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# **Climate challenge of air conditioning and refrigeration in heavy duty vehicles including buses (goods transport)**

**MAC Summit  
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# MACs in trucks and buses in Regulation and in Directive

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## Regulation

- **Non-refillable containers banned**
- **Recovery of f-gases from mobile equipment, if possible**
- **Minimum qualifications for mechanics**
- **By end 2007 review of air-conditioning in vehicles other than motor vehicles and in refrigeration in modes of transport.**
  - **if appropriate legislative proposals to contain better**

## Directive

- **Review by 2011 if provisions on MACs passenger cars should be extended to trucks and buses**



# Commission Study on Refrigeration in Road Transport and Containers

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- Looking at estimated emissions in EU-25 from refrigerated road transport – projected emissions compared to baseline
- Options for limiting emissions
- Calculate economic and environmental impacts
- Data still to be checked with industry



# Provisional results on mobile refrigeration

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- Complex analysis – various refrigerated vehicles – vans, trucks and trailers with different charges
- Refrigerants used R134a, R404a or R410a
- Charge ranges from 2 to 15kg but new vehicles lower charges 1 to 8kg
- Refrigerated transport increasing at around 2% per annum but refrigerant charge diminishing
- Annual emission rates high – estimated at 30% in new vans and 10% in trucks and trailers. Higher in older vehicle stock.
- IPCC Report estimates 20 to 25% annual emission rate
- Wide variations in recovery rates during servicing and at end of life



# Emission predictions from mobile refrigeration

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- Numbers of refrigerated trucks/vans increasing but emissions falling in new vehicles – lower charges, better sealing
- Emissions estimated to increase from 0.8 Mt CO<sub>2</sub>eq and to peak at 1.6Mt CO<sub>2</sub>eq by 2018



# Policy options

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A number of options looked at but three identified as feasible

- Containment and recovery
- Gradual phase-out of systems with f-gases
- Ban from a certain date

Ban least cost-effective option

Containment and recovery most cost-effective

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# Study to establish leakage rates for trucks...

**Starting April 2006, measure 200 trucks > 6 t GVW of six makes of all age categories**

**Approach: Measurements of refrigerant difference between current and initial charge - in line with adapted 2003 Passenger Car (PC) Measurement Protocol**

**Hypothesis: Tilting cabins: flexible hoses longer than in cars, i.e. potentially higher leakage.**

**Next steps:**

**March: Find appropriate truck fleets**

**April: Start of measurements**





## ... and buses and coaches

- Long refrigerant hoses/pipes: high leakage is likely
- Proper MAC working is essential
- Bus repair/maintenance shops control regularly MACs
- Recording of refills mandatory in Sweden and the Netherlands
  - Logbook approach for establishing both irregular and regular leakage rate can be used.
- Currently analysing Swedish and Dutch data
- Report ready by October 2006



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