

Testimony Submitted  
By

The National Insulation Association



Submitted To:

The U.S. House of Representatives  
Committee on Science, Space, and Technology  
Subcommittees on Oversight and Energy

**“Green Buildings–An Evaluation of  
Energy Savings Performance Contracts”**

June 27, 2013  
Rayburn House Office Building  
Room 2318

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Chairman Broun, Chairwoman Lummis and Ranking Members Maffei and Swalwell and Members of the Oversight and Energy Subcommittees, thank you for the opportunity to participate in today's hearing on the importance of Energy Service Performance Contracts (ESPC). My name is Ron King and I am the President Advisor and a Past President and of the National Insulation Association (NIA), the national trade association for the mechanical insulation industry. Our members, the vast majority of which are small businesses and represent over 120,000 employees, have over 800 corporate locations across the United States, and have more than a century-long track record of providing large and small scale long-term energy efficiency, cost savings, safety benefits, and emissions reductions at manufacturing facilities, power plants, refineries, hospitals, universities, and government buildings across the country.

I sit here today as a supporter of the Energy Service Performance Contracts being employed by federal agencies, and to express to you the value that mechanical insulation can provide to achieving energy efficiency and financial return objectives.

Thermal Insulation for piping, equipment, and other mechanical devices, known as mechanical insulation, is a proven energy efficiency and emission reduction technology that will improve personnel safety and reduce costs while also creating tens of thousands of jobs. On this point, it is important to highlight that 95% of the products utilized in the mechanical insulation industry are made in the United States.

Unfortunately, the benefits of mechanical insulation are often overlooked by all pipeline stakeholders—mechanical engineers, facility owners and managers, financial officers, etc.—during new construction, retrofitting, and maintenance opportunities. The benefits of this technology are further reduced because minimum requirements in new construction or retrofit applications are seldom exceeded and maintenance is not accomplished in a timely and proper manner.

The National Insulation Association estimates that implementing a comprehensive mechanical insulation maintenance program in the commercial and industrial market segments would lead to annual:

- energy savings of 1.22 quads of primary energy or \$3.8 billion
- return on investment range from 25%–100%
- CO<sub>2</sub> reductions of 105 million metric tons (MMTCO<sub>2</sub>)

Even with a relatively slow implementation rate, the numbers on a compounded basis over 10 or 20 years would yield tremendous savings—and this does not include the additional savings of going beyond minimum standards in new construction and or retrofit projects.

What do these numbers mean?

Energy savings of 1.22 quads per year equates to:

- 115 billion kWh of electricity, enough to power 10.8 million households (9.4% of U.S. households) for a year. This is the equivalent of annual output from 26,300 wind turbines
- 207 million barrels of oil, enough to fill about 103 supertankers
- 1,220,000,000,000,000 Btus (1.22 quadrillion Btus) of primary energy—about 1.2% of total U.S. annual consumption or 4.5 days of energy consumption for the entire United States

105 MMTCO<sub>2</sub> of CO<sub>2</sub> reductions per year equates to:

- adding 4.6 billion mature trees (10.6 million acres of new forest, an area the size of Maryland and Massachusetts combined)
- removing 19.2 million cars from the roads, about 7.6% of 254 million cars registered in the United States
- installing 1.8 billion compact florescent light bulbs, equivalent to 6 light bulbs for every man, woman, and child in the United States

Mechanical insulation maintenance is also an excellent example of American job opportunities that can be implemented within weeks or months instead of years. It can put tens of thousands of people to work immediately and retain existing jobs while contributing to the competitiveness of U.S. manufacturing, increasing the profitability of private and public businesses and facilities, reducing our country's dependence on foreign energy sources, and improving our environment. Equally important, the majority of insulation contractors who install and maintain mechanical insulation systems represent independent small businesses in every state. Mechanical insulation is a proven technology. It does not require research and development or engineering or design processes. Materials and skilled craft personnel are available now and are ready to be deployed. As I stated previously, 95% of the materials used are made in the United States with the balance primarily manufactured in Canada.

