an energy-intensive company. Dow uses energy, primarily natural gas liquids, as a feedstock to make our products. We also use energy to drive the chemical reactions necessary to turn our feedstock materials into useful products, many of which lead to net energy savings.

Dow is committed to sustainability. Our ambitious 2015 sustainability goals underscore this commitment to reduce our energy and climate "footprint," and to assist other manufacturers and the public to do likewise.

Dow has invested in a comprehensive energy efficiency program, and we have achieved impressive results. Between 1995 and 2005, we reduced our energy intensity (i.e., energy use divided by production output) by 22 percent. We are not stopping there. We have committed to reduce our energy intensity by an additional 25 percent from 2005 to 2015. Such an improvement, if replicated across the country, would be extremely beneficial.

For example, if the U.S. reduced its energy intensity by 25 percent between 2005 and 2015, and assuming GDP grows at the expected three percent rate, we would eliminate the oil equivalent of all the Persian Gulf imports today.

Our financial investment in energy efficiency has been rewarded several times over in terms of energy savings. We believe our experience with energy efficiency can serve as an example for other companies and the general public.

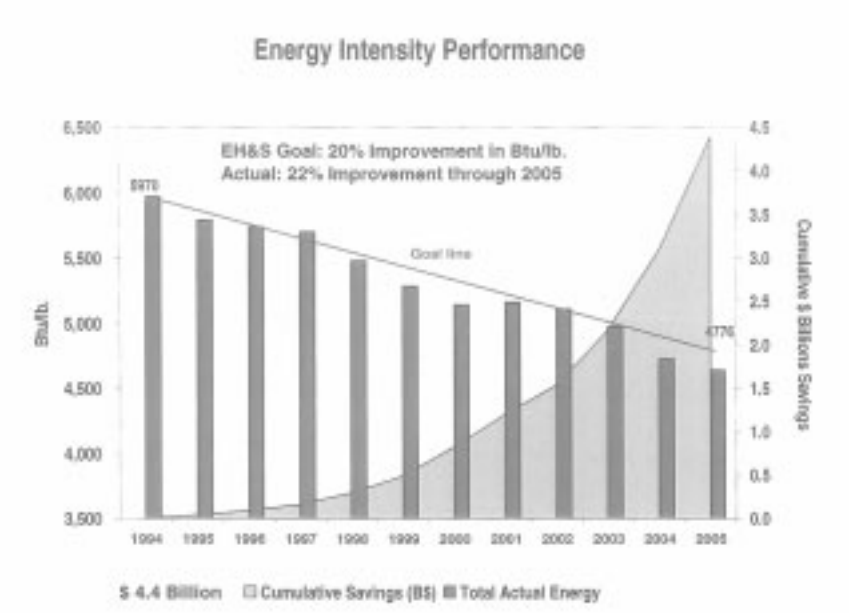
Aside from financial rewards, our energy efficiency program has also helped reduce our absolute levels of greenhouse gas emissions, and we are committed to do even better in the future. Our aggressive focus on energy intensity has contributed to, since 1990, a reduction of over 20 percent in absolute greenhouse gas emissions—below the reduction target set in the Kyoto Protocol.

Energy Efficiency at Dow

Dow is using its expertise to minimize its energy and climate "footprint" and to develop products that enable its downstream customers to do likewise.

The Dow Chemical Company is a recognized industry leader in energy management. Energy efficiency has been part of our heritage since the very early years of our company, when Dow helped pioneer the use of industrial combined heat and power, also known as co-generation. In conventional power plants, a significant portion of the energy is lost (usually through cooling towers or flue gas) in the process of electricity generation. In contrast, co-generation captures more of the heat, utilizing less fuel, which has a significant impact on greenhouse gas emissions and improved air quality relative to conventional utility power. Co-generation typically uses 20 to 40 percent less fuel than separate steam and power generation because energy is captured and used that would otherwise be wasted.

In recent years, through a company-wide focus on energy efficiency, we have dramatically reduced our energy intensity—and exceeded an aggressive, long-term corporate energy efficiency goal mentioned previously. Figure 1 shows how our $1 billion investment in energy efficiency has returned around $4.5 billion in energy savings.



Dow's experience in energy efficiency has convinced us that we can help others realize these benefits, too. Indeed, energy efficiency is a universal tool. It should be the tool of choice, irrespective of whether one's motivation is to save money, reduce GHG emissions, or reduce dependence on foreign energy. It is the cheapest and most renewable "fuel" of all.

Dow's energy efficiency and conservation initiative relies strongly on our structured approach to resource conservation and energy intensity reduction. At the core is the sustained commitment and support of Dow's corporate leadership. The overall Energy Efficiency and Conservation effort within Dow is driven by a Global Energy Efficiency Leader, who has full responsibility and accountability for implementing and managing an aggressive global energy conservation plan. The energy conserva-

tion leader sponsors technology center and site energy efficiency teams and networks throughout the company to identify energy saving opportunities, develop long-term energy improvement plans, and implement projects.

In addition, each business unit at Dow is responsible for aligning its goals and plans to the corporate goal on energy efficiency. Focal points within each business unit are responsible for driving energy efficiency within their respective technologies. Energy efficiency is further driven by the energy conservation teams at our 13 largest energy-consuming sites, which account for over 90 percent of Dow's energy usage. These local teams actively engage employees in energy efficiency improvement projects at their sites and drive an energy efficiency mindset and culture at the local level.

The ITP: Promoting Energy Efficiency

Outside of Dow, the company also partners with, and/or supports, government and other organizations in their efforts to promote energy efficiency among all consumers. Dow is an active participant in the U.S. Department of Energy's "Save Energy Now" industrial energy efficiency campaign. Save Energy Now is sponsored by the DOE Industrial Technology Program. Dow was one of the first six companies selected for a DOE Energy Savings Assessment (ESA) because of its interest and past success in setting an example in energy management.

In the past two years, the company has hosted thirteen energy assessments at nine of its largest U.S. manufacturing facilities. These assessments have included steam, process heating, and pumping systems. These joint assessments identified additional energy saving opportunities:

- The total energy savings potential found in the assessments was more than 3.75 trillion Btu per year, valued at more than $30 million per year.
- At the end of August, seven of the plants have reported implementing energy savings valued at more than $6.1 million.
- Additionally, $3.4 million worth of energy savings projects are underway.
- Finally, $4.7 million worth of energy savings projects are scheduled to be done.

Further, Dow collaborated with the DOE to pilot conducting a series of Industrial Best Practices training sessions via webcast, also well as hosting, in-depth DOE Steam Systems Assessment training sessions in Texas and Louisiana, drawing not only Dow engineers but also surrounding industrial community members, enabling other companies to benefit from energy saving assessment tools and strategies. We are continuing that collaboration on other projects, such as the Superior Energy Performance Partnership, whose purpose is to develop a more consistent framework for achieving greater energy efficiency in all U.S. manufacturing plants. The goal of the Partnership is to reduce, by 25 percent, the energy intensity of U.S. industry over the next ten years. Meeting this goal would save 8.4 quadrillion Btu per year, which is equal to the annual energy consumption of the State of California.

It is useful to provide an illustration of the value of the ITP. Last December, one of Dow's combined heat and power (CHP) units, known as Power 6, participated in the Energy Savings Assessment sponsored by the Department of Energy's "Save Energy Now" program. The three-day activity was facilitated by an expert consultant, and focused on steam system optimization and energy conservation. The assessment yielded a list of opportunities that were evaluated by the Operations and Technology Center teams.

Several of the opportunities were implemented and led to significant energy savings. DOE is launching a recognition program to reward plants who have implemented significant savings through the energy assessment. Power 6 has achieved the highest award level—Energy Champion—by saving over 250,000 million Btu and/or over 15 percent total energy savings.

If a company like Dow, that has a successful track record in energy efficiency, can benefit so much from the ITP program, then what about the thousands of small and medium-size companies that have neither the internal expertise nor the resources?

This is where the unique collaboration between the National Association of Manufacturers (NAM), government, and other organizations can help take industrial energy efficiency to the next level. The U.S. industrial sector is responsible for 33 percent of total U.S. energy consumption. The opportunities for energy efficiency are enormous.

The NAM is the largest industrial trade association in the United States. The NAM represents the more than 14 million men and women employed in the manufacturing economy, producing $1.5 trillion in revenues last year. Through its membership, the NAM has access to a large number of U.S. manufacturers, and has the

means to both communicate and market to candidate companies on the availability of energy efficiency resources. In support of the NAM's agenda to establish a national commitment to reduce energy intensity of the U.S. economy through strategic goal-setting, public-private partnership and consumer education, the NAM created its Energy Efficiency Task Force.

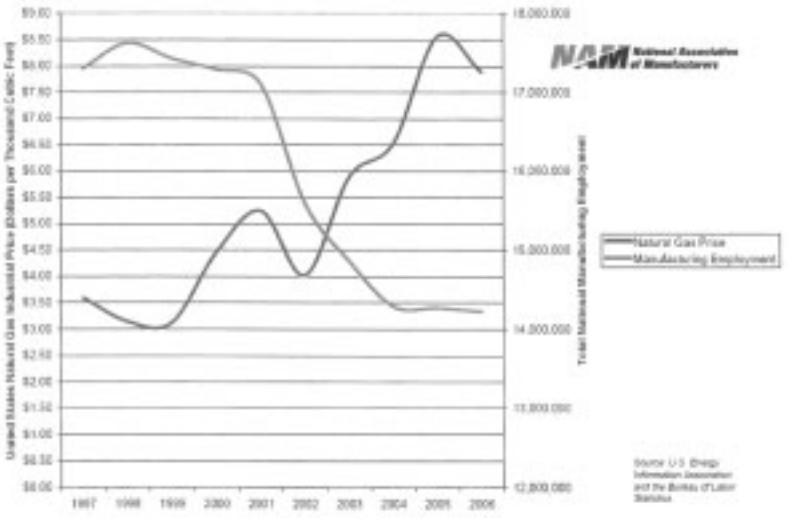
The NAM further affirmed the importance of energy efficiency with the release of its comprehensive model energy legislation earlier this year, the *Energy Security for American Competitiveness Act* (ESAC), which treats energy efficiency as a virtual domestic energy source that can displace imports. The NAM recently signed a Memorandum of Understanding (MOU) with the DOE to promote increased industrial energy efficiency among NAM member companies. The purpose of this MOU is to establish a working arrangement between the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy's Industrial Technologies Program (ITP) and the NAM. The NAM and the EPA's Energy Star Program are working on a partnership. The NAM continues to work on this project with NGO partners, such as the Alliance to Save Energy (ASE) and the American Council for an Energy Efficient Economy (ACEEE).

