Next-Generation High-Efficiency Cooling: Cutting air conditioning energy use in half

PARC has developed a proprietary thermoacoustic refrigeration technology that can achieve double the efficiency of the best current residential and commercial air conditioning and refrigeration systems.

Cooling applications represent 25% of all electricity use in the United States, consuming over 7 quadrillion BTUs of energy and generating nearly 600 million metric tons of CO₂ emissions annually.

The predominant technology for air conditioning, the vapor-compression cycle, despite its maturity and ubiquity, can reach efficiencies of only 12% of the theoretical maximum. Achieving significant energy savings and CO₂ emission reductions requires a fundamentally different approach to cooling.

PARC has developed a technique to enable thermoacoustic cooling technology for air conditioning applications. Wide adoption of PARC’s technology could lead to dramatic energy savings and greatly reduced CO₂ emissions. PARC’s approach could:

- Double the efficiency of air conditioning
- Save 4 quadrillion BTUs (13% of total U.S. electricity use) per year
- Reduce CO₂ emissions by 311 million metric tons annually

While thermoacoustic refrigeration is a well-established technology for cryogenic cooling, it has not been effectively applied at room temperature due to limitations of current techniques. Overcoming this deficiency with a novel acoustic power-recovery technique, PARC’s design can potentially achieve double the efficiency of today’s vapor compression systems.

PARC is currently building prototype systems, and will have a full-scale demonstration unit within a year.

We are seeking strong commercialization partners who have deep market penetration in the air-conditioning or refrigeration industry or who are interested in displacing current cooling approaches.

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