A Solar Energy Proposal for the University of Kansas

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Environmental Studies

Capstone Project

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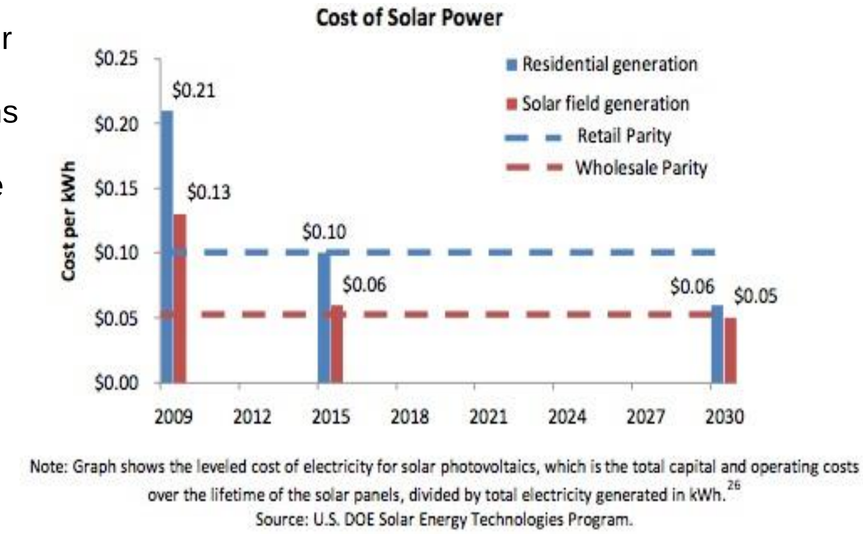
Contents

Abstract

This project was designed to propose a plan for a solar installation for the University of Kansas. The installation will be made on the new dorms planned for Daisy Hill. This will be a great place for a solar array because the panels can be installed along with the building instead of being retrofitted to existing buildings. Daisy Hill is also an ideal location based on solar exposure. We will present significant research to support in financial decision making that is feasible for the University. Along with these

figures, there will be a number of incentives and other options included to help persuade the University into adopting a solar project.



Introduction

The University of Kansas is a prestigious school to attend but is lacking some progress in alternative energy expansion. Many things have changed since the University was founded in 1865. The plethora of fossil fuels and coal being burned by major corporations and industries are creating an abundance of greenhouse gasses in our atmosphere and causing climate change and other substantial problems for the environment. The cost of energy resources have been on the rise from previous years. Now is the time to start looking into future technologies to make the University of Kansas a more sustainable place.

The Implementation of a solar plan at the University could be substantially beneficial for all parties involved. The sun is nature's ultimate energy source and can be harnessed using the right technology. Today, the cost of solar implementation and panels are declining and becoming a more feasible idea around the country and is a cleaner way of obtaining a source of energy (Figure 1). This alternative energy source could produce a substantial annual savings. Our campus has the potential for very high output gains due to the amount of space available for the panels. We need to take advantage.

Figure 1: SHowing the decline in the price of solar, from 2009-2030.

The Importance of Solar/Sustainability

Since the industrial revolution in the late 18th and early 19th centuries, society has become fixated on harvesting our limited resources for the production of industrial and consumer goods. The obvious issue with this reliance is that these resources are finite; therefore, there must be a point in the future in which they run out. With this issue increasing every day as more resources are used, people across the world are looking for a solution that doesn't rely on our finite resources like oil, coal, and even water, turning to "greener" practices like solar and wind energy. These energy sources will be important as society shifts toward renewable energy to solve many of the environmental issues caused by our historically toxic practices, like coal mining, fracking, and nuclear fusion. These renewable energy sources also offer imminent financial benefits, as it becomes cheaper to produce and implement them.