This MOU supports a variety of activities, which aim to assist manufacturing facilities to initiate and implement energy management programs, adopt clean energy efficient technologies, and achieve continual energy efficiency and intensity reduction improvements. NAM and DOE will also coordinate in measuring and documenting the energy savings achieved in NAM member company manufacturing facilities as impacted by the energy efficiency campaign supported by the parties and other partners to the extent the information is available. This MOU represents a non-binding expression of intent between the parties to work together to promote energy efficiency in manufacturing.

As we face the interrelated issues of energy security and climate change, we must increasingly rely on the energy we do not use as the fuel of choice. Energy efficiency is the well we must tap for this resource.

High global oil prices affect the economy as a whole. Natural gas prices differ widely around the world, from 75 cents per million Btu in the Middle East to a forecast of nearly $9.00 for this coming winter in the U.S. Since we often can't pass on our energy costs in the price of our products, manufacturers become the shock absorber for volatile and high natural gas prices.

Manufacturing is the leading edge of demand destruction in the face of high energy prices. And demand destruction is just a more palatable economic term for job destruction. Figure 2 shows how high energy costs have contributed to over three million high paying manufacturing jobs being lost since the run up in natural gas prices began in 2000.



The Energy Efficiency Task Force, chaired by Dow, is partnering with DOE, EPA EnergyStar, the Alliance to Save Energy, the American Council for an Energy Efficient Economy, and other energy efficiency organizations to make use of readily available tools which will help manufacturers identify and address cost-effective energy efficiency opportunities.

The partners are providing their specific expertise and services to access, communicate, and market to a large number of U.S. manufacturers, and deliver a consolidated catalog of tools, technologies, and a menu of options for future direction in energy management. NAM will utilize a website portal to access the right energy efficient technology, a consolidated library of tools, and roadmaps to implementing effective energy management programs.

Through marketing and outreach efforts, the partners plan to reach a greater number of small and medium-sized manufacturers; help them progress toward greater energy efficiency; and establish systems and technology improvements capable of delivering immediate and sustaining long-term energy savings.

Recommendations for Congress and the Administration

The ITP program offers a wide range of important benefits to the manufacturing sector:

- The program provides training for the next generation of manufacturing energy efficiency engineers through the Industrial Assessment Program. Graduates of this program have a proven track record of being able to perform in jobs much more quickly than students without the experience. These students also become sensitive to identifying and implementing energy efficiency opportunities.
- The program has the ability to convene representatives from a wide range of companies to work on manufacturing issues as a whole, without raising antitrust concerns.
- The program's cooperative RD&D efforts have been valuable to industry by allowing industry and government to work together to target research that meets the needs of manufacturing industries, resulting in near-term impacts.

Dow and NAM support the ITP, which is currently the only federal program that supports manufacturing research.

To strengthen the program, we recommend the following:

- Expand the program to focus on co-generation, CHP and recycled energy as important opportunities.
- Develop closer relationships to manufacturing company representatives to ensure that ITP activities meet the needs of the manufacturing sector.
- Program funding should be restored to late-1990s levels to allow re-staffing of the program.
- The program should be coordinated with NIST MEP Centers and DOE CHP Regional Application Centers to maximize synergies between program offerings and minimize redundancies.

Conclusion

U.S. manufacturers are doing a great deal to improve their energy efficiency performance. High U.S. energy prices are a driver, as are the dual problems of energy dependence and rising GHG emissions. But a sole reliance on private sector action is not going to solve these problems. A partnership between the private and public sectors will be required to promote energy efficiency, the development of renewable and alternative energy, and the development and deployment of energy-saving technologies.

Public policy plays an important role, and Congress must enact measures to reduce demand, increase supply, and promote alternatives. The first order of business should be to promote energy efficiency. The DOE ITP program represents the kind of government program that is necessary to help U.S. manufacturers identify opportunities for energy savings through efficiency. We believe this very valuable program should be strengthened in order to promote energy efficiency across the manufacturing sector, increase our energy security, and reduce GHG emissions.

BIOGRAPHY FOR FREDERICK L. MOORE

Fred Moore is the Global Director of Manufacturing & Technology for the Energy business in Dow. He is responsible for the safe and reliable production of power, steam, and other utilities for Dow globally, which represents more than 10 percent

of Dow's asset base. In his Technology role, he is responsible for development, support and application of Energy technology globally and with Dow's major joint ventures.

Fred is a graduate of Purdue University and began his career with Union Carbide in 1975. In subsequent years, he has held technical roles and managerial roles in a number of businesses, functions, and locations in the U.S. and Canada. In addition to his manufacturing experiences in North America, he has been a corporate media spokesperson for environmental matters, lobbied at the State and Federal levels of government, served on a joint venture board of directors, been chairman of or served as board member of several state and industry trade association groups.

Chairman LAMPSON. Thank you, Mr. Moore.

Mr. Cicio.

STATEMENT OF MR. PAUL N. CICIO, PRESIDENT, INDUSTRIAL ENERGY CONSUMERS OF AMERICA

Mr. CICIO. Good afternoon, Chairman Lampson, Ranking Member Inglis. Thank you for the opportunity to be here.

The Industrial Energy Consumers of America (IECA) is a national, non-profit, non-partisan trade association whose membership are exclusively energy-intensive industry companies. The manufacturing sector competes globally, where energy-intensive industries reducing energy consumption is essential. We either continually reduce our energy consumption per unit of product, or we cease to be competitive. And while energy efficiency is highly valued by the industrial sector, other energy issues weigh heavy on us and can overshadow the benefits of energy efficiency.

Since 2000, the manufacturing sector has lost 3.1 million jobs, specifically 18 percent of all manufacturing jobs. To our knowledge this is the first time in U.S. history where we have lost manufacturing jobs despite robust economic growth for the last four years. High relative energy costs, particularly natural gas costs and now rising electricity costs, have been a significant factor for these energy-intensive industries, and we are fearful that if Congress does not increase availability and affordability of domestic energy, more manufacturing plants will move offshore.

Manufacturers are also wary of the direct and indirect costs of Congressional efforts to cap greenhouse gas emissions. Greenhouse gas emission concerns have already incentivised power generators to increase their consumption of natural gas by 19 percent since 2000, which has driven up the cost of natural gas and electricity for all consumers. And we are concerned that without resolving these issues more manufacturing jobs will be lost.

While the industrial sector represents 32 percent of U.S. energy consumption, we have demonstrated absolutely remarkable performance in energy efficiency. Since 1990, the industrial sector total energy consumption increased by one percent, and we increased the total industrial value of shipments by almost 32 percent. The ITP Program has been an important part of that success story.

Improvement in energy efficiency has also played an important role in reducing greenhouse gas emissions. In the industrial sector, the direct and indirect greenhouse gas carbon emissions, in 2006, are below the 1990, levels. Residential carbon emissions are up 31 percent, commercial, up 34, transportation, up 25, electricity production, up 32 percent. So the performance of the industrial sector has been remarkable.

There is no sector in the economy that is more supportive of energy efficiency than our sector. The Industrial Technology Program gets high marks from the IECA member companies. Given the relatively modest federal money dedicated to the program, the benefits to the industrial sector and to the United States economy are significant. In our view we simply need to do more of the same, including restoring higher levels of funding. We do support higher levels for cost-sharing research, demonstration, and deployment of technology and continue to expand programs like Save Energy Now.

The industrial sector needs R&D in areas that provide long-term, cost-effective solutions, particularly for the high-risk, high-value, long-term process technology. Examples of R&D interests of our members deal with control systems, optimization of energies in steam generation, process heaters, heat recovery technology, and alternative energy fuels and feedstocks.

Lastly, IECA member companies wish to be sure this Subcommittee knows how much they value the Save Energy Now Program. Save Energy Now is a superb program because it helps companies accelerate finding high-quality energy reduction projects through plant assessments and uses existing technology, existing products, and existing knowledge to reduce energy consumption. The 200 assessments completed in 2006, found over $500 million in potential energy savings, and the DOE spent only $3 million on the specific program. A tremendous investment for federal dollars.

Thank you.

[The prepared statement of Mr. Cicio follows:]

PREPARED STATEMENT OF PAUL N. CICIO

Good afternoon Chairman Lampson and Ranking Member Inglis. Thank you for the opportunity to testify before this important subcommittee and on this very timely topic.

The Industrial Energy Consumers of America (IECA) is a national non-profit nonpartisan cross-industry trade association whose membership is exclusively from the energy intensive manufacturing sector and is dedicated to a broad array of energy and environment related issues.

The manufacturing sector competes globally. For energy intensive industries, reducing energy consumption per unit of product produced is essential. We either continually reduce our energy cost per unit of product or we will cease to be competitive.

While the industrial sector represents 32.2 percent of the U.S. energy consumption we have demonstrated remarkable performance in energy reduction. Since 1980 the industrial sector total energy consumption increased by only one percent while increasing total industrial value of shipments by 53 percent.

Improvement in energy efficiency has also played an important role in reducing GHG emissions. The industrial sector direct and indirect carbon dioxide emissions in 2006 are slightly below the 1990 level while GHG emissions from the residential sector increased 31.4 percent; commercial +34.6 percent; transportation +25 percent and electricity + 31.7 percent.

