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Subcommittee on Energy and Mineral Resources
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Statement of Robert D. Bessette
President, Council of Industrial Boiler Owners

INTRODUCTION

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the concern over rising energy costs. My name is Robert Bessette, and I am the President of the Council of Industrial Boiler Owners, better known as CIBO.

CIBO is a broad-based association of industrial boiler owners, architect-engineers, related equipment manufacturers, and university affiliates consisting of over 80 members representing 20 major industrial sectors. CIBO members have facilities located in every region and state of the country and have a representative distribution of almost every type boiler and fuel combination currently in operation. CIBO was formed in 1978 to promote the exchange of information within industry and between industry and government relating to energy and environmental equipment, technology, operations, policies, laws and regulations affecting industrial boilers. Since its formation, CIBO has taken an active interest and been very successful in the development of technically sound, reasonable, cost-effective energy and environmental regulations for industrial boilers.

RISING ENERGY COSTS

The cost of energy continues to make headlines, as the rising cost continues to negatively affect the U.S. economy and the American public. Recent economic data show that rising energy prices have slowed U.S. economic growth to a two-year low and there are signs that this will continue in the coming months.

Most of the public's attention is focused on the most direct impacts to the downstream consumer, such as the price of gasoline at the pump, home-heating costs and the cost of electricity. Less apparent – but equally as important – is the impact of rising energy costs on the industrial sector, which powers the nation's manufacturing plants. Some segments of industry such as chemicals and fertilizer suffer disproportionately because they rely on natural gas as both a feedstock and fuel. The industrial sector consumes 29% of natural gas consumed in the U.S. The cost of natural gas, measured in cost per million British thermal units (MMBtu), has increased to levels that are testing the economic capacity of industry to absorb and continue to do business in the U.S.

In the early-to mid-1990's the average price of natural gas in the U.S. was $2/MMBtu. In 2000, with new gas-fired utilities online, demand and cost grew. Today the average price hovers around $7/MMBtu, the highest in the world. Prices in Europe are near $5.50; in Japan and China near $4.50; in Indonesia less than $3.00; and in North Africa, Russia and the Middle East less than $1.00, making it increasingly difficult for U.S. businesses to compete in the global marketplace. Once short-term cost factors are accounted for, CIBO companies report costs of $10-12 MMBtu, or as high as $27 MMBtu. For industrial sources the cost of energy has increased dramatically as a percentage of overall costs of production. For one CIBO member company, energy costs in 2002 were 29% of its total production costs. By 2004, its energy costs had risen to 43% of production costs.

Other fuels are showing the same cost trend. The cost of coal has more than doubled in the last two years. Oil prices are around $50.00 a barrel and are expected to remain at that level for the near future. As U.S. Treasury Secretary John Snow noted a couple of weeks ago, the high cost of energy is "taking some wind out of the sails of the American economy."

In addition to companies with boilers serving industrial processes or generating steam for electricity production, CIBO members include public and private universities, which operate boilers to run campus facilities. The boiler on a college campus is what heats the dorm rooms and keeps the lights on in the classrooms. Universities are also directly impacted by rising energy costs, with students (or their parents) bearing the ultimate burden of the increase in the form of either program cuts or increased tuition. The experience of CIBO members reflects similar budget shortfalls at colleges across the nation.

Data from CIBO university members tell a more precise story. One coal-burning member that has recently bid its coal contract for FY 05/06 will experience an 86% increase in fuel costs -- an additional $3.3 million -- over FY 04/05, due to increased cost of coal.

Similarly, another university member burning coal and natural gas had a 60% increase in coal costs between April 2004 and April 2005. The school's older, cheaper pricing coal contracts expired in January 2005, resulting in a $3 million increase in FY 04/05 costs and a $6 million increase in the FY 05/06 cost of coal. Natural gas price increases have also affected this member. When its current natural gas contract expires on June 30, it expects a 33% increase with a $1 million dollar impact.

