WINNER

1999 R&D 100 Awards Winner

Acoustic Stirling Heat Engine

Features

Our new heat engine efficiently converts heat to intense acoustic power in a simple device that comprises only pipes and conventional heat exchangers and has no moving parts. The acoustic power can be used directly in acoustic refrigerators or pulse-tube refrigerators to provide heat-driven refrigeration with no moving parts, or it can be used to generate electricity via a linear alternator or other electroacoustic power transducer. The engine's 30% efficiency and high reliability make medium-sized natural-gas liquefaction plants (with a capacity of up to a million gallons per day) and residential cogeneration economically feasible.

Applications

- Combustion-powered liquefaction of natural gas to recover gas now flared at remote and offshore oil wells
- Residential cogeneration for more efficient energy use
- Local combustion-powered air separation and liquefaction to reduce transportation costs for industrial gases
- Solar- or waste-heat-powered generation of electricity

Benefits

- More efficient than other no-moving-parts heat engines
- Made from inexpensive, low-tech hardware
- Highly reliable
- Environmentally benign