Energy is used as both fuel and feedstock and can represent as high as 70 percent of the cost of producing some products. For perspective, the industrial sector contains about 226,000 manufacturing sites. However, there are about 6,800 sites that use greater than $2 million of energy annually and consume about 53 percent of all energy in the industrial sector.

The Industrial Technology Program gets high marks from IECA member companies. Given the relatively modest federal money dedicated to the program, the benefits to the industrial sector and the U.S. economy are significant.

In our view, we simply need to do more of the same. IECA supports greater spending on R&D programs that provide cost sharing research, demonstration and

deployment of technology and continuing to expand programs like "Save Energy Now."

The industrial sector needs R&D in areas that provides long-term cost-effective technology solutions, particularly for high-risk high-value long-term technology. Examples of R&D areas of interest are: energy management systems that include control and data acquisition; control system improvements and optimization in the areas of steam generation, process heaters; heat recovery technology; and alternative energy sources for fuels and feedstock.

Lastly, IECA member companies wish to be sure this Subcommittee knows how much they value the "Save Energy Now" program. "Save Energy Now" is a superb program because it helps companies accelerate finding high quality energy reduction projects through plant assessments and uses existing technology, product and knowledge to reduce energy consumption.

Thank you.

BIOGRAPHY FOR PAUL N. CICIO

Paul N. Cicio has been the President of the Industrial Energy Consumers of America (IECA) since its founding six years ago. IECA is a non-profit trade association created to promote the interests of manufacturing companies for which the availability, use and cost of energy, power or feedstock play a significant role in their ability to compete in domestic and world markets. Membership represents a diverse set of energy intensive industries including: plastics, cement, aluminum, paper, food processing, brick, chemicals, fertilizer, insulation, steel, glass, industrial gases, pharmaceutical and brewing.

Mr. Cicio is well know in Washington circles as a consumer advocate for the industrial sector on issues related to natural gas supply, natural gas price manipulation, electricity, energy efficiency and climate change policy. He has testified four times before the U.S. House of Representatives; twice before the U.S. Senate; and twice before the Federal Energy Regulatory Commission. He has also intervened at the Commodity Futures Trading Commission.

In 2006, the Secretary of the Interior appointed Mr. Cicio to the U.S. Department of Interior Outer Continental Shelf Policy Advisory Committee. And in 2007, the Secretary of Energy appointed him to the National Coal Council, an advisory council to the Secretary. In both appointments, Mr. Cicio became the first energy consumer advocate.

Previous to IECA, Mr. Cicio was employed by The Dow Chemical Company where he held a number of diverse responsibilities including: hydrocarbons and energy global issues management and Federal Government affairs, hydrocarbons and energy senior commercial manager, marketing manager, district sales manager, product sales manager and field sales. He retired from Dow Chemical with almost 30 years of service.

Chairman LAMPSON. Thank you, Mr. Cicio.

Mr. Kavanagh.

STATEMENT OF MR. LAWRENCE W. KAVANAGH, VICE PRESIDENT, MANUFACTURING AND TECHNOLOGY, AMERICAN IRON AND STEEL INSTITUTE

Mr. KAVANAGH. Thank you, and good afternoon. I work at the American Iron and Steel Institute, but today I am representing the Alliance for Materials, Manufacturing Excellence, or AMMEX. AMMEX consists of manufacturers in aluminum, chemicals, glass, forest products, metal casting, and steel and other organizations concerned about energy use and competitive manufacturing. So my remarks are in that larger context today.

A little bit of background. The Inter-Governmental Panel on Climate Change says that we need to reduce CO_2 emissions by 50 percent by 2050 to keep global warming below two degrees. Two degrees is kind of the threshold above which bad stuff happens and below which everything is okay. So if you look at the chart that is in my testimony, it shows the improvements in energy use and CO_2 emissions that materials manufacturers have made over time, and

a lot of that was done in cooperation with DOE and the gentleman to my right has already quoted the figures and facts extensively.

So the energy usage gains that we have been able to make make sense because all processes are mature, and we have been working on lowering energy use for some time.

However, it also shows, and this is the key point, that to make any significant change in energy use and CO_2 emissions going forward, new processes are required. There is just not enough left in today's processes because we are relatively energy efficient already. Not to get to the big gains that are required or will be required in a carbon-constrained economy.

So whether you call these breakthrough, game changing, or transformational technologies, new process development is the only path to meeting society's needs regarding energy use and CO_2 emissions.

AMMEX supports an ITP Program establishing a public, private R&D focused on new process development over the long-term, and our estimates indicate the same as has been already mentioned that a funding level of the late '90s period of $125 million or so is a good place to start.

Federal dollars coupled with industry dollars is a very powerful combination, and not only addresses the technical challenges we face, but by placing this joint funding at universities, it also addresses our crucial and expanding need for the next generation of scientists and innovators in our industries.

We also recognize there is a need for near-term and incremental work, and this part of the program should address censors, motors, steam, pumps, and the like, and it should also invite the participation of new stakeholders that may have more room for improvement in the near term than materials manufacturing.

In summary, it is necessary that we realize we could not incrementalize to the type of energy savings necessary to manufacture in the carbon-constrained world. High-efficiency motors and light bulbs will simply not be enough to come close. Reducing energy use and CO_2 emissions are everyone's responsibility, the public and the private sector. And the way to meet this challenge is to create a jointly-funded R&D program to transform industrial processes into ones that use less and diverse forms of energy while emitting little or no CO_2.

Thank you.

[The prepared statement of Mr. Kavanagh follows:]

PREPARED STATEMENT OF LAWRENCE W. KAVANAGH

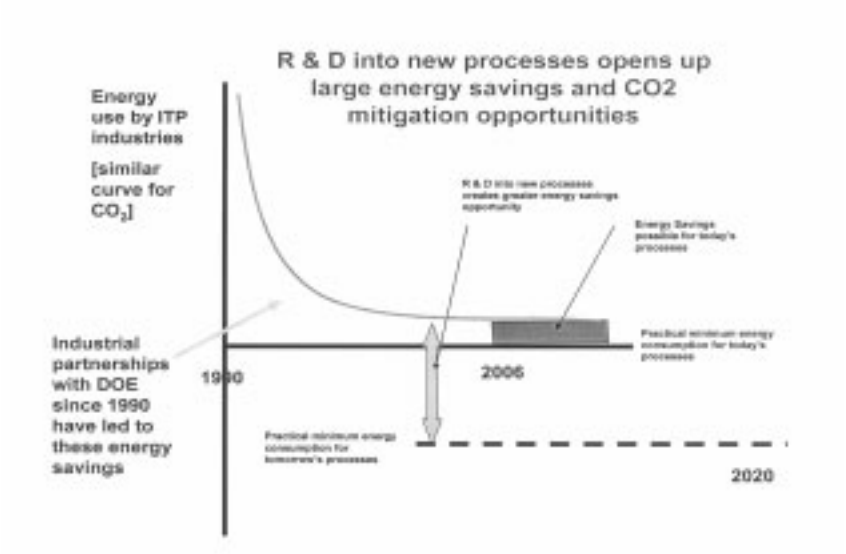
Chairman Lampson, Ranking Member Inglis, and other Members of the Subcommittee, thank you for inviting me here to speak today.

My name is Lawrence Kavanagh and I am Vice President—Manufacturing and Technology at the American Iron and Steel Institute. I am here today on behalf of the Alliance for Materials Manufacturing Excellence or AMMEX. The organizations that are AMMEX members include the basic materials manufacturing sector [aluminum, chemicals, forest products, glass, metal casting, steel] in the U.S. economy along with several stakeholders in materials manufacturing, such as the Northeast Midwest Coalition, the National Association of State Energy Officials and the American Council for an Energy-Efficient Economy.

The member organizations of AMMEX have been partners with the Department of Energy's Industrial Technology Program since its inception. ITP is a true public-private partnership. DOE and materials manufacturers jointly fund cutting-edge research that addresses the needs of the Nation and materials manufacturers. All

projects have the shared goals of reducing energy consumption, reducing environmental impact and increasing competitive advantage of U.S. materials manufacturers.

By reducing the energy intensity of materials manufacturers and accelerating the delivery of new technology, ITP has helped make U.S. materials manufacturers more competitive in global markets, preserving and creating good-paying jobs in the process. The program is unique because we select only projects with "dual benefits"—a public benefit such as reduced emissions or petroleum use, justifying the federal funding; and an industry benefit such as a more efficient process, justifying the industrial funding.



By reviewing the chart above, one can see that materials manufacturers have greatly reduced energy use since 1990 because of their co-investment with DOE. Materials manufacturers have become very efficient for the processes they operate today and in order to make the type of gains in the future that have been seen since 1990, *new process development is required. Research and development efforts into new processes will open up large energy savings and carbon dioxide mitigation opportunities.*

AMMEX fully supports the Bill's focus on the development and deployment of new process technologies.

U.S. materials manufacturing continues to face challenges resulting from increased cost and decreased availability of traditional energy supply resources. These challenges have stimulated innovation in the materials manufacturing sector in order to create significant energy improvements and to diversify the energy supplies. While the innovations of the past have brought the materials manufacturing sector a long way, the sector cannot go further without new innovations. In order to do this, the materials manufacturing processes must be transformed, i.e., new processes and new innovations must be developed which will use much less energy and which will be able to utilize diverse forms of energy.

To accomplish these goals, the Federal Government and industry will need to embark upon a co-funded effort to broaden and accelerate inherently high-risk research, development, and deployment of new materials manufacturing processes that utilize diverse energy sources. This effort will also allow the materials manufacturing sector to lessen dependence on natural gas and oil resources and conventional electricity sources—thus benefiting consumers through contribution to a stable energy market.