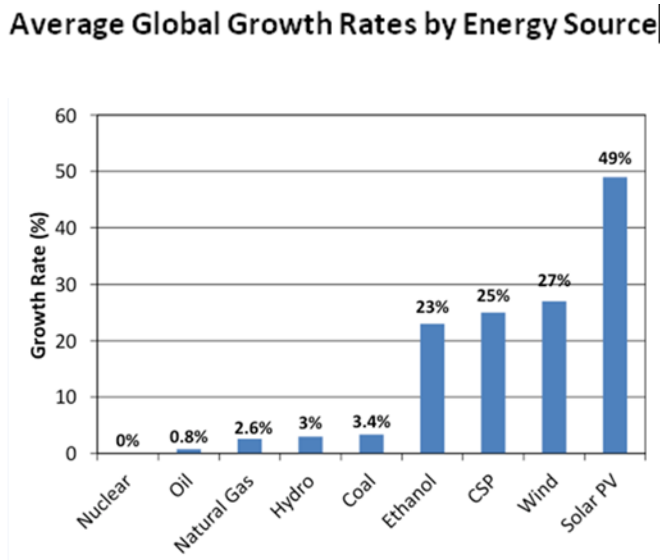


Figure 2: Average global growth rates by energy source over a five year span (2005-2010)
Source: World Watch Institute

Solar has become one of the fastest growing renewable energy sources. It provides an excellent solution to the issue of our diminishing finite resources. Solar also provides energy "security" because it is harvested from our most abundant resources, the sun. For this reason, solar energy will be a viable option for energy as long as the sun exists. Figure 2 shows the global average growth rates for our energy resources from 2005-2010. Solar energy represents the highest growth rate during this time period and continues to grow as technology increases and photovoltaic (PV) cells become more efficient at capturing solar energy. In fact, this graph shows the growth of photovoltaic solar at almost 50% over that five year span; a growth rate that is exponentially higher than the other energy sources shown in the graph. One of the current issues with the implementation of solar energy on a massive scale is the cost of installation and maintenance. Because of these high costs, the current price of solar energy is dictating the market, meaning it is not yet cost effective for the average household; however, as technology progresses, it is rapidly becoming cheaper and more readily available (Ren 2014). For this reason, experts who work in with solar technology, like Dr. Ren at the University of Kansas, project that solar energy will continue to expand and become a vital resource to society. According to the Solar Energy Industries Association (2013), there is an expected 26% growth in solar energy installations in 2014 alone. With this projected increase, there will be enough solar energy generated to power 1.13 million average American homes. (SEIA 2013) Figure 3 shows the projected increase in photovoltaic installations in the next few years, further illustrating the rapid expansion of solar installations. With declining prices, increasing demand, and the environmental benefits, solar energy has become a

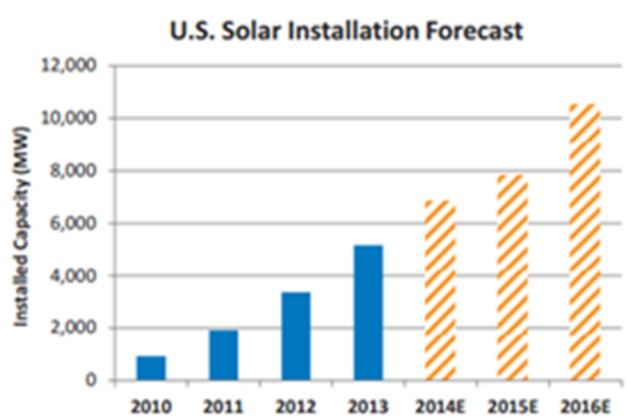


Figure 3: Graph of projected U.S. solar instillations from 2010-2016 Source: SEIA Fact Sheet

viable alternative to traditional forms of energy.

During a time of such rapid growth, it is important that KU follow the example of numerous other universities across the globe and utilize solar energy on campus. Schools like the Massachusetts Institute of Technology, The University of Colorado at Boulder, and the University of North Carolina, have all made groundbreaking advancements in renewable energy practices by implementing solar energy on campus. Traditional forms of energy, like coal and oil, are environmentally costly because they produce and emit massive amounts of greenhouse gasses but the production of solar energy offers a sustainable alternative at a fraction of the environmental cost. With declining prices and increasing environmental issues due to greenhouse gas emissions, it is important that our university follow suit and take a step toward sustainability by utilizing the most sustainable and opportunistic form of energy, solar.

