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Starting the Energy Technology Revolution through Competition

Brief Analysis No. 666 by H. Sterling Burnett July 24, 2009

Energy use is the largest source of greenhouse gases released by human activities. CO_2 emissions from energy use — including transportation, electric power, heating and cooking — account for 82 percent of the country's total. In order to significantly reduce CO_2 emissions, Americans must change the way they use energy.

Dallas Headquarters:
12770 Coit Road, Suite 800
Dallas, TX 75251
972.386.6272
Fax: 972.386.0924
www.ncpa.org

Washington Office:
601 Pennsylvania Avenue NW,
Suite 900, South Building
Washington, DC 20004
202.220.3082
Fax: 202.220.3096

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U.S. energy consumption contributes to other problems. The demand for oil, for instance, outstrips the limited domestic supply, leaving the country dependent on sometimes hostile foreign powers. In addition, current energy use pollutes the air of many cities.

Reducing greenhouse gas emissions and air pollution, and increasing energy independence will require new sources of energy and new technologies.

Ineffective Government "Fixes." Through a variety of subsidies and mandates, the government has promoted alternative fuels — primarily corn-based ethanol for transportation use and renewable sources of electricity, primarily wind and solar power.

However, there is mounting evidence that corn-based ethanol actually increases net CO_2 emissions. In addition, it reduces fuel economy and causes a variety of other environmental harms. It will never be able to replace more than a fraction of America's motor fuel demand.

Other factors limit CO_2 savings from wind and solar power facilities. Wind and solar produce no CO_2 when generating electricity, but because they are intermittent, every kilowatt of potential power must be backed up by traditional power plants. These plants must operate on standby to regulate, supplement or replace the energy supplied by renewables when necessary. The majority of these back-up generators use fossil fuels.

In their thought-provoking book *Breakthrough*, political strategists and environmental activists Ted Nordhaus and Michael Shellenberger argue that substantially reducing CO_2 emissions while meeting future energy demand will require a revolution in transportation and electric power technologies. Are there policies that might encourage this technological revolution?

Improve Energy Use: Win a Prize. In 1996, Dr. Peter Diamandis, Amir and Anousheh Ansari and others established a competition to create a private vehicle capable of space flight. The idea was to encourage the private sector involvement in the space industry; thus, the entries were not allowed to have any government funding. Ultimately, 26 international

teams competed for the $10 million Ansari X-Prize for successfully launching a manned vehicle into low earth orbit. In 2004, the prize was awarded to a team headed by aerospace engineer and inventor Burt Rutan and funded by Microsoft cofounder Paul Allen.

Since then, the X-Prize Foundation was formed to fund innovation through competition in a number of fields. The Foundation has already established a competition for a vehicle that gets the equivalent of 100 miles per gallon of gasoline, with the ultimate goal of developing an affordable, mass-produced passenger vehicle.

Similarly, billionaire Richard Branson is offering a $25 million prize to anyone who can devise a technology that can remove 1 billion tons of CO_2 (or an equivalent amount of other greenhouse gases) from the atmosphere, for 10 consecutive years.

The federal government should follow the X-Prize model and support a competition to create various technologies that meet the twin goals of using energy more efficiently while reducing greenhouse gas emissions. For instance, the government could establish a prize for manufacturing an affordable hydrogen-fuel-cell-powered vehicle for about the same price as a traditional sedan of comparable power, comfort and passenger load. Or the government could establish a prize for the first commercially viable hybrid electric vehicle that could generate power for the electric grid when not in use.

The government could also establish a prize for technologies that remove greenhouse gases from the atmosphere before or after they are emitted. Contests could be established to encourage the development of batteries that store power from renewable power sources for use when they are off line. The competitions are only limited by human imagination and foresight regarding what might be needed to transform the world's energy use.

"Money from oil & gas leases could fund prizes for new technologies."

The X-Prize Foundation notes the myriad virtues of the contest approach to producing breakthrough technologies. For instance, performance-based prizes are efficient since sponsors only pay the winners when and if the goal is accomplished. In addition, prizes encourage multiple efforts, often resulting in a number of unexpected and unconventional approaches to the goal. Although only one inventor or team takes the prize, multiple approaches to the problem may continue to be developed, improved and brought to the marketplace.

In order to speed the global adoption of these technological improvements, the contestants could agree to sell or license their innovation to the government for transfer to developing countries. Thus, in addition to reducing its own emissions, the United States could help developing countries avoid using older, more polluting technologies as their economies grow.

Funding the Prize. Funding the prize need not add to the deficit nor result in higher taxes. Rather, each contest could be funded by revenues from new oil and natural gas production on public lands and coastal zones that are currently off-limits to exploration and production. In 2007, private companies paid more than $10.2 billion in royalties and new lease payments to the federal government for oil and gas development. This is only a fraction of the revenue the government might expect from future leases. By one recent estimate, oil production in areas that are currently off limits could top 2 million barrels a day by 2030. Over the years of production, the revenue from these areas could amount to almost $1.7 trillion. Exploration and development of these areas could quadruple America's domestic reserves of oil and reduce our dependence on foreign supplies. It would also create tens of thousands of jobs.

Conclusion. The X-Prize model for new energy technology development would help the United States transition from the predominant use of fossil fuels to other energy sources while keeping the country at the forefront of technological development and transforming the way the world uses energy in the process.

H. Sterling Burnett is a senior fellow with the National Center for Policy Analysis.