Dramatic increases in industrial energy prices and growing global competition threaten the vitality and the future of U.S. materials manufacturing. Unless this trend is reversed, American manufacturing jobs in these key industries will increasingly move overseas. Manufacturers have responded to such challenges in the past

by applying the power of innovation to create new products and processes that sustain the foundation of the U.S. economy.

Secondarily, proposed changes within the DOE Industrial Technologies Program are also supported by AMMEX members:

- The broadening of the stakeholder group to include data centers and food processors is important as it may offer opportunities for incremental energy savings in the near-term
- The establishment of a cross-cutting portfolio that includes lightweight materials research, inclusive of those made by AMMEX members [e.g., advanced high strength steels, aluminum, metal castings, composites, glasses and others]
- The establishment of a cross-cutting portfolio that includes nano-manufacturing so long as it recognizes that materials made by AMMEX members are in fact nano-materials.

AMMEX remains concerned with the recent funding levels of ITP. In the years 1990–96 the program consisted largely of "industry specific funding" and averaged $100 million annually. Both the House and Senate appropriations bills would increase the total funding for ITP to $58 million. However, this amount remains far less than historical levels for the program, and far less than what is necessary to go after the sizable benefits associated with new process development. As the Committee further examines ITP, we request your assistance in:

- Increasing funding for ITP to at least $125 million.
- Retaining a balanced portfolio of research from the point of view of research application, i.e., that the portfolio includes both industry specific R&D in at least aluminum, chemicals, forest products, glass, metal casting and steel; and cross-cutting research.
- Retaining a balanced portfolio of research from the point of view of research impact, i.e., that 50 percent or more of the funding go to research into new process development [where the energy savings potential in industry is highest].

We would be happy to provide input to the Committee detailing the above points.

The U.S. also faces serious shortages in the science and engineering manpower that is needed to keep America's competitive edge in world markets through technology innovation and timely application. From the President's State of the Union Address to the *Protecting America's Competitive Edge Act* in Congress, the Nation is awakening to the need for a re-energizing of our commitment to technology education.

We have proposed to the Committee an effort to both rebuild America's materials manufacturing industries and revitalize our science and engineering institutions. It builds a new public-private partnership to support these twin goals. It will ensure that the U.S. materials manufacturing industry will remain vital and competitive through:

- Accelerating technology innovation to ensure the future competitiveness, resource efficiency and sustainability of our domestic materials manufacturing industry;
- Building the vital intellectual infrastructure, in American universities and laboratories, that will work in partnership with the materials manufacturing industry; and
- Maintaining the healthy American materials manufacturing base, which is vital to our national security.

Our proposal would accomplish these goals by:

- Establishing an industry co-funded research program that develops the innovative, breakthrough technologies that will sustain our competitiveness, while realizing national goals in energy and resource efficiency;
- Supporting materials manufacturing research programs at universities and research institutions across the country;
- Establishing a program that accelerates the adoption of technology innovation in the marketplace; and
- Assisting industrial facilities in identifying opportunities for greater energy efficiency, improved product quality and reduced environmental impacts.

On behalf of my partners in the AMMEX coalition, I thank you for the opportunity to appear before you today. We look forward to continuing to work with the Committee as you move forward on potential legislation.

BIOGRAPHY FOR LAWRENCE W. KAVANAGH

Mr. Kavanagh is responsible for AISI's activities concerning how steel is made today, how steel will be made in the future and how steel competes with other materials, and alignment of these tasks with AISI's overall goal of making steel the "material of choice." These include oversight of a) various manufacturing committees whose main goals are extensive operations benchmarking and the development and sharing of best practices, problem-solving and the identification of "technical needs" which would lower cost, advance safety, etc.; b) collaborative research and development among steel makers, suppliers, universities and labs designed to improve process control, performance and/or climinate technical barriers to market growth; c) programs to evaluate how steel performs vs. competing materials in order to assess where we have advantages/disadvantages with the goal of developing projects to widen our lead/narrow the gap as appropriate.

Prior to joining AISI in 1991, Mr. Kavanagh was General Manager, Engineering for Davy International's Automation Services Division [now doing business as Kvaerner and VAI]. In this capacity, Mr. Kavanagh was responsible for all phases of project execution—estimating, sales support, specification, engineering, project management, field start-up and acceptance testing for Davy's steel plant equipment installations around the world.

Mr. Kavanagh is a graduate of the University of Notre Dame [BSEE] and the 'mini-MBA' program at George Mason University. He is an active/former board member of various community service and research organizations.

Chairman LAMPSON. You are welcome. Thank you.

Mr. Verdict.

STATEMENT OF MR. MALCOLM E. VERDICT, ASSOCIATE DIRECTOR, ENERGY SYSTEMS LABORATORY, TEXAS A&M ENGINEERING PROGRAM, TEXAS ENGINEERING EXPERIMENT STATION

Mr. VERDICT. Chairman Lampson, Ranking Member Inglis, and Members of the House Subcommittee on Energy and Environment, I would like to thank you for this opportunity to testify on the U.S. Department of Energy's Industrial Assessment Centers, which provides technical assistance for small and medium-sized manufacturers and industrial facilities, utilizing university, faculty, and students from 26 universities around the Nation.

My name is Malcolm Verdict, and I appear before you this afternoon representing the Texas Engineering Experiment Station located in College Station, Texas. The Texas Engineering Experiment Station, known as TEES, is a statewide engineering research agency of the State of Texas. We are located on the Texas A&M campus where our engineering programs educate over 9,000 undergraduate and graduate engineering students every year.

We have run an industrial assessment center for the past 21 years and have seen first-hand the tremendous positive benefits it has had on industry and our young engineering students. I would like to address three main points this afternoon for the Committee. First, the many valuable contributions of the program, some of its current limitations, and recommendations to build upon its past successes.

First, the Industrial Assessment Centers (IAC) have made significant, long-term contributions to industry and to the education of participating engineering students. The program is very unique within DOE since it directly involves engineering students in close

partnership with industry. Engineering faculty and undergraduate students conduct on-site assessments. These are typically one-day visits and provide written recommendations to the owners and operators for saving energy and reducing pollution.

The many valuable benefits from this program include; one, providing cost-effective recommendations for reducing energy and pollution and increasing their productivity. Two, enabling small and medium-sized manufacturers in industry to compete in a highly-competitive global economy. Three, providing real world energy-related job experience for engineering students, and finally, creating valuable new industrial partnerships for the participating universities.

Some significant IAC Program successes include over 13,500 assessments have been made involving over 3,000 engineering students. Participating facilities save on average $5,500 per year with a payback often less than 12 months. U.S. companies have saved more than 700 million in energy and productivity gains according to the Department of Energy. In fact, enough energy has been saved to power the city of Boston, Massachusetts. And more than 1.5 million industrial jobs have been created through this program.

Mr. Chairman, giving you a good Texas example, the Texas Tile Manufacturing Company in Houston, Texas, is but one great example of the many valuable benefits with DOE Program provides its clients. With high energy prices, inefficient energy practices, increased foreign competition, and located within the EPA-designated, non-attainment area, this manufacturer was an ideal IAC Program candidate. In 2006, our Texas A&M team conducted an on-site assessment and identified over $250,000 in energy savings and enabled the firm to find an additional $100,000 in savings while implementing all of the team's recommendations.

Equally important, the energy savings are helping the Houston region meet its EPA clean air requirements. It bears repeating that the IAC Program helps educate students with highly-critical engineering skills needed in the Nation's next engineering workforce. Most IAC graduates go on to energy-related jobs in industry, national laboratories, U.S. Department of Energy, and in engineering teaching careers. In fact, a University of Tennessee study on the careers of IAC graduates found that 73 percent of those surveyed held a position at one time related to energy efficiency, and an amazing 58 percent of these graduates have remained in energy efficiency as a part of their job description throughout their career.

While the Industrial Assessment Centers have made significant, long-term contributions to industry, it is not achieving its full potential in our opinion. Some examples of program limitations include program management continuity and resources have been very inconsistent, especially in the last three years. Participation by only 26 universities leaves some areas of the Nation underserved. The program fails to address other valuable target audiences. The program does not include an energy research component, which limits its opportunities for university, facility, and student educational activities. And there is no clear charter to leverage federal dollars.

Finally, program success metrics do not incorporate the value of training our nation's future energy engineers. We believe that the

IAC Program, which is already a very good program, could be enhanced. Some suggestions for improvement include recreating an IAC-like program advisory group within the Office of Industrial Program, expanding the target audience to include medium-sized commercial buildings and federal facilities to be run by other programs within DOE. Expanding the geographic coverage by authorizing centers in all 50 states and territories where practical, increasing the educational effectiveness through applied research activities such as regularly involving IAC students as summer interns at national laboratories and in other DOE-funded industrial and commercial building research activities. And finally, authorizing adequate resources to implement an expanded IAC Program.

Mr. Chairman, I was asked to comment on the Subcommittee draft legislation entitled *Industrial Energy Efficiency Act for 2007.* This draft already addresses many of the items mentioned in my oral and written testimony. We applaud your efforts to expand upon this very valuable program and to broaden its impact.

In conclusion, the IACs have been highly successful at helping reduce industrial energy efficiencies, pollution, and providing cost savings while providing critical education to the Nation's engineering students. Congress showed much forethought and wisdom in creating this program, and the concept is still very relevant today as our nation faces even greater energy environmental challenges. In fact, the IAC Program is a perfect trifecta energy environment and education in my opinion.

After 32 years of success now is the time for improving this great program to help meet tomorrow's energy needs and train the next generation of energy engineers.

Mr. Chairman and distinguished members, again, I thank you for the opportunity to appear her this afternoon and point out the importance of the IAC Program to our nation's energy future and to share our ideas to increase its effectiveness.

This concludes my remarks, and I am happy to respond to any questions the Members may have.

