The U.S. Mission to the U.N. in Geneva celebrated its new air conditioning system with green cocktails (three parts Midori, two parts Schweppes Tonic Water and 1/2-part lime juice). (William Dowell/GlobalPost)

Are levitating air conditioners the future?

US Mission in Geneva celebrates new AC unit with cocktails.

By **William Dowell** - GlobalPost
Published: April 22, 2009 15:21 ET
-A +A

GENEVA — Most of us take air conditioners for granted. We know they use up enormous amounts of electricity, cause brown outs and occasionally blackouts, and contribute to global warming, but in the sweltering summer months when you are threatened with heat exhaustion, who really cares?

That is all the more reason to marvel at the obvious excitement at the United States Mission to the United Nations here in Geneva Tuesday as it officially launched its new 225-ton "MagLev" chiller. To mark the occasion, waiters wheeled trolleys loaded with fog-generating dry ice and garish green "Chiller" cocktails into a large meeting area for the benefit of a select group of journalists and civil engineering afficionados. What better way to prepare for Earth Day?

In fact, the "chiller" is part of a strategy to make American embassies everywhere standard bearers for environmental consciousness. Geneva joined the vanguard of this effort when the concrete facade of the sprawling mission building needed serious repairs in 2003. Instead of plastering on more cement, the building was covered with elegant blue solar panels. The panels now generate enough electricity to power a city block. The electricity is fed into Geneva's electric grid and the mission is reimbursed for power it draws. The system, which went into operation in 2005, generates about 270 kilowatt-hours a day, and saves about $60,000 a year. It also cuts the building's annual carbon emissions by about 75 tons.

The MagLev chiller has taken the mission's green efforts considerably further. Air conditioners work by compressing gas and then allowing it to expand, which produces the cooling effect. The problem is that compressors are not only power hungry, they also generate heat, and the ball bearings that support the compressor's spinning drive shaft eventually wear out. By the end of its life, a compressor has often lost half its efficiency and is burning twice as much energy for the same effect.

The MagLev (for magnetic levitation) chiller, which is manufactured by Multistack LLC of Sparta, Wisc., substitutes a magnetic field for the ball bearings. The drive shaft is suspended in the air by magnets, while it spins at roughly 40,000 revolutions per minute. As a result, friction is completely eliminated along with the normal wear and tear. The compressor uses 30 percent less electricity than a conventional compressor, generates much less heat, and it works at maximum efficiency throughout its life.

As it turns out, the new MagLev chiller can run on the electricity generated by the building's solar panels, so the building's air conditioning is virtually free. Engineers expect the $2.3 million cost to be amortized in seven years, and it is likely to run much longer than conventional systems.

The decision to invest in the MagLev chiller was pretty much a no-brainer. The mission's two compressors were wearing out and needed to be replaced at about the same time that the mission had opted for solar panels. Electricity prices were beginning to soar and the Swiss were offering incentives for going solar. It looked like a win-win situation.

The Geneva experiment could serve as a prototype for other embassies around the world. It's also a good promotional vehicle for American technology.

Geneva is both the European headquarters for the U.N. and the home of the European Center for Nuclear Research, and it is one of the world's most environmentally conscious cities. Recycling is an obsessive passion, and more business executives ride electric bicycles to work than any other city that I can think of. In that setting, the MagLev chiller fits right in.

William Christensen, a mechanical engineer for the U.S. State Department's Overseas Building Office pointed out that a patent for magnetic levitation was granted in 1942, but technology was not at a point to make it practical.

"The magnetic field could only be changed 60 times a minute," he said. "Today, it can be adjusted 60 times a second." Christensen added that the chiller's drive shaft is kept spinning at 40,000 revolutions per minute within a wiggle room that amounts to only 70 microns.