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# Mobile air conditioning units with carbon dioxide are climate-friendly and efficient

## First-time launch of mobile air conditioning units with CO<sub>2</sub>: UBA presents car at IAA Commercial Vehicles in Hanover

Protect the climate with carbon dioxide—sounds like a contradiction? It may at first seem paradoxical to want to protect the climate with a greenhouse gas, but this is not so in the case of refrigerants used in mobile air conditioning systems. In fact, carbon dioxide (CO<sub>2</sub>) is an ecological alternative to the refrigerant tetrafluoroethane commonly used to date. CO<sub>2</sub> harms the climate up to 1,300 times less than the fluorinated greenhouse gas does. Since carbon dioxide is considerably more climate-friendly than tetrafluoroethane, the Federal Environment Agency (UBA) is calling for CO<sub>2</sub> to be used as the refrigerant in mobile air conditioning units. The Federal Environment Agency will, for the first time, present a vehicle equipped with a CO<sub>2</sub> air conditioning unit at the 62<sup>nd</sup> IAA Commercial Vehicles in Hanover. The Federal Environment Agency commissioned the Obrist company to fit a standard Volkswagen (VW) Touran with a CO<sub>2</sub> air conditioning system.

Measurements of the performance of CO<sub>2</sub> as a refrigerant in mobile air conditioning units make a case for its effectiveness. "Doing something to protect the climate is one of the most central challenges facing the automotive industry in the coming years. The CO<sub>2</sub>-based air conditioning system brings the industry one step closer to producing vehicles that do less damage to the climate. It is ready for serial production and exemplary of climate production by means of technical innovation", said UBA Vice President Dr. Thomas Holzmann. "The time to act is now: the automotive industry must implement this innovative and climate-friendly technology", added Holzmann.

Mobile air conditioning systems have been veritable climate offenders up to present through their operation with the fluorinated greenhouse gas tetrafluoroethane (known as R134 when used as refrigerant), which has a high global warming potential. A car equipped with air conditioning produces additional tetrafluoroethane emissions of about seven grammes CO<sub>2</sub> per kilometre when driving medium-range distances. The EU has therefore decreed in Directive 2006/40/EC that only minimal amounts of climate-damaging refrigerants may now be used in motor vehicle air conditioning units. The tetrafluoroethane used in the EU as the refrigerant in air conditioning systems up to now will be banned in new vehicle types as of 2011. After 2017, the ban will apply to all new vehicles. As an alternative, CO<sub>2</sub> (known as refrigerant R744) demonstrates clear

advantages: it has high cooling capacity, it is non-combustible, and immediately available worldwide at low cost. Although the deadline for the switch draws ever nearer automobile manufacturers have been slow to make the choice in favour of climate-friendly CO<sub>2</sub> in motor vehicle air conditioning systems. Detractors of the CO<sub>2</sub> solution have often claimed that energy consumption of CO<sub>2</sub>-based air conditioning systems is higher than in those filled with tetrafluoroethane. UBA therefore had one of the vehicles in its fleet, a serially produced VW Touran, retrofitted with a CO<sub>2</sub> air conditioning system. Measurements prove that the CO<sub>2</sub> system provides excellent cooling and is energy-efficient in operation. During a normal European summer the energy consumption of a CO<sub>2</sub> air conditioning system is actually lower than in a serially produced R134a system. Test measurements done by the Allgemeine Deutsche Automobil Club (ADAC), Germany's largest automobile club, corroborate these findings.

"The use of CO<sub>2</sub> as a non-combustible and efficient refrigerant in motor vehicle air conditioning systems is a long-term sustainable solution. On a global scale there would be enormous potential to reduce emissions of refrigerants from motor vehicle air conditioning systems", said UBA Vice President Holzmann. Refrigerant emissions on a global scale of at least 270 million tonnes CO<sub>2</sub> equivalents per year could be saved in future—an amount of CO<sub>2</sub> equal to that emitted by 150 million small-sized vehicles each driving 15,000 kilometres per year.

Car exhibition at the Federal Environment Agency IAA booth, Hall 18, Stand A14, until 2 October 2008, map: <http://www.iaa.de/index.php?id=2641&L=0>

The English-language brochure Natural refrigerants - CO<sub>2</sub>-based air conditioning system put to practical testing contains more information about the use of CO<sub>2</sub> in motor vehicle air conditioning systems and is available on the Internet at <http://www.umweltdaten.de/publikationen/fpdf-l/3654.pdf>

EU Directive 2006/40/EC relating to emissions of fluorinated greenhouse gases from air-conditioning systems in motor vehicles is on the Internet at: [www.umweltbundesamt.de/produkte/fckw/index.htm](http://www.umweltbundesamt.de/produkte/fckw/index.htm)

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