[The prepared statement of Mr. Verdict follows:]

PREPARED STATEMENT OF MALCOLM E. VERDICT

Chairman Lampson, Ranking Member Englis, and Distinguished Members of the House Subcommittee on Energy and Environment:

I thank you for the opportunity to testify on the U.S. Department of Energy's (DOE) Industrial Assessment Centers (IACs), which provide technical assistance for small and medium-sized manufacturers and industrial facilities utilizing university faculty and students. My name is Malcolm Verdict and I appear before you today representing the Texas Engineering Experiment Station in College Station, Texas.

The Texas Engineering Experiment Station (TEES), within the Texas A&M Engineering Program, is a statewide engineering research agency of the State of Texas, serving industry in our region while educating over 9,000 undergraduate and graduate engineering students annually. TEES has a long history of partnering with industries, communities, and other academic institutions to provide practical solutions that help improve the quality of life, promote clean economic development, and enhance the Nation's educational systems. We also promote new technology education and investigate problems in energy, renewables and the environment.

Texas A&M Engineering's strong commitment to energy efficiency is voiced at all levels, especially at the top. The Vice Chancellor for Engineering, Dr. G. Kemble Bennett, recently remarked that efficient energy use must be a national priority and that university educated energy engineers have a major role to play. Programs like the IAC produce highly qualified energy engineers with a conservation mindset who

can hit the ground running to save energy for the Nation's manufacturers and others.

Congress showed much forethought and wisdom in creating this program in 1976 after the first oil supply disruption, which some of us in this room can still vividly remember. The IAC concept embraced at that time is still relevant today as the Nation faces even greater energy and environmental challenges. The good news is that with today's clean energy technologies, combined with the expertise and dedication of the graduate engineers from the IAC program, our nation is even better equipped to meet these challenges than when this program first began. The IACs have been a critical component in improving energy efficiencies and providing cost savings to thousands of industrial firms, while at the same time, training hundreds of new, dedicated energy efficiency experts. In fact, the IAC program is a perfect *trifecta*—Energy, Environment and Education.

My testimony draws on my personal experience in energy management programs and policy since 1978 at the State and federal levels, the 21 years of field experience of the Texas A&M IAC Center Director, Dr. Warren Heffington, and the 14 years of experience of Mr. Jim Eggebrecht as our IAC Assistant Director. As you can see, our personnel represent significant experience and knowledge in this area and are strong advocates for its importance. I will address three key points this afternoon:

- The many valuable contributions that IACs have made to industry and to the education of one of America's most valuable natural resources—engineering students,
- Current limitations to the IAC program, and
- Recommendations to build upon the successes of the IAC program to help meet the energy and environmental needs of industrial facilities and others during the 21st century.

Industrial Assessment Centers within the U.S. Department of Energy's (DOE) Industrial Technologies Program (ITP) have made significant, long-term contributions to industry and to the education of participating engineering students since its inception in 1976.

The IAC program is unique within DOE as it directly involves engineering students in a significant manner in partnership with industry. Using standardized procedures, engineering faculty and undergraduate and graduate students from accredited universities provide on-site assessments and written recommendations for energy saving and pollution prevention opportunities. This small but highly effective DOE program conducts 500–600 energy assessments each year and provides educational opportunities for 250 new energy-efficiency engineers.

The many valuable benefits to industry and to the participating IAC universities include:

- Providing objective recommendations for reducing energy and pollution and increasing industrial productivity, using the latest technologies and techniques,
- Enabling small and medium-size manufacturers and industry to compete in a highly competitive global economy,
- Facilitating real-world experience for students analyzing industrial processes who are highly sought after upon graduation, and
- Creating valuable new industrial partnerships for participating universities in their energy engineering programs.

According to DOE, 38 different universities have participated in the IAC program since its inception and 26 are currently participating. The program name was changed from the original Energy Analysis and Diagnostic Centers (EADCs) to the current name to reflect its broader mission. The DOE field manager, Rutgers University, maintains a wealth of program and applied energy conservation technology information available online in a searchable database by technology, location, paybacks, and types of participating facilities (*www.Iac.rutgers.edu*).

Illustrative examples of notable IAC program successes include [Source DOE website]:

- 13,550 assessments have been conducted as of mid-September 2007.
- Participating facilities have saved $55,000 per year on average. Payback on implementation averages only 12 months, and the savings keep adding up, year after year.
- Texas A&M recommendations have resulted in local manufacturers spending over $21 million to implement projects saving $26 million annually.

- U.S. companies have saved more than $700 million through efficiency and productivity improvements.
- Enough energy has been saved to power the city of Boston, MA for one year.
- More than 1.5 million industry jobs have been created and maintained in the United States.

The Texas A&M Industrial Assessment Center has performed over 500 assessments in companies such as bakeries, print shops, machine shops, light manufacturing, and chemical, petroleum and wood product industries. The Texas Tile Manufacturing Company in Houston, Texas is a good, recent example of the many benefits this program provides its clients. With high energy prices, inefficient energy practices, increased foreign competition and a location within an EPA-designated non-attainment area, this vinyl floor manufacturer was a prime IAC candidate.

In 2006, a team from the Texas A&M Industrial Assessment Center identified over $250,000 in energy savings and enabled the firm to find an additional $100,000 in savings while implementing the team's recommendations. In all, the majority of recommendations were implemented within six months of the Texas A&M visit. The remainder is scheduled for completion this year. Equally important, the energy savings will reduce critical air emissions and help Houston meet the EPA Clean Air standards.

Illustrative examples of the significant program benefits to engineering students include:

- Approximately 3,000 students nationwide have participated in the program with over 200 from Texas A&M University and Prairie View A&M University.
- Real-world engineering experience is provided students in an industrial setting.
- Long-term energy-related careers are frequently launched upon graduation.

It bears repeating that the IAC program educates students with highly critical engineering skills needed in the Nation's next engineering workforce. Participating students have done remarkably well after graduation in helping solve our nation's energy problems. In fact, the program produces some of the best energy-educated engineers in the world. Most IAC graduates go on to energy-related jobs in industry, national laboratories, U.S. DOE, and engineering teaching careers. One of A&M's successful graduates is now the Director of the Industrial Assessment Center at the University of Dayton in Ohio. And, our assistant director, Jim Eggebrecht was an IAC student engineer as well. A University of Tennessee study on the careers of IAC graduates found 73 percent of those surveyed held a position at one time related to energy-efficiency and 58 percent have remained in energy efficiency throughout their career. (B. Tonn & J. Peretz, Univ. of Tennessee, 2002)

These are just a few examples demonstrating how IACs successfully help industry save energy and money, while educating students. The program has constantly received high praise from assessment recipients and others familiar with its impact. As noted recently by one senior former DOE official, the IAC program was one of the most successful he had seen in his 24-year career dealing with energy efficiency at the Department.

Although the Industrial Assessment Centers have made significant, long-term contributions to industry by reducing energy use, pollution and energy costs, and providing critical energy engineering skills, it has not achieved its full potential.

Program limitations include:

- Program management continuity and resources have been inconsistent.
- Participation of only 26 universities leaves some areas of the Nation underserved.
- The program fails to address other viable target audiences such as medium-size commercial buildings and federal buildings and industrial processes.
- The program does not include an energy research component, which limits opportunities for university faculty and student educational activities.
- There is no clear charter to leverage resources through cost-sharing for assessments and for partnering with others.
- The program does not require the distribution of information on financing resources and local engineering expertise required to implement more complex recommendations.

- Program success metrics do not incorporate the importance of the intrinsic, long-term value of training our nation's future energy engineers.

Although it has been very successful, the IAC Program is not achieving its full potential. Having been around 32 years, it has naturally gone through numerous reorganizations and managers within DOE. Within the last 10 years, the original IAC program managers have all retired and new internal champions have not emerged. Also, no official mechanism exists for external feedback on the IAC program.

The small number of participating universities leaves some areas of the Nation under-served. Existing resources do not come close to meeting demand. For example within the first four weeks, the Texas A&M IAC had applications for all its available assessment slots for the coming year. Also, there is no mechanism for leveraging IAC funds with other resources such as utility efficiency and State energy programs which also target industrial end users.

The industrial sector has proven to be a wise choice for targeting energy inefficiencies. The IAC model would also work quite well for commercial building owners. Buildings represent over 34 percent of our electricity use in the U.S. [E.IA. 2004] and most buildings need upgrades or operational improvements. Mid-size buildings [25–50,000 square feet] are good candidates for IAC-like assessments. Likewise, process energy consumption in the federal sector is over seven percent of the energy use in federal facilities [Alliance to Save Energy, *Leadership by Example*]. The ITP program has no charter to assist the Federal Energy Management Program even though expertise resides in the Industrial Technologies Program and the IACs.

The demand for motivated, skilled energy engineers has never been greater. The one DOE mechanism designed to increase the educational opportunities is very limited in its approach. The program does not have an educational charter beyond student participation in industry assessments which restricts valuable opportunities. Faculty and students could greatly benefit from participating in industrial research already funded by U.S. DOE. Internships are also excellent programs for students and industry but are rarely provided.

In addition, the usefulness of the assessment reports is somewhat limited as the focus is primarily on the energy efficiency recommendations. Adding a program requirement of providing other implementation information such as qualified engineering firms, State and utility industrial programs and financial resources would help smaller firms with limited staff.

The IAC program effectiveness could be enhanced by improving program continuity, expanding the target audiences and geographic coverage, increasing the educational value and leveraging federal program dollars.

Based on the limitations described previously, the IAC program effectiveness could be improved by the following actions:

- Creating an IAC industry/university advisory group within the Office of Industrial Programs for enhancing program responsiveness and ensuring continuity,
- Expanding the target audience to include medium-size commercial buildings and federal facilities,
- Expanding the geographic coverage by authorizing centers in all 50 states and territories where practical and increasing field management resources,
- Providing an information clearinghouse on qualified engineering firms, utility programs and rebates, State energy office industrial programs and financial resources as part of the assessment reports,
- Increasing the educational effectiveness through applied research activities such as regularly involving IAC students as summer interns at national laboratories and involving IAC faculty and students in other DOE funded industrial and commercial building research initiatives, and
- Authorizing adequate resources to implement an expanded IAC scope.