Yet another university member is currently finishing re-negotiations on a new coal contract that indicates an increase of nearly 25% in coal costs. The school is also moving towards indexed pricing in case of market changes either up or down, which could be much less favorable to the school as compared to its earlier fixed priced contracts. In addition to the fuel cost, it also faces higher transportation costs in the form of fuel surcharges from the railroad and the trucking firms. At this campus, natural gas and fuel oil are being avoided as long as possible, due to an increased cost for #2 fuel oil of 30% over

last year and for natural gas an increased cost of 20% over last year. In aggregate, fuel expenses increased nearly 20% year-to-date over last fiscal year, amounting to over $1.1M in additional expense. Overall, its energy costs (fuel and purchased electricity) typically run about two thirds of the entire budget of just over $18M. Administrators at this university decided to forego a tuition increase and turned instead to program cuts to meet budget.

This same hardship is experienced by yet another university member, whose overall purchased utilities budget expenses increased by 12% from FY03/04 to FY04/05, and will increase by another projected 26% for FY05/06. This is a 41% increase in two years.

Double-digit energy price increases and significant budget shortfalls are the norm for CIBO university members, and is indicative of what is happening around the country. Coupled with rising demand growth on many campuses, may colleges and universities are faced with the unfortunate decision to cut student programs or raise tuition.

Analysts attribute the cause of rising energy costs to many long-term and short-term factors. Often overlooked as a significant contributing factor to rising demand and costs is the failure of our national energy policy to account for environmental initiatives. This lack of coordination of policies directly affects the decisions of manufacturers regarding where to expand capacity and where to produce goods.

NEED FOR A COORDINATED ENERGY/ENVIRONMENTAL POLICY

The lack of an effective national energy policy that is coordinated with environmental policy results in environmental decisions that exacerbate the energy supply/demand imbalance. For example, a good national energy policy would promote the use of diverse energy sources, which would moderate interruptions and spikes in individual fuel supply availability and price. Such a policy would also provide a framework and incentives to promote the use of diverse energy sources and the full use of intrinsic U.S. energy resources, including our large reserves of coal. Because we do not have an effective national energy policy, individual fuel decisions are necessarily based on local short-term economics that exacerbate long-term problems.

In the Clean Air Act (CAA), Congress provided ways to ensure environmental protection and at the same time to meet energy demand by allowing dependence on the full range of the nation’s diverse energy sources. And for the first 25 years of its implementation, the Clean Air Act was interpreted, as intended, to allow industry to rely on all energy resources.

However, beginning in the mid-to-late 1990’s, environmental policy makers began to favor natural gas over other fossil fuels for its cleaner burning properties. All new power generation was built for natural gas. This policy of favoring natural gas over other fuels was incorporated into Clean Air Act rules applicable to the industrial sector as well. These rules are framed in terms of “fuel neutrality,” meaning that all sources would have to meet the same Clean Air Act emission standards regardless of the type of fuel they burn.

At first blush, this “fuel-neutral” approach looks appealing, because it accomplishes an environmental benefit and appears to level the playing field for all fuel sources. In reality, however, the approach is not at all neutral, because it severely punishes the use of energy sources other than natural gas. Under this approach, standards are set at a point that makes emissions reductions cost-effective for sources burning natural gas, but cost-prohibitive, or even in some cases, technically infeasible for sources burning other fuels. Under those circumstances, sources under pressure to comply with Clean Air Act standards will (if they can) switch to natural gas. Through these strong incentives for sources to switch fuel, environmental standard-setting has contributed to the increasing dependence on natural gas and the abandonment of coal and other fuels as reliable alternatives.

CIBO has raised these concerns often, before Congress, during various environmental rulemakings and through the courts. But because EPA has broad discretionary authority under the Clean Air Act, CIBO’s concerns for the most part had gone unaddressed. More recently, in light of soaring energy prices and an effort to address the need for a diverse energy supply, CIBO can report that policy makers appear to be taking into account the negative energy implications of this “fuel-neutral” approach.

