

Welcome to Mission S.O.L.A.R at the SIA Solar Intelligence Agency By NXT-reme

Mission Briefer #1

Agents, Welcome to our mission briefing. We are the SOLAR Intelligence Agency. This is Mission SOLAR - Save Our Library and Resources. Our mission purpose is to help the Ashburn Library improve its energy use and move towards using alternative energy.

Mission Briefer #2:

The Ashburn Library located in Ashburn Virginia uses a lot of energy -- Electrical, Gas, and Passive Solar. Electrical energy is used to operate computers, lights, copiers, printers, kitchen appliances, the A/C, and the hot water. Natural Gas is used for heating as well as the dehumidifier for the air conditioning. Passive Solar energy is used for lighting and heating.

Question 1 Agent _____ Why is Mission S.O.L.A.R needed for the Ashburn Library?

The Ashburn Library is the second least energy efficient building in Loudoun County. We want to help them move toward more efficient energy consumption and using alternative energy.

Question 2 Agent _____ What did you learn from your Energy Audit of the Ashburn Library ?

Mr. Huddy the branch manager gave us a tour of the Ashburn Library. He told us that the library gets its electricity from Dominion Power. (interruption: Dominion Power poster about its alternative energy use goals - windmills etc) The library's foundation is concrete and the roof is tar and pebble. The windows are double paned and fritted glass. The windows are also weather sealed. The floors are not insulated but the walls are insulated. (interruption of wall section poster)

From the Energy Manager for Loudoun County Mr. Salehi, we learned about the electricity use of the library. In the summer the library uses an average of 67,520 KWH a month. In the winter they use an average of 33,866 KWH. In the Spring and Fall, the library uses an average of 47,308 KWH a month.

Question 3 Agent _____ What can you add about the lights and windows at the library?

The library has both florescent and incandescent lights - many are recessed. (interruption with watts that the lights use)

The library has large 2 story windows in the front entry way and in the opposite alcove as well as the children's room alcove. There are also clerestory windows in the vaulted ceilings of the reading rooms. There are also large windows in the magazine room. These windows let in sunlight for lighting the library as well as heat. However in the summer the heat coming in these windows has to be compensated by increasing the air conditioning.

Question 4 _____ Have we learned anything about the heating and cooling of the library?

In our interviews with people using and working in the library, we found out that the cooling is adequate and dependable but generally found it too cool. The heating in the winter was adequate, dependable and comfortable.

We also learned that the heating and cooling is controlled centrally at the Loudoun County municipal building. The library manager can only request temperature changes M-F during work hours.

Question 5 Agent _____ What does the Ashburn Library do well with regards to energy consumption?

The library uses instant hot water heaters under the sinks in the bathrooms and in the kitchenettes. This saves energy by not having a large hot water heater.

The library has lots of windows that allow the library to use passive solar energy for heat and light. The fritted glass is tempered glass that prevents UV rays from going through the window.

Question 6 Agent _____ How did we evaluate the light at the Ashburn Library ?

We went to the library to determine the average foot-candles in several rooms, so we could discover the amount of natural lighting. A foot-candle is the measure of light from a single candle at one square foot. This would allow us to determine if the library could use less energy on lighting.

Question 7 Agent _____ What is a foot candle meter ?

A foot-candle meter is used to determine the amount of light in a certain area. Using a photocell, it determines the amount of ambient light in a set area. (hold up foot candle meter)

Question 8 Agent _____ What are the results of our light measurement gathering experiment at the Ashburn Library?

We chose several rooms in the library and measured the foot-candles. In hour increments, we found and recorded the foot-candles per room with a foot-candle meter. We then determined the average foot-candles per room throughout a normal day.

The recommended foot-candles for a library are about 70 for studying, typing, reading pencil writing and taking notes. When reading printed material the minimum foot-candles are only about 30.

Question 9 Agent _____ How did the library measure up using this foot candle scale?

Hold up chart

On a sunny day in October, in the reading rooms the average foot candle reading is above 70 all day long.

Question 10 Agent _____ What are the practical solutions we can suggest for the library?

First we suggest that photocells that monitor the amount of natural light be used to adjust the amount of artificial light so that when there is more natural light in the room, artificial lights can be turned off.

Second we suggest that more light switches be added so that sections of lights could be turned off when not needed on sunny days. Dimmers could also be added.

Electronics could be turned off when not being used. Particularly computers could be turned off at night and computers could be set to go into standby mode when not in use.

Third, motion sensors could be added to the lights in the bathrooms so the lights would go off when no one was in the library bathroom.

Question 11 Agent _____ What alternative energy options can be suggest for the library?

We think Solar is a good option for the Ashburn Library.

Question 12 Agent _____ Why is solar a good alternative energy for the library?

Solar technology is environmentally friendly. There is little waste. Some of the new technologies cost less than the older photovoltaic cells. The library already has great windows and roof space for collecting solar energy. The library already uses passive solar energy to some degree and it could be refined.

Question 13 Agent _____ What are the solar solutions we can suggest to the library?

We have researched 4 solar solutions for the library. First solar cells could be added to awnings that would be put over key windows where solar

energy would be collected while at the same time prevent unwanted sunlight from overheating the rooms. (place solar awnings on model) Traditional photovoltaic cells could be added to the roof to generate electricity for the library to use. (Interruption - the library could even sell some energy back to Dominion Power.)

Second, we have discovered spray on solar power cells. While a new invention, it has lots of potential for helping the library with increasing its alternative energy use. They are easy to apply to the roof and they can help generate electricity for the library.

Another new alternative energy solar technology is Power glass by XsunX. Higher insulation and generate

A fourth solution is a new technology -- plastic solar cells. These plastic solar cells can collect infrared light. It is one of the less expensive technologies as well.

Question 8 Agent _____ How are we sharing this information with the community ?

Answer: We have posted information on our webpage. We placed articles in community newsletters. We have a display case scheduled for December at the Ashburn Library. We have given presentations to the community at Legacy Elementary School.