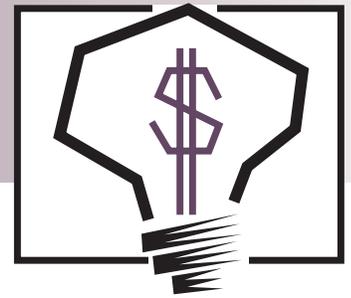


INVENTIONS & INNOVATION

Project Fact Sheet



HIGH ENERGY EFFICIENCY AIR CONDITIONING

USING A NEW REFRIGERANT, IKON[®] B, TO CREATE AN ENVIRONMENTALLY FRIENDLY AND MORE ENERGY EFFICIENT WAY TO COOL YOUR HOME OR SMALL BUSINESS

Benefits

- Offers savings of 10 trillion Btu by 2010
- Can be used as a retrofit refrigerant in place of R-22 with minor equipment changes
- Has greater energy efficiency than new replacement fluids for R-22

Applications

Ikon B can be widely used in residential or commercial facilities that need cooling or air conditioning.

This project will develop a technology for residential and light commercial air conditioning systems that promises to reduce their energy consumption by 20-25%. The technology uses the new, highly energy-efficient refrigerant Ikon B. Ikon B refrigerant is one of an advanced family of nonflammable, non-ozone-depleting refrigerants that have good cooling capacity and high energy efficiency. Ikon B also has low global warming potential and is approved by the U.S. EPA as a replacement for ozone-depleting refrigerants in a variety of cooling and refrigeration applications. Tests at the Department of Energy (DOE)'s Oak Ridge National Laboratory gave a 20-25% higher coefficient of performance (a measure of cooling obtained per energy used) for Ikon B versus R-22. The energy saving potential of Ikon B is very large. In this project Ikon B will be tested against R-22 in a typical split system air conditioning unit. Cooling capacity and energy efficiency will be baselined with R-22. The unit will then be modified for use with Ikon B and its cooling capacity and energy efficiency measured to determine the improvement.

TYPICAL SPLIT SYSTEM AIR CONDITIONER COMPRESSOR UNIT



Ikon B refrigerant installed in a split system air conditioner promises to give 20-25% higher energy efficiency. The compressor unit, which contains the compressor and receiver, is where Ikon B would be installed.



Project Description

Goal: The project goal is to demonstrate the suitability of Ikon B refrigerant for use as a high energy efficiency refrigerant in residential and small commercial air conditioners. Ikon B refrigerant will be tested versus R-22 in a typical residential split-system central air conditioner under controlled environment conditions. Because Ikon B has much lower operating pressure than R-22, a power factor controller (PFC) will be installed between the compressor motor and the compressor motor's run capacitor to reduce total power to the compressor motor so that the full energy savings of Ikon B will be obtained. The expansion valve will also need to be changed to adjust the system for Ikon B's lower operating pressure.

When Ikon B is used as a retrofit replacement for R-22, the air conditioner's compressor will run at no more than about 70% load because of the lower operating pressure. Residential and small commercial air conditioner compressors are not large motors, so there should be a significant power saving benefit from using a PFC installed in the motor. Without a PFC, the full energy savings of Ikon B cannot be realized in an air conditioner because the compressor motor's loss of efficiency at lower load will offset a significant amount of Ikon B's greater energy efficiency.

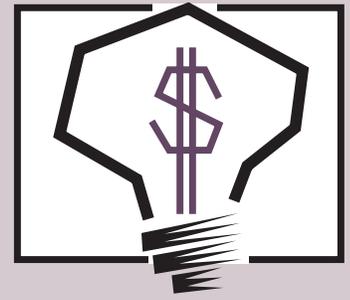
Progress and Milestones

The following are the main tasks to be performed:

- Obtain and install a new 2-ton, split-system, R-22 residential air conditioner in a walk-in environmental chamber along with instruments for performance testing.
- Measure the baseline air conditioner energy use with and without a PFC.
- Measure the air conditioner energy use with and without a PFC after modifying the machine and adding Ikon B.
- Run the air conditioner an extended time with Ikon B and test for incompatibilities (such as corrosion, deposits, or decomposition of the coolant).

Economics and Commercial Potential

Ikon B, a suitable expansion valve, and a PFC will be retrofitted to existing equipment and installed in new equipment. When compressors specifically made for use with Ikon B are made, the PFC will no longer be needed. The market advantages will be the energy use savings obtained by the user and the ability to continue using the existing comfort cooling system. Ikon B has excellent potential to be a quickly developed product and commercial success. It is blended from commercially available components and should be well accepted by the refrigerated cooling equipment community once sufficient testing and demonstration data is obtained. Commercial introduction of the technology is expected by 2006. Annual energy savings by 2010 would be 10 trillion Btu. By 2020 the savings would grow to 139 trillion Btu.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

For project information, contact:

Nimitz, Inc.

4500 Hawkins St. NE, Ste. B
Albuquerque, NM 87109-4541
Phone: (505) 345-2707
Fax: (505) 345-4884
pdhooge@etec-nm.com

For more information about the Inventions and Innovation Program, contact:

Lisa Barnett

Program Manager
Inventions and Innovation Program
Phone: (202) 586-2212
Fax: (202) 586-7114
lisa.barnett@ee.doe.gov

Visit our home page at
www.oit.doe.gov

Office of Weatherization and
Intergovernmental Program
Energy Efficiency and
Renewable Energy
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121



September 2002