Yet, our environmental policies still do not ensure that we can meet the growing energy demand. Some programs outright prohibit expanding the domestic supply of natural gas. Others more subtly discourage use of fuels other than natural gas. To the extent that any environmental program or policy undermines the nation’s parallel goal of using a variety of energy resources, this creates an unsustainable situation for the energy-dependent manufacturing base in an era of global competition.

Congress is asking the industrial base to increase production without additional energy. Industry has met this challenge to a large extent, by increasing efficiency. One of our members improved energy efficiency from 1994-2004 by 21%, and plans to achieve an additional 25% efficiency over the next 10 years. Similar efficiencies are being achieved and planned for the future by all our members.

But Congress must know that there is a limit to the ability of U.S. industry to absorb the energy price shock and still remain competitive. Once energy costs can no longer be absorbed through energy intensity adjustments, companies will seek to meet production demand in parts of the world where energy is cheaper. In a word, our inability to address this issue translates into jobs.

To take one example, in the plastics industry, the cost of natural gas tripled from 2000-2002, 130,000 jobs were eliminated and plastic product shipments declined by $14.7 billion. Similarly in the chemicals industry, the global chemical industry is expected to grow annually by 4% but the U.S. will not see any of that growth under present energy cost projections. Rather, U.S. companies now plan to meet export demand by developing capacity oversees. One CIBO member has already closed down non-competitive production facilities in 11 U.S. cities in NY, NJ, NH, MI, WV and TX. Overall, chemical companies closed 70 U.S. facilities in 2004 and plan closure of another 40. Over 120,000 jobs in the industry have been eliminated since 2002. For 80 years the U.S. maintained a trade surplus in chemicals, with a $20 billion surplus in 1997. Today the U.S.

has a trade deficit in chemicals. As demonstrated by just these two sectors, the crash course our policies are now on is eroding the manufacturing base in the U.S.

It should be noted that CIBO is not suggesting that we sacrifice environmental protection for energy security. Rather, these can and should be parallel goals, building on the remarkable environmental improvements over the last three decades. In the last 30 years since the adoption in 1972 of the Clean Air Act, emissions of the six criteria pollutants declined by 54%, even though there was a 187% increase in the gross domestic product, a 40% increase in the population and a 171% increase in miles traveled by vehicles. Air toxic emissions declined 30% from the years 1990 to 1999 alone.

As Congress considers options for addressing the impact of rising energy costs, environmental policies should be closely examined for opportunities to ensure that these policies support rather than hinder efforts to address energy cost concerns.

ENERGY EFFICIENCY & INDUSTRIAL BOILER EFFICIENCY

The average industrial boiler produces 100,000 pounds of steam per hour, with most boilers ranging in size from 10,000 to 1,200,000 pounds of steam per hour. Industrial boilers are tailored to meet the unique needs and constraints of widely varying industrial processes. The 70,000 industrial boilers in use today are as varied as the products and processes they serve.

Overall process or operational efficiency of a boiler is determined by the needs of the operation and the design of the powerhouse used to meet those needs. Likewise, energy efficiency for industrial boilers is a highly boiler-specific characteristic. Four factors are critical for assessing energy efficiency in the industrial powerhouse supplying energy to make products: (1) fuel type, (2) combustion system limitations, (3) equipment design, and (4) steam system operation requirements. The industrial facility's complexity, location, and objective are additional complicating factors.

Fuel characteristics determine the design of a particular unit. When fuels are switched, the interaction of the new fuel and the boiler often produces negative impacts on either the load or the boiler efficiency. These effects often are amplified because of limitations encountered in specific areas of the boiler where these adverse interactions occur. Changes in fuel, load, and operation can easily impact overall efficiency.

