

# The National Academy of Science Recommendations: Frequently Asked Questions

*As Congress considers the most effective way to move America toward a more energy efficient, low-carbon future, the American Gas Association (AGA) strongly urges that it follow the recommendations of the National Academies, which found full-fuel-cycle measurement to be the most appropriate method to accurately capture energy consumption and environmental impact.*

*Setting appropriate efficiency standards and giving consumers accurate information are critical to creating the changes in energy use necessary for achieving the nation's goal of reducing greenhouse gas emissions and conserving precious energy resources. Supporting legislative implementation of the National Academy of Science (NAS) recommendations is the first step toward providing consumers with options and information needed to make smarter energy choices.*

*Below are frequently asked questions regarding the report and its recommendations.*

## **Who is the National Academy of Science?**

The National Academy of Science (NAS) was created in 1863 by President Lincoln to "investigate, examine, experiment, and report upon any subject of science or art" whenever called upon to do so by any department of the government. Since then, the nation's leaders have often turned to it for advice on the scientific and technological issues that frequently pervade policy decisions.

## **Why did NAS undertake this report?**

Section 1802 of the Energy Policy Act of 2005 required the Department of Energy (DOE) to commission a study by the highly esteemed, nonpartisan NAS on whether site-based (light switch or burner-tip) or source-based (well-head or mine-mouth) energy measurement is more appropriate for purposes of measuring energy efficiency.

As Congress looks to energy efficiency as a critical component in the solution to the nation's energy and environmental challenges, it is imperative that energy use is measured accurately to avoid a waste of energy resources and to ensure that we reduce greenhouse gas emissions in a cost-effective manner.

## **What are the benefits of measuring energy efficiency from the "source"?**

Source measurement of energy efficiency more accurately reflects the total environmental input associated with meeting our daily energy demands. This "full-fuel-cycle" efficiency takes into account the energy consumed and lost in production, transportation, distribution, and consumption of fuels. Current efficiency ratings consider only the energy consumption at the point of end-use. For example, under current DOE site-based rating methods an electric end-use product, such as a water heater, often will receive a higher efficiency rating than its natural gas counterpart despite consuming more total energy. This is because end-use measurement of efficiency ignores the fact that as much as 73 percent of the energy used to power that

electric water heater was already consumed in the production, generation, transmission and distribution of the power (i.e. before it reaches the end-use itself). A source energy analysis would reflect the energy efficiency of the full-fuel-cycle, instead of limiting the evaluation to what happens at the point of use.

Armed with this information and appliance efficiency ratings based on source measurement, consumers would be better positioned to make choices that conserve energy, reduce utility bills, and manage the carbon footprint of their home energy needs.

### **How does the DOE currently measure energy efficiency?**

DOE currently calculates appliance efficiency based solely on the energy consumed at the point of use. Site-based measurement of energy use does not account for energy lost in the production, generation and transportation of energy to the point of end use. Site measurement also fails to provide a basis for calculation of the potential carbon footprint of appliances and other impacts that can only be completely accounted for by considering the full-fuel-cycle – or source-based energy measurement.

In contrast, the EPA currently uses source energy as the basis for its energy efficiency rating systems, such as the ENERGY STAR™ performance rating for commercial buildings. EPA also has formal definitions of source energy on its website, as well as explanations of using it over other measurement approaches.

### **How could the NAS recommendations be implemented?**

As Congress considers how it will address climate and energy challenges, the NAS study recommending full-fuel-cycle energy efficiency measurements should be used to inform any legislation pertaining to efficiency standards. Public interest in understanding the environmental impact of energy use (including carbon emissions) is growing, and this study confirms that measuring efficiency from the source provides a more accurate, more comprehensive energy efficiency measurement.

DOE should also consider these recommendations as it reviews efficiency standards for appliances. DOE can neither calculate carbon footprint (which would be required as an addition to appliance labels under the current Waxman-Markey draft) nor regulate efficiency based on carbon footprint without full-fuel-cycle or source energy efficiency measurement.

Another implementation option is that DOE or EPA issues an executive order requiring that full-fuel-cycle measurements are put into effect and that appliances are labeled accordingly.

### **Why does the study use the term “extended site measurement?”**

‘Extended site measurement,’ as defined by the National Academies study committee and incorporated in its recommendations, is equivalent to ‘source energy measurement.’ In developing its recommendations, the study committee had to differentiate full-fuel-cycle efficiency, which includes fuels consumed in the energy extraction processes (such as by drilling and mining machinery), from the conventional definition of source energy, which only considers the fuel source under development. This “abbreviated” measurement falls short of full-fuel-cycle accounting but is a step in the right direction, because fuel extraction represents a small fraction of total fuel consumption.