We are aware of a draft Subcommittee bill entitled the *"Industrial Energy Efficiency Act of 2007,"* which addresses many of the items covered in this testimony. We applaud your efforts to improve upon the IAC program which has served our country extremely well.

In conclusion, the IACs have been highly successful at helping reduce industrial inefficiencies, pollution and providing cost savings while providing critical education to the Nation's engineering students. However, the program is not without its limitations. After 32 years of success, it is now time for improvement to meet tomorrow's energy needs. The current DOE program and the required information provided to industry should be expanded, student educational opportunities should be

increased, and the intrinsic, long-term value of the educational benefits should be more fully recognized.

Mr. Chairman and distinguished Members, I thank you again for the opportunity to highlight the importance of the IAC program to our nation's energy future and to share some ideas to increase its energy, environment and education impacts. I would be glad to respond to any questions you may have.

BIOGRAPHY FOR MALCOLM E. VERDICT

Mr. Verdict is Associate Director of the Energy Systems Laboratory, a division within the Texas Engineering Experiment Station and the Texas A&M University System. Mr. Verdict has over 29 years of energy management program and policy experience at the State and federal levels. He is currently project manager for numerous building commissioning projects in large public and private buildings, and works closely with the Laboratory team that created the innovative emissions reduction calculator for energy and renewables.

From 1992 to 2001, he was a senior program manager at the Alliance to Save Energy in Washington, DC and was responsible for their energy efficiency financing, Home Energy Rating, Federal Energy Productivity, Habitat for Humanity, and Energy Star Home initiatives. He worked closely with DOE to help develop the Presidential Executive Order 13123 "Greening the Government Through Efficient Energy" and drafted many of the Federal Agency energy management requirements in the *Energy Policy Act 2005*. He also served on DOE's Financial Advisory Subcommittee for the International Performance Measurement and Verification Protocol (IPMVP) and the Greening of the White House (1994) sustainability initiative. In 2004, he was appointed as the Texas State representative to the Western Governor's Energy Efficiency Task Force for Clean and Diversified Energy.

Prior to joining the Alliance in 2001, Malcolm was Deputy Director of the Texas State Energy Conservation Office where he helped create the award-winning $98 million LoanSTAR energy retrofit loan program. Still going strong today, LoanSTAR has saved Texas taxpayers over $215 million since 1990. Before entering the energy efficiency field in 1978, Malcolm was a commercial banker in Louisiana.

He holds a Bachelor of Science (BS) from the U.S. Air Force Academy in Colorado and a Masters in Business Administration (MBA) from Louisiana Tech University. He is a Certified Energy Manager (C.E.M.) and was selected the "2005 Energy Manager of the Year" by the Association of Energy Engineers. He holds a commercial pilots license and was a former Air Force fighter pilot in Vietnam.

DISCUSSION

Chairman LAMPSON. Thank you very much, Mr. Verdict. All of you. Good presentations. We appreciate you all.

I am going to yield the first five minutes to myself as Chairman, and we will begin our questioning process.

ITP FUNDING AND PAST ITP EFFICACY

I am going to ask a number of questions, if you will. To begin, I would like for all of you to comment very shortly so I can get through as much of this as I possibly can.

Over the past several years the funding for the ITP Program has been on a significant decline; $175 million in 2000, to $55 million in 2007. What has the trend done to the efficacy of the program, and what is the appropriate level of funding that we need to be putting into this bill?

If we just go down the line, if you don't mind.

Mr. MOORE. Let me start. I find it amazing that we are not even funding at the level that we were in the late 1990s, at the 175 million funding level. When you think about what our energy bill is, I think Paul may have mentioned it earlier, but let me just put it in perspective for Dow.

At an average price of $8 for natural gas, my fuel bill just to produce steam and power is $5 billion a year. I think that we are missing opportunities to drive that down for our manufacturing sector and impact our energy security for the United States by not bellying up to the table something in excess of $100 million just seems kind of silly.

Chairman LAMPSON. What is the right amount?

Mr. MOORE. I would say a good start is the $150 plus million that we had in the program in the 1990s, late 1990s.

Chairman LAMPSON. Thank you. Mr. Cicio.

Mr. CICIO. Thank you, Mr. Chairman. You need a significantly well-funded program like we talked about, like in the late 1990s to do the quality of research on projects on technologies that yield the best opportunity. Those are the high-risk, long-term, and expensive research projects, and with a shrinking budget you can't do those types of high-quality projects that make a big difference when they become reality. And that is probably one of the most significant answers to your question of what is the impact of reducing that funding. You cannot do projects that are of the scale and magnitude that really have the most significant payoffs.

Chairman LAMPSON. Mr. Kavanagh.

Mr. KAVANAGH. What he said. I mean, we—it is exactly right.

Chairman LAMPSON. He didn't give me an amount, though, and I got to go, I would go back to him.

Mr. KAVANAGH. To do projects of significance, and I am here advocating that we try to transform our industries, how we make steel a different way, make aluminum a different way. It takes, you know, in the '80s and '90s when this program was at the 125, 175 level, we were investigating. We had enough momentum when you put in what industry was matching to really do something and a lot of the processes we are using today came out of this. Since the program has been down now for six or seven years, we have been treading water trying to make due in these investments, and what we got is a gap. It normally takes eight to ten years to get something from the lab into the plant of significance, and we have got a six-year window that, you know, we are going to pay a price at some point in the future because we have not, you know, the pipeline is dry basically.

So that is the consequence.

Chairman LAMPSON. So what is the right amount to put in the bill?

Mr. KAVANAGH. The right amount to put in the bill is, I have my testimony 125, but I like the 175 number.

Chairman LAMPSON. You want to give me a number?

Mr. CICIO. Yes, sir. One seventy-five.

Chairman LAMPSON. Mr. Verdict, your turn.

Mr. VERDICT. Sir, I am not sure that I am authorized to give you a number, but I certainly like hearing some of the numbers that are being mentioned by some of my colleagues. I would like to give you some of the real world impacts that this tremendous reduction has recently.

Recently we have had some very highly-dedicated faculty for a number of years and all of these centers and some of the program leaders, and when you see us pulling the rug out from underneath

what we consider a very successful program and also reducing the funding, you see a great deal of disillusionment upon the faculty as well as the students. And even more importantly is that by not putting people in the field, we used to have 500 audits per year at the $7 million level, and that is down to 300 audits per year. What you really got is a lot of missed opportunities, and that is energy that is wasted if you are not there with another set of eyes helping these small and medium-sized firms.

ITP Research and Development Limitations

Chairman LAMPSON. What are some of the limitations in the current efficiency of the research and development of the ITP? Any comment on that, limitations? Other than money.

Mr. KAVANAGH. You mean how things are carried out or——

Chairman LAMPSON. Yes.

Mr. KAVANAGH. The way the program is structured and managed, you know, the mechanism for delivering funds to universities and matching them with industries, that has been in place for 20 years, and we have been in the program for 20 years, and it works. So our opinion is the structure and delivery mechanism is right. It is just the focus has to go back to new process development, and the dollars have to be there to support it.

Chairman LAMPSON. Are there any specific areas of research that could be enhanced or explored, maybe that would better serve the industrial sector?

Mr. KAVANAGH. Again, I will jump in. The six industries that are a part of AMMEX, steel, aluminum, glass, forest products, metal casting, and chemicals, have identified their priority research areas going forward to do this type of transformational work, and I would be happy to send that to you, Mr. Chairman.

Corporate Welfare Concerns

Chairman LAMPSON. Please. Okay. How do you address the concern of corporate welfare when discussing the Industrial Technologies Program and other private, public partnerships.

Mr. KAVANAGH. It is a very good question, but it is an easy one to answer. Again, speaking from our realm of experience within the AMMEX member industries, for there to be corporate welfare, corporations have to get the welfare. Okay. That doesn't happen in this program. The industries don't receive the money. They put money in. DOE puts money in. Industry puts money in, and the recipients are places like Texas A&M. Okay.

So the whole idea of corporate welfare as far as this program goes is a myth.

Chairman LAMPSON. But they do get the benefit, and there will be——

Mr. KAVANAGH. Yes, but they are co-investing. They are earning the benefit, aren't they?

Chairman LAMPSON. Yes, sir. Mr. Cicio.

Mr. CICIO. Mr. Chairman, the corporate welfare issue goes back to one of the points I had made earlier, that the breakthrough technology in the most important areas are too expensive for any one

company, even the size of companies like a Dow Chemical Company, to do all by themselves.

Again, the breakthrough technologies will be the technology of choice for a period of 20, 25, sometimes 30 years. You are talking about major breakthrough technology. One company does not have the money and the time and the risk tolerance to be able to do that all by itself.

ITP RETURN ON INVESTMENT

Chairman LAMPSON. Thank you. What kind of return on investment can your industries expect from projects conducted with the ITP Program? You all already said many of the numbers, but the match that you make, is it typically equal? What are some of the kinds of matches that you may know of?

Mr. KAVANAGH. The matches range in our industries for a third to half, depending on the type of research and the risk that is involved.

Chairman LAMPSON. And then some of the returns? Give me some examples of what kind of return.

Mr. KAVANAGH. Oh, the return goes to how good the projects you pick. So let me explain it this way. The mechanism that industry uses to decide what projects to propose and fund is very carefully done because you are investing company capital that could go into product development and any other part of the business. So when you select a research project, there has to be some probability of success.

Within the steel industry, we have over time developed some 60 different projects, and the level of successful commercialization of that technology is about one in four. Okay. That is pretty good for research, especially, we are still learning a lot from the three that don't actually result in a commercial process or technology.

So the return for industry as you pointed out before is you get the benefit of the technology. It is getting the technology to the plant floor, lowering your costs of operations, improving the quality of your product, and lowering the energy bill.