Unlike utility boilers, which operate solely to produce electricity, industrial boilers are more complex and designed for diverse facilities dedicated to a variety of different objectives. A boiler that serves a pulp and paper facility is very different from one that serves a university campus. Even at a single installation, application of steam from an industrial boiler can change dramatically with the seasons, when steam or hot water is used for heating, as well as from day-to-day and hour-to-hour, depending upon industrial activities and processes underway at a given moment and their demand for steam.

The possibility of such widely fluctuating demand for steam in most industrial processes means that the industrial boiler in the great majority of cases, does not operate steadily at maximum capacity. In general, the industrial boiler will have a much lower annual operating load or capacity factor than a typical utility boiler. This results in a lower efficiency.

In addition, because industrial boilers are smaller, operate at low capacity factors, and operate with a widely fluctuating load, environmental controls are less efficient, and less cost-effective than the same controls used on utility boilers. Further, some controls that can be applied effectively to utility units, which operate at steady state, cannot be readily applied to industrial boilers, which operate at a wide variety of loads. Importantly, combustion and add-on control technologies often negatively impact boiler system efficiency as well as system reliability.

These different requirements naturally create optimal efficiencies that vary widely from industry to industry and from facility to facility. The "one size fits all" approach often used by regulators to encourage increased energy efficiency and to maximize emission reductions of a given pollutant simply does not work because this approach does not consider the many specific factors that affect emissions reduction and energy efficiency at a given industrial facility.

Nevertheless, consideration of energy efficiency for industrial boilers often is simplified and categorized to a one-size-fits-all approach.

A sound energy/environmental policy would account for this wide variation in industrial boilers while encouraging these sources to utilize all available fuel sources and develop potential efficiencies. Two opportunities to achieve these goals are discussed below.

COMBINED HEAT AND POWER EFFICIENCY

Starting with fuels, industry accomplishes conversion by burning the fuel and releasing heat. An engine then converts heat energy into mechanical or electrical energy. If combustion occurs inside an engine, it converts heat energy to mechanical energy that can be used to drive a pump, fan, compressor, or electrical generator. Exhaust leaving the engine is hot. This exhaust contains over half of the BTUs released during initial combustion of the fuel and it can exceed 1000 oF. If none of the exhaust heat is used, the device is known as a simple cycle. If heat is recovered from the exhaust for the additional utilization, the combination of the engine and other devices is known as a cogeneration system or a combined cycle system.

The concept of combined heat and power provides further efficiency improvements over producing only electricity by using exhaust heat directly in the manufacturing process. Many manufacturing processes require heat at temperatures between 250oF and 700oF. The BTUs provided by the exhaust are at temperatures that match these temperature requirements well. Hence, by converting high temperature, high quality BTUs to mechanical or electrical energy and taking the lower temperature , lower quality BTUs to meet process temperature needs, the energy in fuel can be used most effectively and efficiently. With this combination, from 60% to 85% of the BTUs in the fuel can be recovered and used effectively.

Given that the use of CHP routinely achieves twice the efficiency of conventional boiler steam and electric utility generation, our national policies should encourage its use. Unfortunately, the diversity and complexity of industrial CHP facilities is

not understood, and environmental regulation can discourage its use. For example, how the useful energy value of process steam is calculated will either encourage or discourage an industrial source to make the capital investment to use CHP. If the value of the steam is calculated at less than the cost to produce it, few sources would invest in the technology. In the past, EPA has assigned sources a uniform useful value of steam thermal energy due to difficulty in measuring output of thermal energy at an industrial source. This uniform valuation may not represent the true value to an industrial facility of the thermal energy produced. More recently EPA has indicated it is considering allowing a more precise calculation of the value of thermal energy facility-by-facility.

CIBO strongly advocates a more accurate measure of thermal output because it will provide a significant incentive for investment in CHP units that use a very high percentage of their steam for useful thermal purposes. If Congress is truly committed to the investment in high-quality CHP installations, our environmental regulations should allow facilities that make that capital investment to accurately account, whenever possible, for the full value of the thermal energy they produce.

