Non-CO₂ Greenhouse Gases: High-GWP Gases

Source/Sectors: Substitution of ODS/Chillers

Technology: Options for emission reduction including leak repair (C.1.1.4)

Description of the Technology:
There are many types of repairs applicable to reduce leaks in chillers, the major repairs include installment of new purge systems, replacement/removal of the motor, installment of new refrigerant metering, and replacement of flare joints, gaskets, or seals (USEPA, 2001). Usually, those options are very expensive, so they are often feasible only for large equipments. In addition, new and advanced leak reduction technologies are emerging and expected to lower the costs over time (IEA, 2003). Technologies such as early warning signals are in the final stage of development (USEPA, 2006b).

Effectiveness: Good

Implementability: Good

Reliability: This is a primary option for emission reduction.

Maturity: Law in many developed countries already regulates maximum allowable leak rates, but further leak reduction improvements, such as upgrades or replacement, are still possible (USEPA, 2006b).

Environmental Benefits: High GWP-gas emission reduction

Cost Effectiveness:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Lifetime (yrs)</th>
<th>MP (%)</th>
<th>RE (%)</th>
<th>TA (%)</th>
<th>Capital cost</th>
<th>Annual cost</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leak repair</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td>0-4</td>
<td>$27.55</td>
<td>$0.00</td>
<td>$3.05</td>
</tr>
</tbody>
</table>

Note: MP: market penetration; RE: reduction efficiency; TA: technical applicability; costs are in year 2000 US$/MTCO₂-Eq.

Industry Acceptance Level: Good

Limitations: The reduction efficiency of this option varies on a case-by-case basis since it depends on the age of equipment and quality of repair. Similarly, the total percent of abatement that is achievable through this option is uncertain (IEA, 2003).

Sources of Information:
    Proc. International Conference on Ozone Protection Technologies, October 21-23, Washington, 
    D.C.

    Hydrocarbons: Propane, Isobutane, and 50/50 Mixture of Propane/isobutane”, Proc. International 
    Conference on Ozone Protection Technologies, October 21-23, Washington, D.C.

    International Conference on Ozone Protection Technologies, October 21-23, Washington, D.C.

    Refrigerants and Emerging Technologies”. Prepared by Oak Ridge National Laboratory for 
    Alternative Fluorocarbons Environmental Acceptability Study and U.S. Department of Energy, 
    Oak Ridge, TN.


    Inventories, Projections, and Opportunities”, Office of Air and Radiation, U.S. Environmental 

    Substitute Emissions”, Office of Air and Radiation, U.S. Environmental Protection Agency, EPA 

    and Sinks: 1990 to 2004” Office of Atmospheric Programs, United States Environmental 
    Protection Agency, EPA-430-R-06-002, June 2006

12. U.S. Environmental Protection Agency (2006b) “Global Mitigation of Non-CO2 Greenhouse 
    Gases”, Office of Atmospheric Programs, United States Environmental Protection Agency, EPA-
    430-R-06-005, June 2006.


    as Refrigerants” in Non-CO2 Greenhouse Gases: Scientific Understanding, Control and 

    Newsletter, vol. 18, no. 1, p. 13-16.