Solar at the University of Kansas

Even though KU has promoted other green initiatives, such as KU recycling and the Revolving Green Fund Loan, there are only a couple solar installations on campus. The solar installations most similar to what our group will propose later in the paper are the Center for Design Research and the Hill Engineering Research and Development Center, both located on west campus. Studio 804, which is a class of KU architecture students taught by Dan Rockhill, designed and built the buildings with the goal of researching and developing sustainable, affordable, and inventive buildings (Depcik). The Center for Design Research includes many green features including a wind turbine, 36 solar panels, an electric vehicle charging station, and a smart meter provided by Westar Energy to provide continuous data on energy usage (Spaces: Center for Design Research). The 36 solar panels produce a 7.4 kWh energy output and the wind turbine can generate 400 kW per month (Studio 804: Futuristically Green). Smart metering allows for surplus energy produced by the solar panels to either be used at night or fed back into the grid, reimbursing energy cost per kiloWatt hour. The Hill Engineering Research and Development Center is where the KU Ecohawks, engineering students focused on a sustainable approach to vehicle and energy infrastructure, research and develop electric cars and renewable energy technology. Photovoltaic panels are located on the entry canopy and there is a large array along the roof top. Net metering of these panels means that surplus electricity can be fed back into the power grid and KU is credited for that energy, the same process as the Center for Design Research. Both buildings have achieved LEED certification and provide ample opportunities into student driven research. The following will outline reasons as to why KU has not implemented more solar projects along with counter arguments as to why solar energy is feasible on campus.

As one would expect, cost has been the biggest factor into why solar energy projects are not prevalent on campus. Westar Energy and KU have a contract that supplies all the energy that the campus needs at a cost of $0.76 per kWh (Werth 2014). Taking this electricity rate and the cost of solar panels and construction, has made it very difficult for projects to be approved. Installation, construction, and maintenance of solar projects have a large upfront cost, and then pay back over time through the production of solar energy that is converted to power whenever it is needed. Returns on investment will take time but there are many other benefits such as research opportunities and sustainability that make up for the initial costs. KU is funded every fiscal year through state appropriations to the six state universities from the Kansas Board of Regents (KU Revenues and Expenditures). Solar projects have been shot down in the past because of the fear that there will not be a fast enough return on investments and the university cannot afford these projects, but that is no longer the case.

With the push towards sustainability and the need to reduce greenhouse gases, solar energy installations on campus are worth the investment. Costs have deterred funding for projects in the past, but now there is an option that KU cannot pass up. Applying for the Westar Energy Solar Project Grant was the most viable option for a large scale solar initiative. The Facilities Department and the Center for Sustainability together applied for the grant before the March 1, 2014 deadline. The grant would "provide funding for installation and maintenance of photovoltaic panels and associated equipment" (Westar Energy). Proposed locations to receive the 10 kWh solar project grant are Lindley Hall, the School of Engineering, Allen Fieldhouse parking garage, and the Hill Center (Severin 2014). More details on this grant along with financial costs and incentives will be discussed in later sections.

Recent research has shown that Kansas has a high potential for solar power energy. According to a 2006 study by the National Renewable Energy Laboratory, Kansas tied in eighth for energy potential for solar power based on the sun index at 0.95 (Comparison of Solar Power Potential By State). The sun index is the amount of direct sunlight received and takes latitude and cloud cover into account. The ranking of sun indexes was calculated by averaging the hours of direct sunlight per year from 1960 to 1990 (NREL Solar). Kansas' solar potential gradient runs from low in the northeast, 4.0-4.5 kWh/m^2/day, to high in the southwest, 5.5-6.0 kWh/m^2/day, much like the rest of the United States (Kansas Solar Resource Map, 2006). Translating solar potential into clean, renewable energy must be a goal for every Kansan, "The average annual solar energy falling on one square mile in central Kansas is about four billion kWh...the equivalent to two and one-half million barrels of oil. About 70 square miles receive solar energy equal to Kansas's annual energy consumption" (Kansas Solar Resource Map, 2006: pg. 2). Residents in Kansas, along with the rest of the US, have the potential to reduce carbon emissions through renewable energies like solar energy. Lawrence, KS is one of the more favorable locations for solar power receiving approximately 1,700 kWh/m2 annually (Kansas Solar Resource Map, 2006). A campus solar project could harness this energy and convert it to usable power, reducing KU's energy costs and greenhouse gas emissions.

