

VENDING MACHINE
ENGINEERING EVALUATION AND TEST REPORT

Using

Model: Vending Miser
By
Bayview Technology



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1. INTRODUCTION

The Vending Miser (VM) is designed to reduce the cost of ownership of vending machines by reducing the amount of electricity they consume. The compressor life is more likely to be extended due to the operation of the VM. The other components, such as lights, fans, and electronics will also exhibit extended life by the reduction of the total number of hours of operation.

2. SOURCES OF INFORMATION

Information shown in this report was gathered from manufacturer’s information, published specifications, in-house testing, and interviews with effected customers. The energy rates used in the analysis are the approved utilities sales rates for Rate-A type customers (such as AAFES) electricity service.

3. ANALYSIS

- a. Testing – The VM was tested on a beverage machine (BM) located in Bldg 4612, DPW Headquarter (break room). The test was conducted from 29 April 02 through 12 May 02. The measured consumption of the BM (prior to retrofit) for one week was 32.58 kWh. This was derived by connecting an ARC¹ Data logger between the power source and the BM. The power consumption was, thereafter, measured for the initial 7 days. After the initial 7 days, the VM was installed, and readings were recorded for an additional week. With the addition of the VM, the energy consumption was reduced 48.94% to 16.64 kWh/week with little effect to the temperature of the beverage product (See Table 1). The break room was frequented by at least 30 people daily during the weekday from the hours of 7am through 5pm daily, and this area was normally unoccupied during the weekend.
- b. Utility Cost – The electricity cost used for this analysis was the Utilities Sales Rate (Rate-A) of \$0.0698 per kWh.

Reduction of Electricity using VendingMiser					
kWh/year			\$\$/Yr		
w/o VM	with VM	Energy Saved	w/o VM	with VM	Savings
1,759.19	898.29	860.90	\$122.84	\$62.73	48.94%
Note: Electricity Cost: \$0.0698/kWh					
Savings versus Simple Payback					
# of BM	Installation \$ Per VM	Project Cost	Savings	Simple Payback	
700	\$179.00	\$125,300	\$42,081.41	2.98	
Note: VM per unit cost: \$149 Labor per unit cost: \$30					

Table-1

- c. Retrofitting – The VM can be expected to be installed on 700 BMs, and based on the percent reduction, this will result in a savings of \$42,081 annually and a simple payback of 2.98 years.

4. COMPRESSOR CYCLE RATE VS TEMPERATURE

- a. Cycle Rate – The cycle Normal refrigeration cycle rate data varied widely from one source to another. The in-house testing shows (before VM) an average of 2/hr for a weekend day and 3/hr for a weekday. After VM installation, the cycle rates went to 1/hr for a weekend day and 2/hr for a weekday.
- b. Product Temperature – The beverage company Coke and Pepsi recommends that the product do not exceed 42 degrees (Shown as *Base_Temp* in graphs).
- c. Figure 1 and 2 illustrates the system operation for a weekend day. The equipment consumed roughly twice the energy without the VM installed, and the temperature of the product did not exceed the recommended temperature after the installation of the VM. The *Amp_Temp* shown in the graphs is the ambient temperature in the break room.

