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## Future Clean Energy Sources

Hydrogen, as the ultimate transportation fuel, has been the focal point for many discussions on the future energy economy. While this may still be the dominant subject of discussion in the mainstream media, it has been interesting to note the growing amount of attention that clean coal technologies have been receiving.

Pennsylvania's Governor, Edward G. Rendell, a vocal advocate of clean coal technologies, recently launched the Energy Deployment for a Growing Economy (EDGE) initiative, which promotes advanced coal gasification technology. Rendell even went so far as to request that the EPA join him in allowing utilities to have a one-time option to invest in replacing inefficient plants with coal gasification, rather than invest hundreds of millions of dollars for conventional air-pollution controls. Clean coal technologies are also being investigated throughout the U.S., in states including Wyoming, Montana and Illinois.

One technology that has not been talked about as frequently is nuclear fusion (the source of energy for the sun and stars), perhaps because it is thought of more as a myth than reality; thanks largely in part to the infamous cold-fusion incident in 1989. Trying to prove that nuclear fusion is fact and not fiction, Dr. Rusi Taleyarkhan, professor of nuclear engineering at Purdue University has been a major driving force in researching and publishing articles on acoustic inertial confinement fusion (AICF; also termed sonofusion, pp. 6-8). This technique involves the use of sonic pressure waves that cause the growth and subsequent collapse of microscopic bubbles, during which energy can be emitted in the form of light. If this energy is great enough, it is thought that fusion reactions can be initiated.

Taleyarkhan and his colleagues published a controversial paper on their experimental findings in *Science* back in March 2002, with many skeptics saying that the results were just plain wrong. Despite the negativity, Taleyarkhan has persisted and has steadily published papers on sonofusion, including similar experimental results in *Physical Review E* in 2004 and a recent overview paper in the March 2005 issue of *IEEE Spectrum*.

Maybe nuclear fusion is not only for the stars. Research continues on to see if sonofusion can be made into a viable future energy supply. In January 2005, Impulse Devices, Inc., Boston Univ., Purdue Univ., Univ. of Mississippi in Oxford and the Univ. of Washington in Seattle founded the Acoustic Fusion Technology Energy Consortium (AFTEC). The hope is that by collaborating, technological breakthroughs can be achieved.

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