Our Proposal

The combination of our geographic location along with an appropriate building site would make solar power cost effective and energy efficient due to its ability to maximize energy output. The construction of the new dorms on Daisy Hill provides an ideal location for the solar panels. One reason the dorms are ideal is because by putting the panels on the roof, all visual interaction is avoided. Additionally, by putting the panels on a flat, unshaded surface, the amount of energy harvested by the panels is optimized. Taking advantage of new construction sites eliminates the need to retrofit any existing buildings, which can prove costly and time inefficient. The data presented in this paper examines the costs of fulfilling our projects' goal of solar power on campus. It also depicts the cost ($/Watt) of such projects decreasing at a favorable rate, making the present a financially sound time to invest in a solar energy system. In addition, solar technology has increased to a level in which the panels are capable of paying for themselves in the near future. Taking into account the scale of the campus, this project could be thought of as a demonstration or tool to analyze the effectiveness of the panels. Down the road, it would be a very useful model when the time comes to implement solar power on other campus buildings.

Feasibility

The monetary savings from solar energy come in two forms: lowering actual energy usage and lowering demand charge. The largest contributor to the savings is through the reduction of energy used from Westar due to the power produced by the photovoltaic panels, necessarily accounting for the reduction in demand charge from Westar. The demand charge is determined by the 15 minutes of highest usage by a single meter during a billing period. Once that 15 minute interval is determined, Westar goes to all other meters billed and reads their demand. Westar then adds up the total pull of all meters during the timeframe and determines the demand charge accordingly. Typically, the largest pull of energy is sometime between 11:00 am to 12:00 pm, which coincides with times of high conductivity by the solar panels, thus reducing the demand charge.

There are several options that we have come across as to who could install the solar panels and methods of how we could go about funding such a project. Cromwell Solar, a solar leasing company based out of Lawrence, installs panels on existing buildings at no charge to the customer. They then create a 15-20 year contract that locks in an energy rate lower than current rates from Westar. Another option that we have is purchasing the panels ourselves and having them installed. This way would give the most control to the university over the solar project, but it would also involve the need to have maintenance, repairs, and replacements done periodically by university staff.

In order to pay for the high costs of the photovoltaic panels, we will need to tap into one of many different sources of funding. The ideal funding option comes from the Westar Energy Solar Project. Westar offers this project to any school, non-profit, or government agency, and the project includes a fully paid for photovoltaic system that will produce 10-30 kW of direct current. This is the best choice for the university due to the lack of expense, but unfortunately, there is no guarantee that we will be the one institution selected for this project. Other methods for paying for the panels include the use of the Revolving Green Loan Fund at KU to obtain a loan up to $40,000 to cover the project. Using the Green Fund would help to keep the campus sustainable and would grow the Green Fund, which would increase funding for future projects. The guaranteed funding we would receive for the project comes in the form of the Solar Investment Tax Credit (ITC). The ITC subsidizes 30% of the cost of all solar projects in the United States by government institutions.

Solar panels can be put on existing campus buildings or be integrated into the new dormitories planned on Daisy Hill. Estimates on the largest sized solar array that the roof can support could not be attained, however, due to the enormity of the incoming building, it is safe to assume that the usable area of the roof could support at least a 45 kW system. The cost of a system this size is $152,080 with a payoff period just under 22 years, saving $6,982.09 a year in electricity costs. The estimates for this 45 kW system on the new dormitories are based on estimates of a system of the same size on the Hall Center for the Humanities. However, of all the existing buildings on campus, Wescoe Hall is the prime candidate. Chris Rogge of Cromwell estimates that up to a 300 kW system could be placed on the roof of Wescoe and could produce annual savings of $44,236.29 (Rogge 2014). This system would cost $1,015,000, which would give it a payback period of just under 23 years. Another possible candidate for solar is Blake Hall with a roof that can support up to a 29.5 kW system, which would produce savings of $2,875.37 per year. This system would cost an estimated $71,000 and would have a payback period of approximately 24.5 years. Malott Hall would be another good place to consider because it has the capacity for a 62 kW system that would produce savings of $9,142.11 per year. The system would cost $213,328 and will pay itself off in just under 23.5 years.