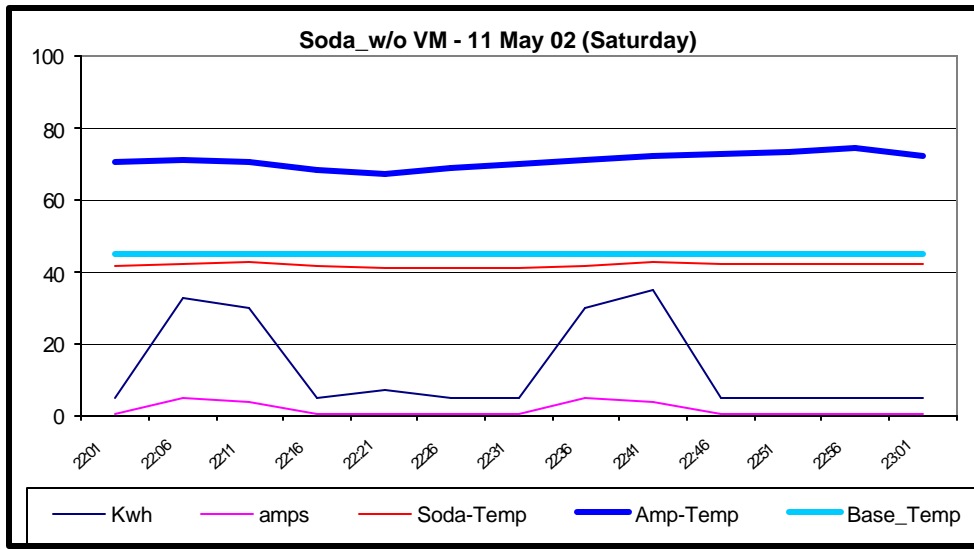


Figure-1

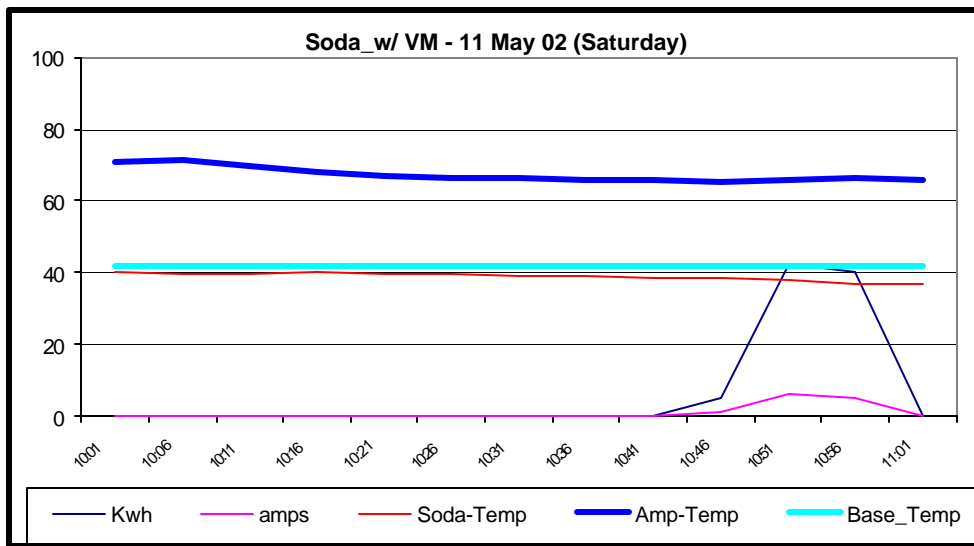


Figure-2

- d. Figure 3 and 4 illustrates the system operation for a weekday. The equipment consumed roughly twice the energy without the VM installed. The temperature of the product did exceed the recommended base temperature, but only by 1° , and this occurred under normal operation and not with the VM installed. The cause of this increase has been connected to the fact that the ambient temp for that particular date was set incorrectly.

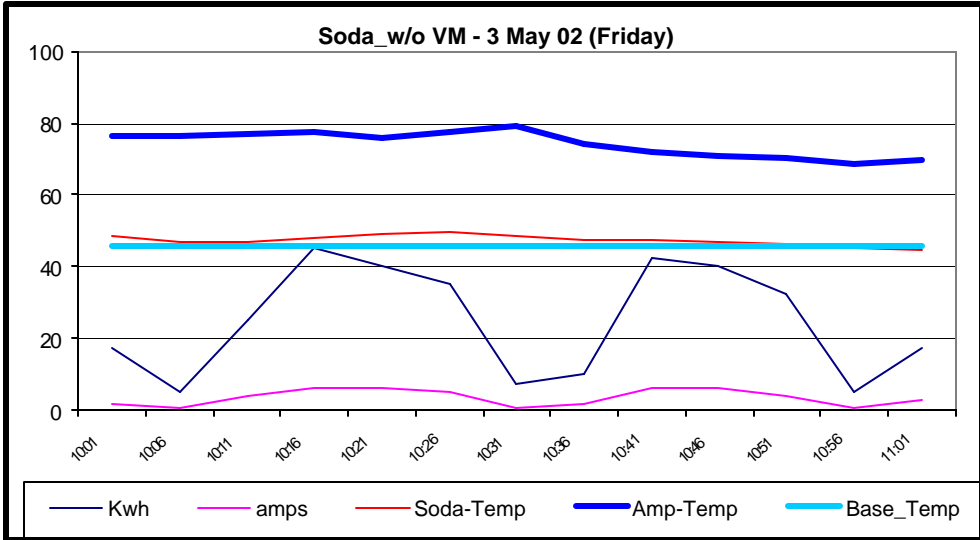


Figure-3

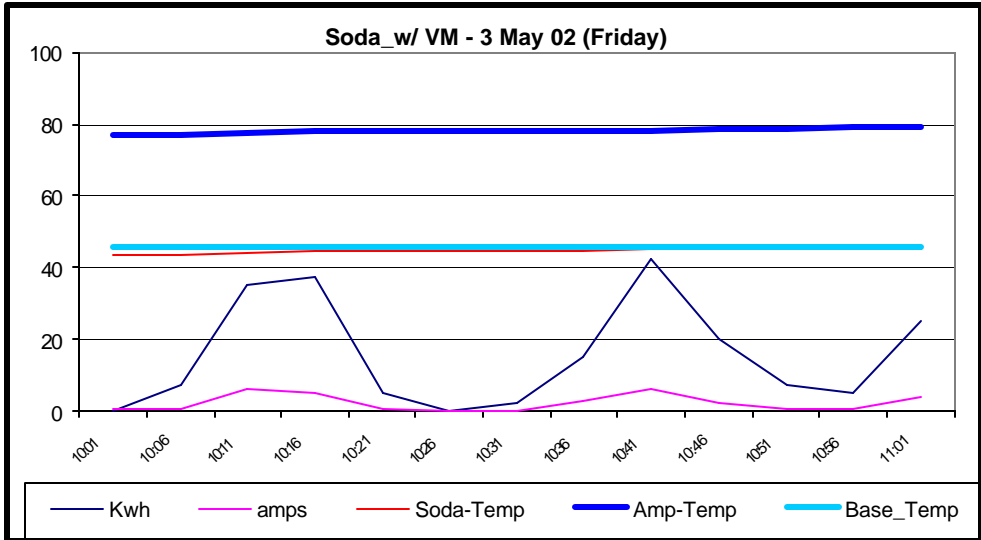


Figure-4

5. CONCLUSION

There were no problems with the operation of the unit and no complaints about the temperature of the beverage products. The device periodically and automatically cycled the BM on and off to keep the product cold. The motion sensor knew when a potential customer was in the vicinity, and the machine automatically “powered up”. Because the sensor could identify activity at least 15 feet away, the customer never saw a powered down machine.

The unit was installed very easily on existing equipment as they are actually connected electrically between the power receptacle and the BM. To sum it up, the VendingMiser performed very well.

Notes:

1. ARC is the Data logger company that manufactures the logger.