USE OF ALTERNATIVE FUELS SUCH AS BIOMASS AND WASTE COAL

Other environmental policies that can undermine energy policy involve criteria pollutant standards. Under the Clean Air Act, industrial sources must meet emissions standards for particulate matter. Depending on the emission reduction required by the standard, but also on the type of boiler, fuel, available control technology and other complex factors discussed above, a given unit may or may not be able to achieve the emission reduction cost-effectively. Some industrial boilers, particularly smaller units, may be able to fire non-fossil fuels such as biomass and other opportunity fuels, which tend to have higher particulate matter concentrations than other fuels. Those non-traditional fuels will likely provide an opportunity for marginal industrial facilities to remain in operation when compared to the current extremely high fossil fuel costs. In addition, use of non-traditional fuels can help alleviate the current energy supply/demand imbalance and help lower fuel costs. Clean Air Act particulate matter standards should not be set without accounting for the potential economic impact on smaller industrial units using opportunity fuels. Standards should not foreclose the continued operation of these small sources that provide economic stability for communities, assist in balancing the energy demand/supply imbalance, and provide other environmental benefits by fully utilizing waste products for energy production.

Another example involves the Clean Air Act standard for sulfur dioxide (SO_2). In some geographic regions of the country, some units have found it possible to extract the valuable energy from waste coal from abandoned refuse piles. This provides a significant net benefit to the environment. Burning coal refuse not only prevents potential acid mine drainage and reclaims abandoned mine land for productive use, it also makes beneficial use of the remaining energy value of the refuse through the production of electricity. These environmental benefits contribute to achieving national environmental goals set forth in the Resource Conservation and Recovery Act and other federal and state laws. Nevertheless, because of the complexities of the units having this capability, the units have a limited ability to reduce SO_2 emissions beyond their inherent SO_2 reduction capabilities compared to units burning traditional fuels.

CIBO believes that the environmental and energy supply benefits from burning coal refuse far outweigh the slight incremental SO_2 emission reduction that would be achieved by imposing an infeasible SO_2 standard on these sources. In fact, under these circumstances, the net environmental impact would be harm, because units that cannot feasibly meet a standard will switch fuels or close down rather than recovering the coal refuse resources, once again abandoning the coal refuse piles to create an environmental hazard.

SUMMARY AND CONCLUSION

To fully address the issue of rising fuel costs, Congress must take into account the impacts on the industrial sector. A substantial portion of the total energy budget in the nation is produced and consumed by industrial users. Operators of industrial boilers are major users of utility-generated power and are extremely vulnerable to energy price spikes and differentials against our global competitors. If our facilities become less efficient and less productive, then our ability to compete in the domestic and international arenas sharply declines.

Congress has the ability to adopt a course of action to address the energy supply/demand imbalance and devastating energy prices. Broad efforts including energy efficiency, fuel diversity, infrastructure improvements, and improved supply need to all be included in a comprehensive approach. As part of that effort, Congress should include measures to ensure that environmental policy coincides with energy policy. Clean Air Act standards, for example, should encourage industrial sources to invest in technologies that maximize energy efficiency and to use alternative energy resources including biomass and waste coal.

CIBO recommends that Congress adopt coordinated energy/environmental legislation that (1) addresses energy supply concerns by increasing the domestic supply of natural gas, facilitating the permitting of energy-related facilities within the U. S., and ensuring continued reliance on nuclear, renewables, coal and all other energy resources; (2) maintains and preserves fuel diversity including not only coal, but diversity within coal types; (3) supports the use of all alternate fuels including biomass, waste coal and other similar energy resources; (4) abandons “fuel neutrality” as a basis for setting environmental standards, which pushes sources to use natural gas to the exclusion of other available fuels; and (5) insists on consistency in energy and environmental policy, recognizing the distinctions between utility and industrial boilers and ensuring industrial sources are able to maximize energy efficiency and use the full range of energy resources.