Other Options

The University of Kansas is home to many historic buildings and is known for its red tile roofs, which can be seen for miles around. These tiles have beneficial properties, such as having a high albedo or reflectivity, and also add an important aesthetic dimension to our campus. Aside from buildings with the historical tile roofs, the University of Kansas is home to many other possible sites, such as; existing non-historic buildings, facilities located on West campus, and several large parking lots with unused space.

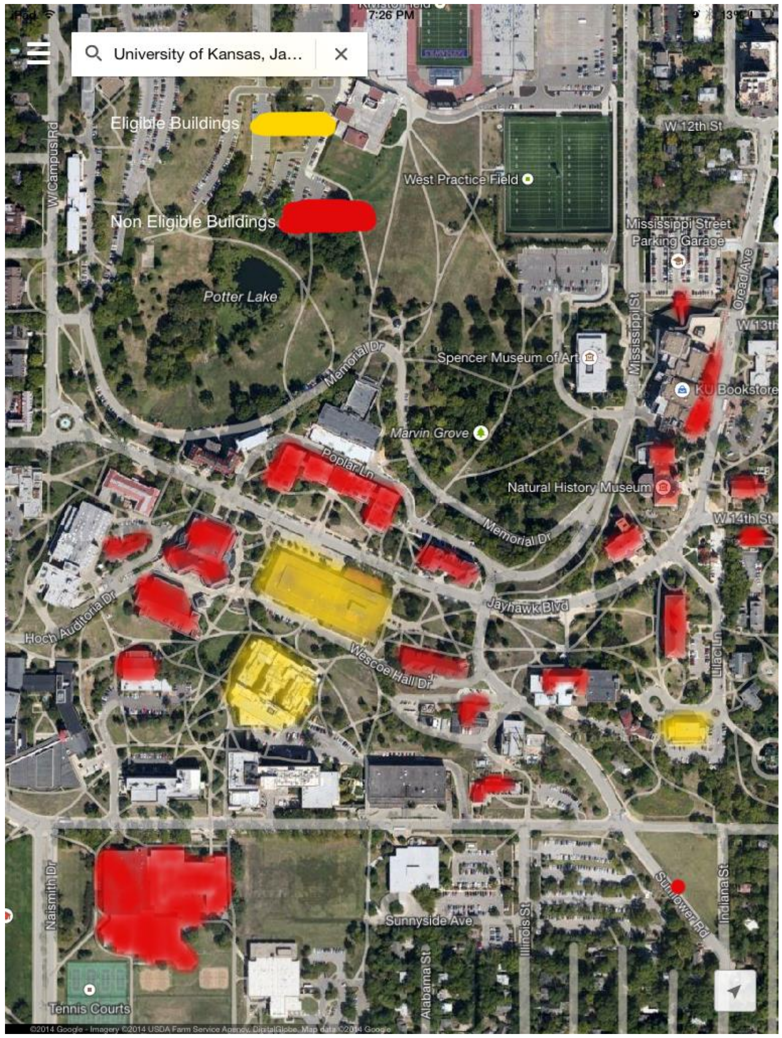


Figure: 4 Possible Installation Locations

Photovoltaic cells work at an atomic level to convert light into energy by using electric fields. When light strikes the magnetic field, electrons are knocked loose from the atoms in a semiconductor material, which surrounds the atoms. When electrical conductors are attached on both the positive and negative sides a circuit is created, which allows for the capture of the electrons in the form of an electric current(NASA Knier). When many cells are placed together in the form of a panel, the amount of potential energy increases, and also eliminates absorption problems due to shadows and the placement of the sun in the sky. The main objective of the panels is to convert as many photons into usable energy, which means that in order to be the most efficient they must be placed in areas that will be exposed to direct sunlight throughout the day.

There are two main types of rooftop solar panel installations; fixed and tracking. Fixed panels have a directional orientation that is set at the time of installation, which makes for a rigid and stable structure. Tracking solar panels are attached to a motor, which follow the sun throughout its position in the sky throughout the day. Although these are able to generate more energy, they are easily encumbered by heavy precipitation and snowfall.

