



702 H Street, NW, Suite 300, Washington, DC 20001
Tel: 202-462-1177 • Fax: 202-462-4507
1-800-326-0959 • www.greenpeaceusa.org

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Energy Star Appliance Program
Office of Air and Radiation
U.S. Environmental Protection Agency
Washington, D.C. 20460
appliances@energystar.gov

Re: ENERGY STAR Room Air conditioners first draft comments

To Whom It May Concern:

These comments regard the Energy Star Eligibility Criteria Draft 1 Version 3.0 for Room Air Conditioners.

In particular, Greenpeace will address refrigerant technologies.

“EPA seeks comment on technologies, best practices, and alternatives that might be incorporated into ENERGY STAR specifications to reduce the refrigerant-related climate impacts of room air conditioners.”

There is much empirical evidence regarding the energy benefits provided by alternative refrigerants, including hydrocarbons in particular. A 2000 study reviewed and compared experimental performance between various hydrocarbon and non-hydrocarbon refrigerants. It found that in 90% of cases, hydrocarbons offered the highest coefficient of performance¹. The study also showed that on average hydrocarbons provided almost 10% efficiency gain over non-hydrocarbons. The paper suggested that the high thermal conductivity and low viscosity of hydrocarbon fluids make them superior refrigerants. In addition, their availability and affordability, along with their negligible global warming impact, make them compelling alternatives to the HFCs currently being used in US air conditioning equipment.

In practice, many international manufacturers have realized these advantages and have begun marketing hydrocarbon air conditioning systems internationally². In Italy, De’Longhi has been producing a range of portable propane-based domestic air conditioning units for the European market since 1995. The units achieve an energy efficiency rating of 3.2 or greater – which classifies as an “A” rating, the top rating on European energy labels. In Australia, Benson Air Conditioning markets hydrocarbon systems that get 15-20% efficiency improvement compared to the company’s R22 units. In China, Gree has developed highly efficient room air conditioners that achieve 15% improvement over corresponding R22 units. They achieve an EER over 3.5, which is better than the “A” rating in Europe.³

The market for hydrocarbon-charged air conditioners is growing and there is enormous potential for introduction in the U.S., especially given the Department of Energy’s plan to improve energy standards in 2014. The proposed SNAP rule that would allow flammable refrigerants in refrigerators and efforts at UL

¹ Colbourne, D. and Suen, K. Assessment of performance of hydrocarbon refrigerants. *Proceedings of the IIR Natural Working Fluids Gustav Lorenzen Conference*. Purdue University. USA. 2000.

² Mate, J. Cool Technologies-2010: Examples of HFC-Free Cooling Technologies in Various Industrial Sectors. Greenpeace. 2010.

³ Council Directive 92/75/EEC and Commission Directive 2002/31/E available
http://europa.eu/legislation_summaries/consumers/product_labelling_and_packaging/l32004_en.htm and
http://ec.europa.eu/energy/efficiency/labelling/energy_labelling_en.htm

to reconsider current restrictions on flammable refrigerants in multiple sectors, also point to the future of hydrocarbons in the U.S. market.

In addition to efficiency advantages, hydrocarbons also offer tremendous climate benefits. A common refrigerant used in room air conditioners in the U.S., R-410a, has a global warming potential (GWP) of 2088, compared to less than 3 for hydrocarbons like propane and isobutane.

Since one of the main goals of Energy Star is to “reduce greenhouse gas emissions and other pollutants”, it is appropriate and essential to consider the GWP of refrigerants in Energy Star criteria and reward manufacturers that transition to refrigerants with low GWPs.

Some international certification systems already provide such an incentive. For example, the European Ecolabel provides an incentive for low-GWP refrigerants in its heat pump specifications, which state:

“If the refrigerant has a GWP of less than 150 then the minimum requirements of the coefficient of performance (COP) and primary energy ratio (PER) in heating mode and the energy efficiency ratio (EER) in cooling mode, as set out in criteria 1 and 2 of this Annex, shall be reduced by 15 %.”⁴

There is precedent for this type of incentive in U.S. regulation as well. In May 2010, EPA finalized light-duty vehicle emission standards that will regulate greenhouse gas emissions from vehicle tailpipes. As part of the rule, EPA is allowing auto manufacturers to earn credits toward fleet-wide average CO₂ standards for using lower global warming potency refrigerants.⁵

Greenpeace recommends that EPA follow a similar model to incentivize low GWP refrigerant use through its Energy Star program.

Specifically, Greenpeace recommends that new Energy Star specifications require room air conditioners to be 10% more efficient than current federal standards if they use refrigerants with low GWPs (roughly 3 or less), compared to 15% more efficient if they use refrigerants with higher GWPs. This would essentially maintain the current Energy Star criteria for equipment that uses low GWP refrigerants, while increasing the requirement to 15% for all others.

Greenpeace recommends that this incentive be applied on a temporary basis to reward first movers toward hydrocarbon air conditioners as they ramp up experience and production of these units and generate economies of scale. After sufficient penetration of the market, this incentive should be removed.

The Energy Star label is an enormously successful and powerful certification scheme that has a sizeable influence on consumers and manufacturers and has helped move industry toward greater efficiency overall. Greenpeace encourages EPA to use this influential label to help propel the cooling sector toward climate-friendly refrigerants.

Thank you for considering these comments. Please contact me with any questions.

Sincerely,

Claudette Juska
(202)319-2475
cjuska@greenpeace.org

⁴ Ecolabel criteria for heat pumps located here: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:301:0014:0025:EN:PDF>

⁵ Factsheet: EPA and NHTSA Finalize Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks. Located here: <http://www.epa.gov/oms/climate/regulations/420f10014.htm>