Chairman LAMPSON. And ultimately lowering the cost to the consumer, which we are all after. These are the kinds of things that I think our whole Committee exists for. The more money we invest and the kinds of programs that give us the kinds of returns that we are talking about here, the better off we as a nation are. We have always done that. We seem to have slipped some of late, but hopefully this and other ways will help us find a way to get back.

Both of you comment, and then I want to turn it over to the Ranking Member.

Mr. MOORE. I am just going to just make a brief comment, not so much because I am not really here to testify about the investment aspects but just a concept around DOE and ITP Program and what they can do around technology.

Today the technology exists to split water via electrolysis or some other means, produce hydrogen, use a gasification plant to take coal to syngas and with enough hydrogen cogeneration you can actually produce chemicals with no CO_2 emissions. Zero. None. Okay.

What we are missing today is the high enough efficiency in electrolyzing that water to make hydrogen, or some other mecha-

nism to do that in order to make that economically competitive on a global basis. Once we do that it means that you can use non-carbon source fuels like solar or photovoltaic or nuclear or the like and match them up with a coal-to-olefins technology and basically have a process that produces all the chemicals we rely on every day of our lives with no CO_2 emissions.

These are the kinds of things where the DOE has come to play and can come to play in helping fund some of these integrated efforts around fuel diversity, energy diversity, alternate fuels, and feedstock.

Chairman LAMPSON. Nicely stated. Thank you.

Mr. CICIO. Your question was about what kind of return, that these companies are looking at when they do cost sharing. And I am not an expert in this area, but based on what the companies have told me, that is not nomenclature that they use in their judgment in doing these R&D programs.

Even at cost sharing of 50 percent, these are risky. This is money that is an outlay that they currently have an alternative, some other alternative to do something with. Build a production facility, expand a product line, pay employees more, employee benefits. The rate of return is not really part of the decision-making and whether they invest in a DOE project like this or not. It is about are you going to make a commitment to your future by potentially having a winning research project that is going to have substantial benefits ten years from now.

So that type of discussion normally doesn't happen.

Chairman LAMPSON. Thank you very much.

Mr. Inglis.

NATURAL GAS PRICES

Mr. INGLIS. Thank you, Mr. Chairman. Mr. Cicio, I was struck by your reference to the price of natural gas, and that is a significant concern. I think you are right, that the more we use it for electrical generation, the more we drive the price up and the more the plastics industry, especially in places like South Carolina's fourth district, become imperiled.

DOW ENERGY EFFICIENCY EFFORTS

And, Mr. Moore, I was very interested in your comments about the incredible savings that Dow has found. I think you also found incredible savings in greenhouse gas emissions. Right? I mean, didn't I hear that the other night from your CEO about some incredible number?

Mr. MOORE. Actually, if you go back to 1990, largely as a result of our energy efficiency improvements, our actual greenhouse gases from 1990, through today are actually down more than 20 percent.

Mr. INGLIS. Yeah.

Mr. MOORE. All of those energy efficiency efforts.

Mr. INGLIS. Yeah.

Mr. MOORE. At the same time that we have grown our company substantially.

Mr. INGLIS. It is very impressive, so that is very encouraging.

ITP ENERGY SAVINGS

You reached significant savings. I think you said $4.5 billion in savings as a result of the energy efficiency that you have achieved. Right?

Mr. MOORE. Right.

Mr. INGLIS. So I guess some people would say, and perhaps this is what the Administration is saying, that Dow did it for very good reasons, and that is their citizens, your citizens of the world, and you are in this country, and you are also interested in making money, which is a wonderful thing. I am all for making money. I think profit is a great thing, and so $4.5 billion delivered to the bottom line is a pretty substantial incentive to a company to do this. And so some would say why have the Department of Energy help with that if Dow is going to get the benefit. Right?

Mr. MOORE. I think the important thing here is not so much the benefit that Dow is going to get from the ITP Program. It is the benefit that literally the thousands of others will get from it. One might wonder that, you know, I mentioned the Texas city example where Dow actually found benefit from ITP's Industrial Assessment Program, but just as important, if not more importantly, that learning, via the ITP Program, can now be leveraged across ten or 20,000 small and medium-sized manufacturers.

CHARGING INDUSTRY FOR ASSESSMENTS

Mr. INGLIS. Right. And as I understand it, the program has two parts. Right? I have just learned this from Elizabeth, but it has got two parts. The R&D and then it has got the assessment part of it. The R&D as currently used and in place seems to be a decent way of going, that the Department of Energy spends money, helps create the R&D, and develop new technology.

In the case of the assessment, why would the entity benefit if not paid, say on a contingency fee basis, to the DOE for the assessment? In other words, right now what you have, right, is the money, and Mr. Kavanagh, I differ with you about the definition of corporate welfare there. What you just described is a subsidized rate. It is like you and I have decided to go out to dinner tonight, we are going to split the bill, and it is either that we go to Charlie Palmer's or we go to Burrito Brothers. And if Elizabeth is going to pay, we are going to Charlie Palmer's. Even if I am putting some of the money in myself, right? Because I am going to get something out of it. So it is a subsidized rate.

So what I am wondering about is whether, if industry X out there is going to benefit from this assessment, why not have money flow back to DOE based on how much they saved to cause DOE to become a profit center. I am into profit. To have the DOE become a profit center for the government. We could actually maybe start paying for things that DOE does by what we collect from our customers that are served by the universities, they are achieving these savings. Is there a problem with that?

Mr. VERDICT. Sir, if I may attempt to answer that question. It is a wonderful concept, and I think it provides maybe the right motivation and practicality to be able to actually add a monitoring verification component to the Small Industrial Assessment Pro-

gram, and actually verify the savings like companies have to do that are in a shared saving, performance savings arrangement. You would probably drive the program costs out of existence. It barely survives on being able to do these simple walk-throughs and these quick returns.

So I think you would end up spending at least in the IAC Program as much money trying to verify the savings as the company would get back.

Mr. INGLIS. Well, I can see a problem. It would provide some employment for lawyers as well as scientists, however, which would be helpful as a lawyer, but I can see that as a challenge. In other words you have to set up some definition. You have to have a contract that sets up definitions about how much energy is being used now and when you are going to measure it, and therefore, how you are going to pay.

But I just wonder whether that would solve the Administration's concerns, which I assume are these things about corporate welfare, that you actually get a profit model going and truly have a very enlightened kind of partnership between government and industry. Right? Where government can actually benefit.

Mr. KAVANAGH. You have to get down to another level of detail. I don't really agree with your dinner analogy, and I will try to explain why. Within the ITP Program we pick projects that serve the government's goals as well as the industries' goals. We don't pick projects that only benefit industry. There has got to be some public good or benefit associated with success.

Mr. INGLIS. Well, there is always going to be public good in reducing energy consumption, because we are all concerned about energy security. So 100 percent of the projects would be for government good.

Mr. KAVANAGH. Well, that defeats the corporate welfare argument, doesn't it, because——

Mr. INGLIS. No.

Mr. KAVANAGH.—that justifies—should the DOE——

Mr. INGLIS. Because you could go——

Mr. KAVANAGH.—invest in projects for the public good?

Mr. INGLIS. Well, it doesn't necessarily because there are still winners and losers. If you have an unlimited budget, yeah, then you would have everyone in industry getting that benefit. But if you have only some, then you have some benefiting and others not, unless you have an infinite budget.

Mr. KAVANAGH. I agree with you there, and that is another important distinction. I can't speak for the Industrial Assessment Center side, but on the R&D side, the projects are not undertaken between the Department of Energy and one company. They are taken with a sector so the entire sector benefits, and that enhances the public good because it is replicating the technology throughout a part of the industry, and at the same time all of that sector is investing their own dollars as well. Okay.

So it is like you and I are going out to dinner, and we are both eating. It would be unfair if only I ate. Okay. So that is kind of the way the program is set up, and in fact, in some of the programs there is a repayment provision when you develop a technology that is commercially successful, okay, the companies that invested and

took the risk get a royalty-free use of it, just like the government, because it invested and took a risk. But if there is another company out there that was not an investor, okay, and the technology is commercially available, they have to pay a royalty to use it, and that royalty then flows back into the treasury to help repay the investment.

Now, that works, and it has been done, but you know, the time scale that we are talking about for that kind of dramatic process development takes 8 to 10 years. So it can get messy, which is why some projects have gone away from the repayment provision. But in the steel industry we use it, and we are in favor of it.

Mr. INGLIS. My time is well up, and we got a vote on, don't we?

Chairman LAMPSON. We do. We have a vote on. It is about seven minutes before the first one. There is a total of three. Five-minute votes will follow the 15-minute vote, and I would personally like to head back. If you all can be patient with us while we go and vote, we will come back.

Mr. INGLIS. Keep going here if you want to. I mean, if you have, how much time do you have?

Chairman LAMPSON. We have——

Mr. INGLIS. I am happy to yield back at this point.

Chairman LAMPSON. Only 25 people have voted, so I think we have got a little while, but let me, again, let me try to go through these somewhat quickly, and if you will keep your answers as succinctly as you possibly can, I would appreciate it. And let me go to Mr. Moore.

THE CHEMICAL INDUSTRY IN THE U.S.

DOW's CEO has said that you are investing heavily outside the United States. Is it too late to save the chemical industry in the United States?

Mr. MOORE. The simple answer is no, but let me add a little bit of background in-between.

Across the globe there have been 19 world scale crackers. These are big, ethylene conversion assets are used in integrated petrochemical complexes that have been announced to be built in the next decade. Not one of them is scheduled to be built in the U.S.

Then I go and I look at what Dow is doing. Dow is growing, and it is growing globally, but it is not growing significantly in the U.S. You can just look at our announced joint ventures with Saudi Arabia, with Saudi Aramco, or in Kuwait as an example. And we are growing there because they have reliable and competitive-priced fuel and feedstocks.