Eligible Buildings on Main Campus

Although the University of Kansas is known for its red tile roofs, not all buildings on campus have that feature. There are a few buildings on campus that would make good candidates for solar installations, including; Blake hall, Malott hall, and Wescoe hall. Each of these buildings has its own set of characteristics that would make them a good choice. Blake hall is currently the political science building and stands at 6 stories tall, making it a great option due to its relative height to surrounding objects such as trees and other buildings. Blake sits atop a south-facing hill, and would be able to receive more sunlight compared to buildings on the North facing side. Malott hall is home to many science labs and research opportunities, which would benefit from having cutting-edge solar installations to help cut the high energy costs of the building as well as giving the students another medium to learn with. Wescoe hall has the largest open roof on campus, and would be able to accommodate the largest solar application of all eligible buildings on campus. The roof of Wescoe is not visible from any roads, which would make any problems of unsightliness void. The large solar capacity of Wescoe teamed with it’s central location provides the University of Kansas with many options in regards to where the energy allocated by the panels could actually go. With many large buildings nearby, like Budig, Anschutz, and Strong Hall, the power could be outsourced to any combination of those available.

Applications in Parking Lots

As an alternative to retrofitting existing buildings with solar panels, the University of Kansas could utilize unused space in parking lots. Solar canopies are structures that provide protection from the elements, generate electricity, and maintaining the aesthetic qualities of the buildings at the University of Kansas. There are several types of solar canopies to consider, including architectural solar canopies, fixed-tilt solar canopies, and tracking canopies. Architectural solar canopies are the most aesthetically pleasing and stable structures available. These applications also have the ability to change the pitch of the roof in two directions at the time of installation, allowing for optimized solar absorption. Fixed-tilt solar panels are similar in design to architectural solar canopies, but may only be oriented in one direction, which does not allow for as much absorption. Tracking solar canopies use motors to keep the panels at an optimum angle with the sun. These systems provide up to 25% more energy, but do not provide a system for precipitation runoff and do not hold up well against snow accumulation (Sunpower). There are three ways to finance a solar parking feature; cash purchase, solar power purchase agreement (PPA), or a solar lease (Sunpower). The cash purchase is the simplest route in terms of financing a solar feature, and also provides for the greatest net total energy savings over the system's lifetime. By avoiding third party expenses and interest, you can maximize energy and capital savings. The solar power purchase agreement allows your organization to purchase solar energy on a monthly basis with no upfront cost. This means that the university would house the solar features, but not have to deal with any maintenance due to third party management. Leasing is the least desirable option, because at the end of the agreement you are either left with nothing or outdated equipment.

West Campus

West campus is a great option for solar energy at the University of Kansas due to the fact that the buildings constructed there do not have the red tile roofs found on many buildings located on the main campus. West campus is also home to many research facilities, including; Wakarusa Research Building, Multidisciplinary Research Building, Higuchi Biomedical Research Center, Structural Biology Center, and the Youngberg Hall Center for Research Inc. (KU

