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SUSTAINABLE ENERGY STUDY #12

Solar Hot Water Could Save California the Equivalent of 24 Percent of All Gas Use in Homes:

On April 23, 2007, Environment California Research & Policy Center - along with a coalition of policy makers, environmental groups and businesses - released a report on the potential of solar water heating technologies. The report summarizes the current state of solar water heating technologies and outlines the significant benefits of growing a more robust market for these systems.

It found that solar hot water could save California 1.2 billion therms of natural gas a year, the equivalent of 24 percent of all gas use in homes and equal to 5 percent of statewide gas consumption.

Furthermore, solar water heating could reduce global warming pollution by 6.8 million tons of CO2 per year. This is equivalent to the annual emissions from over one million cars, and represents 5 percent of the total reductions needed to meet the state's greenhouse gas emissions cap by 2020.

In addition, consumers can cut their energy bills by up to 50 percent by investing in solar water heating technology. Decreased demand for natural gas saves all ratepayers money: some studies have shown that a 5 percent reduction in demand could shave 25 to 35 percent off California's wholesale natural gas prices.

Accordingly, the report calls for an expansion of California's solar power market to include solar water heating, a rooftop technology that captures sunlight to reduce fossil fuel use in homes and businesses.

Meanwhile, a new piece of legislation is moving through the state Legislature. AB 1470 is seen as a companion to SB 1 (Murray) signed into law last year, the Million Solar Roofs bill that created incentives for solar electric panels funded through a small surcharge on electricity bills. AB 1470 would similarly create consumer incentives for solar water heating systems through a small surcharge on natural gas bills. The roof of a typical home or business could physically support both a solar electric system and a solar water heating system, thus saving on both electricity and natural gas bills.

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Solar Water Heating - How California Can Reduce Its Dependence on Natural Gas

Executive Summary

Solar hot water systems capture energy from the sun to heat water for homes and businesses, thereby displacing the use of natural gas, or in some cases electricity, with free and limitless solar energy. Solar hot water could save California 1.2 billion therms of natural gas a year, the equivalent of 24 percent of all gas use in homes. To prevent global warming pollution, reduce dependence on imported fuel, and ease the price of natural gas, California should act now by jumpstarting a main-stream market for solar hot water.

Solar hot water is a simple, age-old technology that is used around the world.

Solar collectors, usually placed on the roof of a home or business, absorb the sun's energy to heat water that is then stored in a water tank. The efficiency of the collectors can be as high as 87 percent, meaning very little solar energy is lost in the process.

Solar hot water systems in California reduce fuel usage for water heating, usually natural gas, by 75 percent or more in the buildings that employ them. A stronger market for solar hot water systems can reduce California's dependence on natural gas, bring down the price of gas for all consumers, and reduce global warming pollution.

Many countries are encouraging increased use of solar hot water technology. Worldwide installations grew 14 percent in 2005, led by China with almost 80 percent of today's world-wide market. On a per-person basis, Israel leads the way with 90 percent of all homes taking advantage of the technology. Worldwide, solar hot water capacity reached 88 gigawatts-thermal (GWth) in 2005, with 46 million houses equipped with systems.

The United States currently has 1.6 GWth of solar hot water capacity installed, or 1.8 percent of global capacity. Hawaii, with a strong re-bate program, installed almost half of the 9,000 new systems in the U.S. in 2006. California, Florida, and Arizona each installed about a thousand systems in the same year.

California could greatly increase its use of solar hot water, reducing the price of natural gas and the state's global warming impact.

Virtually any building with a need for hot water and a roof exposed to the sun can take advantage of solar hot water, but less than 1 percent of California buildings have systems installed today.

A study by KEMA-Xenergy, an energy consulting group, modeled the potential energy savings of various energy efficiency measures that could be utilized in California homes, including solar hot water. The study showed that solar hot water systems could save more natural gas than any other technology: 971 million therms per year in houses, apartments, and mobile homes across the state.

Another study by KEMA-Xenergy found that solar hot water could save more natural gas than any other efficiency technology in commercial buildings as well. California's commercial

buildings could save 219 million therms of natural gas a year by installing solar hot water systems.

Between the residential and commercial potential for solar hot water, California could save over a billion therms of natural gas, or 5.2 percent of all statewide consumption today.

A study by the American Council for an Energy-Efficient Economy (ACEEE) modeled the effects of natural gas savings in California, Oregon, and Washington on the price of the fuel. The report found that efficiency measures leading to a 5.1 percent reduction in natural gas consumption would be accompanied by a 27 and 37 percent reduction in the wholesale price of natural gas in the Northern and Southern California markets, respectively.

Solar hot water can reduce California's dependence on natural gas from outside the state. Currently California relies on imports for over 85 percent of its natural gas needs.

Taking full advantage of solar hot water in California would reduce the state's global warming pollution from water heating by 6.8 million metric tons of carbon dioxide-equivalent per year, as much as the annual emissions of over a million cars. The savings represent about 5 percent of the total reductions needed to meet the state's global warming pollution cap by 2020.

Inconsistent and poorly designed public policies have kept solar hot water from making a meaningful contribution to California's energy needs.

California has a long history with solar hot water. For example, in the late 1800s, before oil and gas became available in the West, more than one third of Pasadena residents had solar hot water systems.

The energy crisis of the 1970s renewed interest in solar hot water as a way to conserve fossil fuels, leading to tax breaks federally and in California. Without certification requirements, however, quality was inconsistent, and when energy prices dropped in the early 1980s, incentives were allowed to expire and the market collapsed.

Fortunately, the market for solar hot water did not collapse in every country, and the technology has continued to improve steadily. As a result, today's solar hot water systems run a net profit for system owners in less than 10 years, but upfront costs and lack of public awareness are barriers to widespread utilization.

Appropriate policies will allow California to take advantage of the vast benefits of solar hot water.

California should offer state rebates to reduce the upfront cost of solar hot water systems, enforce quality standards, and ultimately encourage economies of scale and a mainstream market. These rebates should be secured for a 10 year period to give the industry confidence to invest in production, research and development.

State and federal tax credits should be extended for 10 years to encourage investments in the industry and further reduce the upfront cost of solar hot water systems. California should encourage the installation of solar hot water systems in new homes, which reduces costs by up to 50 percent. At a minimum, all new homes should be “solar ready,” and new homebuyers should always be given the option of installing solar hot water in new homes.

All new government buildings, from the municipal to federal level, should install solar heating technologies to offset natural gas usage, save taxpayers money, and help meet targets for reducing global warming pollution.

California and the federal government should create training programs to help prepare Californians for the new “green collar” jobs that will grow out of the shift to clean energy technology.

California and the federal government should invest in educating the public about the benefits of solar hot water.

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The full text of the 21-page report "Solar Water Heating - How California Can Reduce Its Dependence on Natural Gas" can be found at:

http://www.environmentcalifornia.org/uploads/at/56/at563bKwmfrrtJI6fK19U_w/Solar-Water-Heating.pdf

The "Executive Summary" for this report can be found at:

<http://www.environmentcalifornia.org/reports/energy/energy-program-reports/solar-water-heating-how-california-can-reduce-its-dependence-on-natural-gas>

The news release accompanying this report can be found at:

<http://www.environmentcalifornia.org/newsroom/energy/energy-program-news/group-calls-for-more-solar-power>