Solar Energy in Business Applications

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Outline

I. Introduction
   A. The amount of money it costs to operate a business' energy needs can be astounding.
   B. Problems include cost, not knowing about solar, and not knowing the benefits.
   C. Solar energy is growing more popular, cheaper, and more economical with big businesses every day.

II. Body
   A. History of solar energy
      1. Ancient Greeks and Romans used it
      2. Crusaders used solar energy
      3. Archimedes even tried to build a weapon out of it.
      4. Solar was used for water heaters as early as the 1950's.
   B. Popularity of solar energy
      1. Lease systems
      2. Creates jobs
   C. How solar energy works
      1. Photovoltaics
      2. Solar arrays
   D. Positive effect of solar panels on a roof
      1. Keeps building cooler in the summer, warmer in the winter
      2. Energy savings
   E. Big business using solar energy

III. Conclusion
   A. Solar energy has many benefits from keeping a business cool, to alleviating energy costs.
   B. Solar energy is more popular every day with big businesses.

The amount of power needed to run any business can cost a monumental amount of money. There are computers to keep going, lights that need to be on, heating and cooling systems for the employees, refrigerators for lunches, and with bigger companies, you can have massive servers that require so much cooling that you need to wear a snow jacket and boots to get into the room. Solar power can help alleviate some of these power issues. Solar panels have become even more popular; they have become more efficient because of their popularity; and they are not terribly difficult to understand, which shows why solar power has been used for hundreds of years. Solar energy is also growing more popular in large companies that operate giant stores in an effort to lower the energy consumption of the stores. Solar energy should be used because of its abundance and the energy savings involved.

"Solar energy is the most important and reliable resource of all renewable energy sources currently exploited...," Alin Rubnicu states in his article "Advancement of Knowledge and Use of Solar Energy" (2012). Solar energy has been used since the times of the Ancient Greeks and Romans, from orienting their homes to face in such a way that during the winter, they would get the most amount of sunlight to warm their homes, to using mica as windows to create a greenhouse effect. Archimedes even tried to create a ship, which had hundreds of mirrors on it, to use as a solar death ray. As the soldiers would point their mirrors in the same direction, the sun was amplified to a specific point on the enemy ship, causing it to burst into flames. During the Crusades, Christian soldiers had fire box mirrors, which they would use to light sacrificial altars. Even in modern times, as early as 1945, scientists were experimenting with solar energy to make homes independent of oil and coal as a means for heating homes and

water tanks. Solar energy was also discussed as a possible solution during the 1930's because of the number of skyscrapers going up. The shading that was caused by the buildings was causing the streets to not receive any sunlight. The building of the skyscrapers was stopped, which caused architects to start designing large buildings in such a way that they didn't affect as much of the sunlight reaching ground level (Rubnicu, 2012).

Solar energy is becoming even more popular in the United States as time goes on. In 2009, solar energy installation grew by 40%. The US is still behind in the amount of solar energy usage, with Germany and Italy being on top of the charts in solar energy usage in Europe (Lew, 2009). The growth in popularity of solar energy can also be linked to the lowering of its cost. As the technology becomes more available, some companies are now leasing solar energy systems for the home. The consumer gets all the benefits of a solar energy system, but at a lower upfront cost while still seeing the savings. The companies normally even provide service, as well as insuring their products to work (Feldman, 2013). Solar energy becoming popular means that there will be more jobs available. These jobs include those for scientists, engineers, textile workers, and installation technicians, and this field can only grow from here (Hamilton, n.d.).

"Photovoltaics is the direct conversion of light into electricity at the atomic level," writes Gil Knier (2002). Albert Einstein was a major contributor to describing how light works with the photoelectric effect pertaining to photovoltaics, which led to him winning a Nobel prize in physics. Bell Laboratories is credited as creating the first solar battery. In a basic solar panel, sunlight hits an anti-reflective coating on the panel so that it gets trapped in a specially treated semiconductor material. There are contacts on the front and the back of the panel. When the light hits the semi-conductor material, the electrons are jarred from the atom, which creates

electricity that can be put into batteries, or used to directly power almost anything. A group of solar cells makes up a solar module, and a group of modules create an array. The arrays are put into panels and then installed on roves, or in large solar farms. A larger array means higher energy production. For these solar arrays to get the most energy out of the sun, multi-junction cells are installed in the arrays. The multi-junction cell has several different types of gases and semi-conductors in it so that it captures more of the energy beamed on it from the sun (Knier, 2002).

There are many positive sides to having solar panels installed on the roof of a home or business from the energy savings, to not having to rely solely on the power company, to them actually cooling a home in the summer. Jan Kleissl and his students performed a series of tests, using a thermal imaging camera over a series of days to show that the building that had solar panels installed on it was around five degrees cooler during the heat of the day than an adjacent building that had no solar panels installed. The panels caused the temperature to be around five degrees warmer at night, meaning that during the winter heating costs would be lower. Kleissl's team also determined that buildings that had tilted solar panels on them versus buildings that had flat solar panels on them are more efficient. The flat solar panels cause heat to be trapped between them and the roof of the building that they are installed on, which causes the building to become warmer, and less efficient, which can mean large differences in energy costs (Patringenaru, 2011).

Many large corporations have started to implement solar panels on their buildings as a way to be more energy conscientious. The top five of these companies, according to the Solar energy Industries Association are Walmart, Costco, Kohl's, IKEA, and Macy's, by solar capacity.

These stores have made the decision to go to solar in some of their stores because of the lower initial cost of installing the solar systems and the greater energy savings accompanied by the solar panels ("Solar Means," 2012). There are many other companies that operate stores, factories, and other commercial buildings under solar power. Whole Foods offset 100% of its electricity usage by letting green power purchasing be a company-wide initiative. They have also won the EPA Green Power Leadership Award twice. Intel corporation, a company that creates computer parts, gets more than 50% of its power from solar energy (Lew, 2012).

In conclusion, solar energy seems to have many benefits that range from keeping a business' actual building cool, to saving energy, to becoming energy independent, and even just being a good example to mankind. Solar energy has a rich history in the ancient world from being used to heat homes based off of the orientation of the home, to helping start a fire by directing the solar rays into one specific point to heat tinder. Solar energy is also becoming more and more popular as it becomes even cheaper as the days go by for even the average person can afford a system. Solar panels are not quite as complicated as once thought, and all that is required is a little research to find out that the sun does all the work just by shining. They have also been proven to cool the inside of buildings during the day, while also keeping the building warmer at night, providing increased saving during summer and winter just by being installed on the roof. Also, many large businesses have started to turn towards solar energy to try and reduce their carbon footprint and are setting a good example for the rest of the country to be more energy conscientious.

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