



## Vending Misers: Facts and Issues

Vending Misers are nifty little devices that can be installed on beverage vending machines. Vending machines run very inefficiently. At Tufts, each vending machine costs the University about \$380 in electricity costs each year. With a Vending Miser, the electricity consumption can be cut in half. Vending misers cost about \$165 and have a pay-back of about 1-2 years. They were developed by Bayview Technology in Denver, CO. In 2003, Bayview was acquired by [USA Technologies](http://www.usatech.com) which continues to produce energy misers for a variety of vending machines.

Tufts installed about 90 vending misers in 2001. Although we recommend vending misers wholeheartedly, there are several issues that should be taken into account before launching into a vending miser project. This handout is meant to help other institutions use vending misers successfully and avoid some of the mistakes we have made. Please note that this project happened in 2001 and much may have changed since then.

If you have questions about installing vending misers, please contact the manufacturer directly: USA Technologies ([http://www.usatech.com/energy\\_management/index.php](http://www.usatech.com/energy_management/index.php)).

### How much Does a Vending Miser Save?

<b>Electricity Usage Of One Vending machine w and w/o a Vending Miser</b>	Without Vending Miser	With Vending Miser
<b>Electricity Use Per Year</b> (this number was estimated, after a energy consumption of a vending machine was measured for one week in an occupied dormitory)	<b>3468 kWh</b>	<b>1716 kWh</b>
<b>CO2 emissions per year</b> @ 1.3 lbs/kWh	2.26 tons	1.12 tons
<b>Cost of vending miser</b>	--	\$165
<b>Cost over 52 weeks</b> Cost of electricity @ \$0.11/kWh	<b>\$381</b>	<b>\$189</b>

<b>Cost of installation</b>		
<b>Payback</b> Not including installation costs	--	less than 1 year

A typical beverage vending machine uses almost 3500 kWh per year (That is an average of almost 0.4 kWh per hour. This translates into 4500 lbs of CO2 emissions per vending machine per year.) To put this in perspective, a modern residential refrigerator (22 ft3) uses 450-800kWh per year.

## How Does a Vending Miser Work?



A vending miser consist of a motion sensor and the miser itself (see picture). The vending machine is plugged into the vending miser, which is attached to a wall and plugged in to an outlet. The motion sensor is plugged in to the vending miser.

If no one is near the vending machine for 15 minutes and the compressor is not running, the vending miser will shut off the machine. If someone walks by the machine, the motion sensor will sense the movement and send power back to the machine (lights turn on). The internal thermostat of the vending machine will then decide, if the compressor needs to come on or not. In other words, the Vending Miser does not influence the internal thermostat or the compressor.

The vending miser also measures ambient room temperature. If the room is very warm, the vending miser will more often send power to the machine than if the machine is in a cold room. The machine will come on every 1-3 hours, EVEN IF NOONE WALKS BY THE MACHINE. Like this, the beverages stay cool, even if no one walks by the vending machine for many hours.

The vending miser has three LED lights.

- If the green light is on, the miser is working properly.
- If the red light is on, occupancy is detected.
- If the amber light is on, the compressor is ON.

**If all three lights are blinking, something is wrong with the vending machine. Very likely, it means that the compressor of this machine never turns off. Such a machine should**

**immediately be repaired. Identifying these machines quickly means you save even more energy!**

## What Are the Issues and Potential Problems?

Permanent installation is not hard but needs to be done correctly. Here are some issues to watch out for:

### 1. Electrical Circuits: Make sure your circuits are not overloaded!

Sometimes several vending machines are plugged into the same circuit. (By code, only two can be on the same circuit.) At Tufts Vending Misers helped us to identify potentially over-loaded circuits since these circuits tripped, once vending misers were installed, because all the machines would come on simultaneously, when someone walked past them.

At Tufts the problem was successfully addressed in three ways:

- Machines were switched to different outlets.
- Several new electrical circuits were installed.
- Vending Miser Repeaters were installed in several locations (see picture). Repeaters stagger the start time of machines by a few seconds.



### 2. Moving and Replacing Vending Machines: Coordinate, coordinate, coordinate!

Make sure you coordinate with whom ever is in charge of adding, replacing and moving vending machines. Motion sensors and the vending misers have to be mounted permanently into the wall or ceiling. Having to move the misers to a new location is cumbersome and should be avoided.

### 3. Misconception about Misers: Educate everybody!

At Tufts, several Misers were found unplugged after they had been correctly installed. Also, Coke employees expressed strong dislike for the misers, mostly because Coke staff has not been educated about how they work. Several myths prevailed, e.g. misers make beverages warm or misers hurt the compressors. However the technology has been approved by Coke.

It is extremely important to coordinate the installation with all parties involved. Even though we put up signs on all the machines with our contact info, it was only by accident that we heard from Coke that employees had complained. Don't expect people to come to you. Seek out everybody who is involved with the vending machines and get them together for a meeting to explain who the misers work. Develop a plan about how problems, moves, repairs should be reported.

After we had an educational meeting with Coke representatives, all the issues could be resolved.

Be aware that turn over rates of employees may be high and that each new delivery person has to be informed.

Tufts has put up signs on (see left) and behind (see right) all vending machines:

This machine is equipped with a  
**VENDING MISER**

The lights shut off when no one is standing by the machine. The fridge powers down when the sodas are cold.

**This saves about 50% of the energy!**



Learn more about how you can stop climate change!  
Visit us at: [www.tufts.edu/tci](http://www.tufts.edu/tci)  
or call us at: 617-627-5517

**STOP!**  
**Do Not Plug Beverage Machines Directly Into Outlet!**



Per Order of Tufts University,  
**All Beverage Machines Have to Be Plugged Into a Vending Miser!**

If You Have Questions,  
Call Patti Klos, Director of Dining Services  
n 617-627-xxxx

#### 4. Malfunctioning Vending Machines

As mentioned above, when all LED lights on the miser are blinking, the vending machine is not working properly. Most likely this means that the compressor never shuts down (there are several possible reasons for this). These machines use even more electricity than a properly functioning machine and they should therefore be repaired immediately. The miser is likely to be blamed for vending machine failure – however, in fact, the miser has simply identified a pre-existing problem.

#### Keys to saving energy with vending misers

- Appoint a coordinator
- Inform all involved parties (students, staff, facilities, vendors, etc.)
- Provide training on how the misers work early on
- Establish a system for when vending machines have to be moved
- Don't let misers take the blame for problems

#### Other opportunities to save

Assess if each vending machine is paying its way – increase awareness of true costs of vending machines.