Now, chemical industry is not immediately at risk in the U.S. In fact, it is terribly important to Dow and to most other companies that operate here. In fact, 50 percent of Dow's assets are still in the U.S. They are terribly important. They are critical to our success.

It is terribly important for us to operate them both effectively and efficiently, and as I noted earlier, the importance of having a reliable and a secure and a competitive price, fuel and feedstock, is ultimately tied to our long-term success here in the U.S.

NEED FOR CONTROL SYSTEM IMPROVEMENTS

Chairman LAMPSON. Mr. Cicio, there are numerous energy-intensive industries, and the ITP does not have the resources to focus on all of them. So in your opinion where can ITP have the largest impact, the most bang for the buck?

Mr. CICIO. If I may, when I polled my companies, which is a broad cross section of these energy-intensive industries, it was pretty unanimous that there are plenty of areas that almost all would benefit from. And this gets to the issue of control system improvements, optimization of steam generation. See, lots of manufacturers use steam process heaters, heat recovery technology. These are basic types of technology that are used to route these industries.

So there is a lot of room for focus on those technologies that would benefit almost all of them.

Chairman LAMPSON. Thank you. Mr. Verdict, talk about IAC for just a second. Can you or do you have an estimate for an appropriate level of funding for the IAC Program to meet the demand that you describe?

Mr. VERDICT. I think at the minimum it needs to go back to where it was six or seven years ago, but I think there are additional opportunities, and if DOE would run this as a business model, then they would actually go out and sample the demand. I think they are going to find there is tremendous demand there for this product, and I think they are going to find willing partners even to do some cost sharing. I think you are going to find programs in many states where you have a very active and aggressive utility funded programs to also be willing to work with the assessment centers.

But we really had no guidance or no authorization to actually try to match up funding. But there is certainly, just indirectly the demand is far greater than what the current funding levels are.

Chairman LAMPSON. Well, like I said awhile ago, these are exactly the things that I think this Science Committee needs to show the leadership on if we at all possibly can. I put our country's resources into things that give us back significant return. Clearly what you have described here today and helped us understand is one of those areas.

Yes, sir.

Mr. VERDICT. If I could just add one thing on the educational benefit. We keep talking about the immediate payback, but once you train one of these energy engineers, and he stays out there, he is continually working and improving the processes which he is involved in. It is very, very hard to put a dollar benefit to that, but we say we were going to add 3,000 in the program over some 31 years. That is really not that many engineers. We really have got to train a lot more engineers than that, and they are out there with the first line of defense, with their computers and their meters, and they are helping save energy, and I think that is the right thing that some of our Government resources should be doing.

Chairman LAMPSON. I totally agree. Thank you and thank you all, and we are not going to come back after this vote, so we dismiss the panel. We thank you very, very much. Under the rules of

the Committee, the record will be held open for two weeks for Members to submit additional statements and any additional questions that they may have for the witnesses. You may be receiving some things from us. We thank you very much for your testimony today.

The meeting is adjourned.

[Whereupon, at 3:02 p.m., the Subcommittee was adjourned.]

Appendix:

Additional Material for the Record

SECTION-BY-SECTION: DISCUSSION DRAFT

Industrial Energy Efficiency Act of 2007

Section 1. Short Title

"The Industrial Energy Efficiency Act of 2007"

Section 2. Findings

The U.S. Industrial sector accounts for more energy use (32.2 percent) than the residential, commercial, or transportation sectors. Industries have almost reached optimal energy efficiencies and new innovations and technologies' research, development, and demonstration are necessary to increase energy efficiency and diversify energy and feedstock sources.

Section 3. Industrial Technologies Program

Establishes a program within the Department of Energy to work with energy-intensive industries, industry trade associations, and institutions of higher education to conduct cost-shared research, development, demonstration, and commercial application activities for new innovations and technologies to enhance industrial energy efficiency, environmental performance and economic competitiveness of U.S. industrial sector.

Defines the activities of the program to include: research to improve the quality and quantity of feedstocks recovered from waste streams; to develop alternative resources for use as industrial feedstocks; developing alternative energy sources to supply heat and power for energy-intensive industries.

Section 4. University-Based Industrial Research and Assessment Centers

Requires the Secretary to operate university-based Industrial Research and Assessment Centers to aid small and medium-sized manufacturers by identifying opportunities to optimize their energy efficiency and improve environmental performance, to serve as clearinghouses for technical assistance resources, and to train students to conduct energy assessments, and to conduct educational outreach in cooperation with other state-accredited technical training centers and community colleges.

Section 5. Authorization of Appropriations

Funding is authorized from FY 2009 through 2013 and has not yet been determined.

(Original Signature of Member)

110TH CONGRESS
1ST SESSION

H. R. _____

To support research and development of new industrial processes and technologies that optimize energy efficiency and environmental performance, utilize diverse sources of energy, and increase economic competitiveness.

IN THE HOUSE OF REPRESENTATIVES

Mr. LAMPSON introduced the following bill; which was referred to the Committee on _____

A BILL

To support research and development of new industrial processes and technologies that optimize energy efficiency and environmental performance, utilize diverse sources of energy, and increase economic competitiveness.

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

SECTION 1. SHORT TITLE.

This Act may be cited as the "Industrial Energy Efficiency Research and Development Act of 2007".

SEC. 2. FINDINGS.

The Congress finds the following:

1 (1) According to the Energy Information Ad-
2 ministration's 2006 Annual Energy Review, the in-
3 dustrial sector in 2006 accounted for more energy
4 use (32 percent) than the residential (21 percent),
5 commercial (18 percent), or transportation sector
6 (29 percent).
7 (2) The Department of Energy has dem-
8 onstrated the success of public-private partnerships
9 to research, develop, and deploy new energy efficient
10 technologies which reduce emissions and improve
11 manufacturing competitiveness.
12 (3) Innovations in manufacturing processes
13 may be translated into efficiency improvements in
14 buildings, transportation, and other economic sec-
15 tors.
16 (4) While past public-private partnerships have
17 resulted in significant energy efficiency improve-
18 ments in manufacturing processes, there is a need
19 for new technologies to achieve continual energy effi-
20 ciency improvements.
21 (5) Innovations made in the last few decades
22 assisted the United States in remaining competitive
23 in the global market. Continued innovation in the
24 areas of energy efficiency and feedstock diversifica-

1 tion are necessary to enable the United States to
2 maintain a competitive edge.
3 (6) The Department of Energy should continue
4 collaborative efforts with industry, particularly the
5 manufacturing sector, to broaden and accelerate the
6 high-risk research and development of new manufac-
7 turing processes that optimize energy efficiency and
8 utilize diverse sources of energy.
9 (7) These partnerships support critical research
10 and development capabilities at universities and
11 other research institutions while training engineers
12 in critical areas of energy systems and efficient in-
13 dustrial process technologies.

14 **SEC. 3. INDUSTRIAL TECHNOLOGIES PROGRAM.**

15 (a) IN GENERAL.—The Secretary of Energy (in this
16 Act referred to as the "Secretary") shall establish a pro-
17 gram, in cooperation with energy-intensive industries, in-
18 dustry trade associations representing such industries,
19 and institutions of higher education, to conduct research,
20 development, demonstration, and commercial application
21 activities with respect to new industrial and commercial
22 processes, technologies, and methods to—
23 (1) achieve—
24 (A) substantial improvements in energy ef-
25 ficiency; and

1 (B) environmental performance improve-
2 ments such as waste reduction, emissions reduc-
3 tions, and more efficient water use; and
4 (2) enhance the economic competitiveness of the
5 United States industrial sector.
6 (b) PROGRAM ACTIVITIES.—Research, development,
7 demonstration, and commercial application activities
8 under this section may include—
9 (1) activities to support the development and
10 use of technologies and processes that improve the
11 quality and quantity of feedstocks recovered or recy-
12 cled from process and waste streams;
13 (2) research to meet manufacturing feedstock
14 requirements with alternative resources;
15 (3) research to develop and demonstrate tech-
16 nologies and processes that utilize alternative energy
17 sources to supply heat, power, and new feedstocks
18 for energy-intensive industries;
19 (4) research to achieve energy efficiency in
20 steam, power, control system, and process heat tech-
21 nologies, and in other manufacturing processes; and
22 (5) a program to fund research, development,
23 and demonstration relating to inventors' and small
24 companies' technology proposals, based on energy

1 savings potential, commercial viability, and technical
2 merit.
3 (c) FINANCIAL ASSISTANCE.—Financial assistance
4 under this section may be in the form of grants, contracts,
5 and cooperative agreements, which shall be subject to cost
6 sharing as required under applicable Federal law.
7 (d) COMPETITIVE AWARDS.—All awards under this
8 section shall be made on a competitive, merit-reviewed
9 basis.
10 (e) COORDINATION AND NONDUPLICATION.—The
11 Secretary shall, coordinate efforts under this section with
12 other programs of the Department and other Federal
13 agencies, to avoid duplication of effort.

14 **SEC. 4. UNIVERSITY-BASED INDUSTRIAL RESEARCH AND**
15 **ASSESSMENT CENTERS.**

16 To strengthen the program under section 3, the Sec-
17 retary shall provide funding to university-based industrial
18 research and assessment centers, whose purpose shall
19 be—
20 (1) to identify opportunities for optimizing en-
21 ergy efficiency and environmental performance;
22 (2) to promote application of emerging concepts
23 and technologies in small and medium-sized manu-
24 facturers;

(3) to promote the research and development for usage of alternative energy sources to supply heat, power, and new feedstocks for energy intensive industries;

(4) to coordinate with appropriate State research offices, and provide a clearinghouse for industrial process and energy efficiency technical assistance resources; and

(5) to coordinate with State-accredited technical training centers and community colleges, while ensuring appropriate services to all regions of the United States.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary to carry out this Act $150,000,000 for each of the fiscal years 2009 through 2013.