



Mark Platt, left, president and CEO of MultiStack, hands off the MagLev chiller plant to Steve Fulcher, Tokyo facilities manager.

Great Green

NEW AIR-CONDITIONING TECHNOLOGY
LOWERS COSTS AND EMISSIONS

BY MICHAEL CHRISTENSEN

On Earth Day 2007, the U.S. Embassy in Tokyo became the showcase of a new energy technology when the world's first large-tonnage, air-cooled, magnetic-levitation-bearing (maglev) chiller was installed.

In 2006, U.S. Ambassador to Japan J. Thomas Schieffer and Bureau of Overseas Buildings Operations Director General Charles E. Williams chose the embassy for this energy demonstration project because the embassy's chillers (the largest mechanical component of the post's air-conditioning system) were at the end of their useful life and energy costs had risen.

The MagLev chiller's nearly friction-free compressor is expected to reduce the energy required to cool the embassy by up to 30 percent and thereby reduce the embassy's carbon dioxide output by more than 100 metric tons annually.

No Contact

Magnetic levitation bearings eliminate metal-to-metal contact and do not need lubricating oil. This eliminates virtually all compressor maintenance and increases energy efficiency (oil degrades heat transfer). The chillers' quiet, vibration-free operation and low starting-power requirements reduce electricity charges and can allow for a smaller standby generator to be used in new office building construction.

The new chiller is green friendly. It has no cooling tower so it needs no water to cool the refrigerant. This also eliminates the use of biocide and corrosion-control chemicals, which ended up

in the post's wastewater. The total water use reduction will be more than 4 million gallons per year, and the embassy will gain more than 125 square meters of useable space.

"We see this as the bellwether project in the State Department's ambitious, worldwide effort to reduce embassy electrical energy consumption especially in air-conditioning systems," said General Williams. "Japan's progressive energy and technology policies were central to selection of the U.S. Embassy in Tokyo for this important U.S. energy technology demonstration project."

The chiller is manufactured by MultiStack, LLC, of Sparta, Wisc. Its technology caught the attention of OBO Project Manager Antonio Tony Rivera, who pursued implementation of the project as a means for environmentally friendly, compact, low-maintenance air-conditioning.

Future Savings

OBO contracted with Cosmopolitan Corp. of Columbia, Md., to install the 2,520-kilowatt (720 tons of cooling) air-cooled chiller plant. The plant consists of a dozen 210-kW MagLev chiller modules on the roof of the embassy. Rivera, OBO senior mechanical engineer and project manager for this demonstration project, expects the \$2.8 million project to pay for itself in less than 10 years.



MagLev compressors are very quiet because of a lack of reciprocating mass and the extremely fine balance achieved through digital control.

When the chiller came online, the U.S. Embassy in Tokyo facility manager, Stephen Fulcher, said, "Nobody is happier than I am," noting how the chiller eliminated the need for cooling tower maintenance costs and lowered electric bills. ■

Michael Christensen is a mechanical engineer in the Bureau of Overseas Buildings Operations.

Above: A cut-away drawing shows the details of the MagLev compressor. Left: Teamwork between the Tokyo Facilities Maintenance Unit, manufacturer MultiStack LLC and installer Cosmopolitan Corp. got the chiller operational by Earth Day 2007.