The total number of jobs created by implementing a comprehensive mechanical insulation maintenance program extends well beyond the direct and indirect jobs that are created. The employed workers will spend their earnings on a variety of products and services, which stimulates growth in other sectors. Furthermore, businesses will have additional dollars to spend on capital, expansion, or other projects as a result of reduced energy cost. The cycle of job creation is ongoing.

The American Council for an Energy-Efficient Economy recently released a white paper, "Energy Efficiency Job Creation: Real World Experiences" by Casey J. Bell (October 2012). It indicated that, on average, every \$1 million spent on energy efficiency in the construction sector supports

approximately 20 jobs. While we think that number is potentially low for mechanical insulation maintenance opportunities because of the magnitude of the return on investment, that estimate extrapolated to the potential of mechanical insulation maintenance would equate to roughly 153,000 total jobs—more than double the direct and indirect jobs.

In a single day, one worker can accomplish the following tasks, leading to significant savings:

- Insulating 45 linear feet of 8-in. high-pressure steam line equates to about \$13,600 per year, equivalent to removing 13 cars from the highways. Assuming the facility exists for 20 more years, the total savings from that one workday would be \$272,000.
- Insulating 70 linear feet of 3-in. low pressure steam line equates to over \$4,000 per year in energy savings, reducing CO<sub>2</sub> emissions as much as removing 3.7 cars from the highways. Assuming the facility exists for 20 more years, the total savings from that one workday would be \$80,000.

As you are well aware, buildings are responsible for 40% of U.S. energy demand and 40% of all greenhouse gas emissions, making efficiency gains in this area crucial if we are to markedly reduce America's energy consumption. The industrial sector is similar in energy efficiency opportunities. At the residential level, insulation is well publicized for its efficiency benefits. However, the same cannot be said in the commercial and industrial sectors, which together consume 2½ times more energy than homes, according to the Energy Information Administration. Mechanical insulation has the potential to slash the energy demand for the building and industrial sector.

By definition, an Energy Service Performance Contract is one that employs an Energy Service Company (ESCO), which is a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a typical 7 to 20 year time period.

“ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project. Typically, they offer the following services:

- develop, design, and arrange financing for energy efficiency projects;
- install and maintain the energy efficient equipment involved;
- measure, monitor, and verify the project's energy savings;
- assume the risk that the project will save the amount of energy guaranteed

These services are bundled into the project's cost and are repaid through the dollar savings generated”<sup>1</sup>

ESCO projects can be, and usually are, comprehensive and employ a wide array of cost-effective measures to achieve energy savings. These measures often include the high profile energy efficiency measures such as high efficiency lighting, high efficiency heating and air conditioning, efficient motors and variable speed drives, and centralized energy management systems. Mechanical insulation and potentially other less known energy efficiency initiatives may or may

not be included. Unfortunately, we have found that mechanical insulation is easily and often overlooked.

Mechanical insulation typically yields a return on investment ranging from a few months to less than 7 years. As an example: a mechanical insulation energy appraisal was conducted on a variety of State of Montana facilities located in and around Helena, Montana. The appraisal was a part of the Montana Mechanical Insulation Assessment Pilot Program (Pilot Program). The objective of the Pilot Program was to determine the energy, cost, and emission reduction opportunities available via the repair, replacement, and/or maintenance of mechanical insulation systems in Montana's state facilities. The assessment addressed mechanical rooms in 25 facilities pre-selected by State of Montana personnel based on the potential for energy savings.

Each of the facilities chosen for analysis had at least a few items that needed insulation. Overall, approximately 3,500 items were identified in the 56 mechanical rooms visited. Low pressure steam and domestic hot water systems were the primary systems included in the analysis. Estimated energy savings were approximately 6 billion BTUs per year. The resulting overall payback period was 4.1 years, with an annualized rate of return of 24%. These projected savings are primarily savings in natural gas usage and represent roughly 8% of the total natural gas consumption of the facilities analyzed. Associated reductions in CO<sub>2</sub> emissions are estimated at 300 metric tonnes per year. On a square foot of gross building area basis, the energy cost savings averaged \$0.043/sf.

