

Eliminating Chillers that use Environmentally Harmful CFC Refrigerants.

Large water-cooled chillers are the "engines" of the air-conditioning systems for almost all large buildings. Prior to 1993 the vast majority of chillers used CFC-11 and CFC-12 refrigerants which have been banned for new installations because their breakdown products attack the ozone layer. Although 2/3 of these obsolete and inefficient chillers have been replaced, some 30,000 remain in both public and private facilities across the country. Replacing them will allow for the recovery of 37 million pounds of ozone depleting CFCs which equates to 64 MMT of CO₂eq. The minimum 61% improvement in chiller efficiency which would be achieved by replacing these old systems would save 17.2 MMT of CO₂/yr from reduced electricity consumption. To put that number in context, it is equivalent to taking 3.3 million cars off the road or avoiding the need for about seven new 400 MW coal-fired power plants. This improvement would also reduce HVAC energy use in participating buildings by at least 20%.

CFC chiller replacement is cost-effective, but the high initial costs mean that many building owners do not make these investments. Moderate incentives would improve the economics and reduce the upfront cost, substantially increasing the number of systems replaced. AHRI estimates that the cost of replacing the average large chiller is \$470/ton, inclusive of labor to remove the obsolete unit and install the new one. The average chiller to be replaced has a capacity estimated at a weighted average of 411 tons of cooling.

Virtually all replacement chillers sold in North America are also manufactured in North America. Major plants are located in Pennsylvania, Wisconsin, Texas, Virginia, Colorado and North Carolina. If all CFC chillers are replaced, AHRI estimates that approximately 10,500 jobs may be directly created or preserved in the manufacturing, removal and installation of new chillers, with additional jobs being created by the engineering services required to take advantage of these incentives. ACEEE estimates that when indirect and induced jobs are included, approximately 60,000 jobs are provided.

Enabling these chillers to be changed out quickly will facilitate substantial economic benefits, greater energy efficiency and environmental protection. To achieve this end the Air-Conditioning, Heating and Refrigeration Institute (AHRI) and the American Council for an Energy-Efficient Economy (ACEEE) have led a task force to create a consensus proposal which would promote a more rapid change out of CFC based chillers.

We propose that a tax credit be offered for removing from service any chiller using CFC refrigerant and replacing it with a chiller meeting the efficiency levels set by ASHRAE standard 90.1-2010. This credit should be in place for three years from date of enactment. A tax credit of \$200/ton, based on the tonnage of the CFC unit being replaced, would be an appropriate incentive for a consumer to absorb the significant cost associated with the purchase of a new chiller and the removal of the old system. An additional incremental incentive of \$100 per ton for chiller downsizing would be added. This additional incentive could only be accessed if, during installation, all chilled water distribution pumps were upgraded to variable frequency drives. Non-taxpaying entities which are eligible for the credit could transfer the credit to the seller, in a transparent manner, which would allow for an up-front price reduction for the consumer. This is important as AHRI estimates that as many as half of the CFC chillers in operation are in buildings owned by non-taxpaying entities.

Proposed Provisions:

1. Provide a tax credit of **\$200/ton**¹ for the replacement of pre-1993 water-cooled chillers that use refrigerants CFC-11 and CFC-12. This incentive shall be based on the nominal nameplate capacity of the chiller being replaced.² To receive this incentive, the taxpayer must:
 - perform an analysis by a registered professional engineer or qualified auditor, of the building loads and opportunities for additional cost-effective building energy savings,³
 - demonstrate that the old chiller was operable when it was decommissioned for replacement under this program, and demonstrate that the refrigerant charge has been recovered in accordance with the law and EPA regulations, and

¹ Utilities commonly rebate 50% of incremental cost and we are following this precedent.

² Basing the incentive on the capacity of the units being replaced is intended to discourage over sizing.

³ This analysis could include measures comparable to those laid out in level two of the ASHRAE Procedures for Commercial Building Energy Audit.

- purchase and install a qualifying chiller.
2. An additional incentive will be added for owners who downsize their chiller during replacement. The incentive will be \$100 for each ton downsized⁴. Accessing this additional incentive would require that, during installation of the new chiller system, all chilled water distribution pumps are upgraded to variable frequency drives.
 3. Qualifying chillers must be certified to meet the requirements for water chilling packages of Table 6.8.1C of ASHRAE 90.1-2010.
 4. The incentive would be offered for qualifying chillers placed in service within 36 months of date of enactment⁵.
 5. The seller of chiller to tax exempt entities, as described in 26 USC section 50(b) paragraphs (3) and (4), shall be treated as the taxpayer that placed in service the new chiller replacing the old chiller, but only if the seller clearly discloses to the purchaser the amount of the credit to be received.

This proposal was developed and is supported by the American Council for an Energy-Efficient Economy, the Air-Conditioning, Heating and Refrigeration Institute, and the Natural Resources Defense Council.

⁴ NRDC estimates this provision would provide, for a 600,000 sf. building, between \$10,000 and \$55,000 for additional energy efficiency improvements.

⁵ \$493 million is the approximate cost assuming \$200/ton and 20% of eligible chillers are replaced. The optional downsizing incentive will add to this, but only modestly, as we expect most chillers not to be downsized.