"From the materials produced to construct buildings and the energy used to operate them, buildings consume vast amounts of resources and are responsible for nearly half of all greenhouse gas emissions. High-performance buildings, which address human, environmental, economic, and total societal impact, are the result of the application of the highest level design, construction, operation, and maintenance principles—a paradigm change for the built environment.

- Our homes, offices, schools, and other buildings consume 40% of the primary energy and 70% of the electricity in the U.S. annually.
- Buildings consume about 12% of the potable water in this country.
- The construction of buildings and their related infrastructure consume approximately 60% of all raw materials used in the U.S. economy.
- Buildings account for 39% of U.S. CO<sub>2</sub> emissions a year. This approximately equals the combined carbon emissions of Japan, France, and the United Kingdom.
- Americans spend about 90% of their time indoors.
- Poor indoor environmental quality is detrimental to the health of all Americans, especially our children and elderly."<sup>2</sup>

The use of Energy Service Performance Contracts by Federal agencies is an excellent means by which to achieve federal high performance building and energy efficiency objectives. These types of contracts have led the effort to verify—rather than estimate—energy savings. Holistic

metering of energy usage and the resulting savings is the key component for payment of the investment.

In addition, many Energy Service Performance Contracts also include estimates of ongoing maintenance cost, the need for any specialized employee training, identification of hazard materials, and a host of similar services.

Prescriptive measures like mechanical insulation are well suited to be an integral part of energy service contracts and the resulting holistic savings verification. They add value in achieving the projected energy savings, return on investment expectations, emission reduction, and achieving other high-performance objectives.

As an example, one of our members completed a mechanical insulation energy assessment of 4 different operating systems at the National Institute of Health in Bethesda, MD and determined that by insulating areas not previously insulated and where insulation was missing, the potential annual savings of \$400,000 with a simple payback period of 3.3 years and over 6 million pounds of CO<sub>2</sub> emission reduction was obtainable.

Independent of an Energy Service Performance Contract, the return on investment of implementing and maintaining a proper and timely mechanical insulation maintenance program is compelling and easy to implement without extensive engineering support or in many cases, any disruption of the work place.

Mechanical insulation opportunities can be easily identified, with potential energy savings and emissions reduction determined with proven DOE-utilized software technology. For facility owners and operators, the savings are swift and sustainable, and the return on investment from mechanical insulation in building applications is typically less than 4 years (and sometimes as little as 6 months).

NIA and its members are committed to working with Congress, the Department of Energy and other federal agencies, and key stakeholder groups on Energy Service Performance Contracts and other initiatives that will lead to greater energy efficiency nationwide.

We have formed alliances with engineering and other industry trade organizations and have offered to work with the Department of Energy and other agencies to bring together a coalition to help develop, implement, and provide mechanical insulation educational awareness programs established and funded in a partnership environment by industry and Congress.

We have included below a list of available resources that will provide additional information on the many benefits of mechanical insulation. All of these resources can be found directly or via links on the NIA website, [www.insulation.org](http://www.insulation.org).

- National Insulation Association, [www.insulation.org](http://www.insulation.org)

- National Institute of Building Sciences, Mechanical Insulation Design Guide (MIDG), [www.wbdg.org/midg](http://www.wbdg.org/midg)
- Midwest Insulation Contractors Association, National Commercial & Industrial Insulation Standards Manual, [www.micainsulation.org](http://www.micainsulation.org)
- E-Learning Modules—DOE National Training & Education Resource, [www.nerlearning.org](http://www.nerlearning.org),
- Simple Energy Calculators can be found at the Department of Energy's Industrial Technologies Program's Software Tools website, [www1.eere.energy.gov/industry/bestpractices/software.html](http://www1.eere.energy.gov/industry/bestpractices/software.html)

Thank you for the opportunity to submit testimony in support of a program that is critical to job creation, economic growth, energy savings, and emissions reductions.

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<sup>1</sup> National Association of Energy Service Companies (NAESCO), website ESCO Market Analysis, What is an ESCO?, [www.naesco.org/resources/esco.htm](http://www.naesco.org/resources/esco.htm)

<sup>2</sup> High Performance Building Congressional Caucus Coalition website, [www.hpbccc.org](http://www.hpbccc.org)