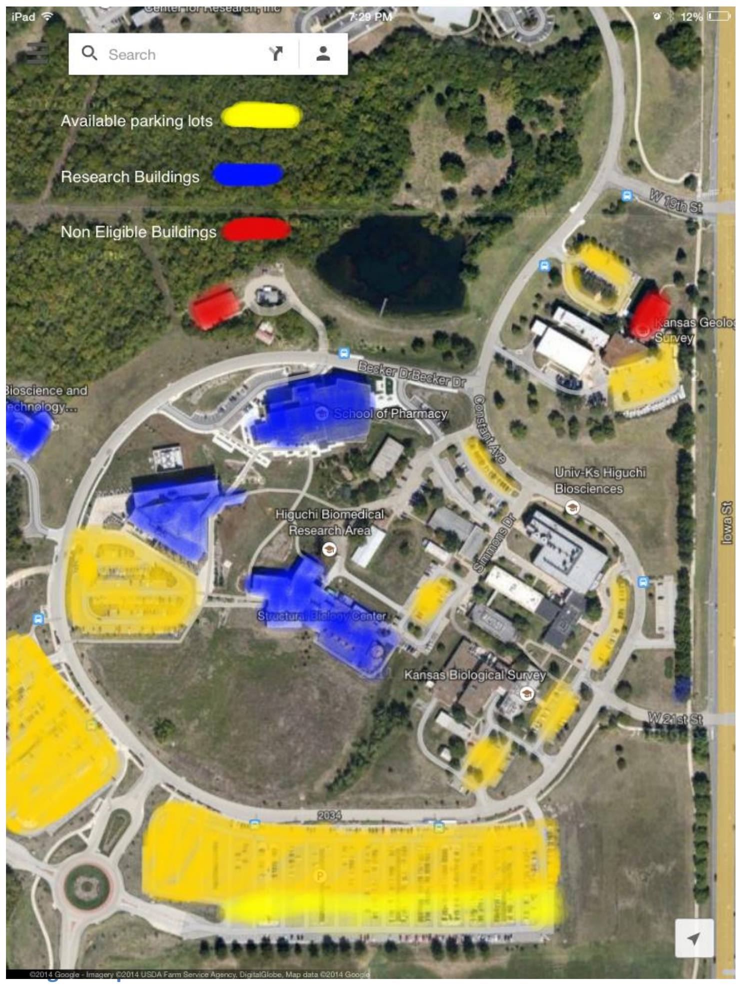


Figure: 5 Possible Installation Locations

Building Directory). There is a lot of cutting edge research being conducted at these facilities, and the addition of solar panels could provide students with an opportunity for hands-on experience with this increasingly popular technology. The layout of West campus is much more spread out than that of main campus, and has an advantage when it comes to the amount of available sunlight due to shadows and shading. In addition to suitable buildings for installation that I previously mentioned, West campus is also home to multiple very large parking lots that would be good sites for solar canopies.

Incentives

Massive Solar Expansion in Universities

Across the country, solar panel installations on college campuses have increased. The University of Kansas is falling behind on a very important step towards a sustainable university. One can understand the financial issues that surround implementing solar on campus, specifically with a long payback period. Since the campus is funded on a yearly basis, it is difficult to make an investment that would take years to pay itself back, but with the

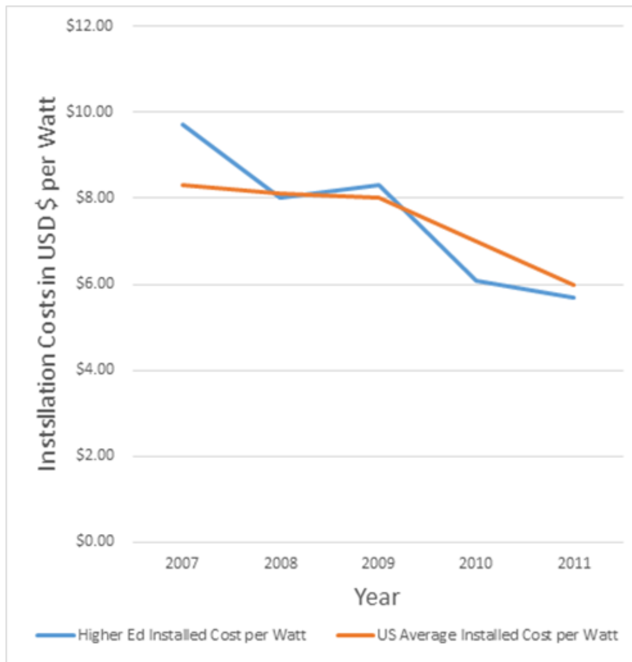


Figure 5: Decline of average Installed Solar system Cost per Watt for Universities and US Commercial/Private Sector

**Figure 6. represents the decline in price for solar installation from 2007 until 2011 for both higher education organizations and the commercial and private sectors of the United States. This figure shows that higher education installation costs are even less than the average United States installation cost (commercial and residential). Data sourced from Hummel 2011 and Barbose et al. 2013.*

declining cost of solar installations, the feasibility of this installation is becoming more probable. There are more solar installations at universities now than ever before. According to a 2011 report provided by the Association for the Advancement of Sustainability in Higher Education (AASHE), “installed solar capacity [at both universities and private homes/businesses] has grown 450 percent over the last three years… as institutions have taken advantage of dropping solar prices, state and federal incentives and innovative financing mechanisms” (Hummel 2011). What is making these installations so much more possible than before? As seen in Figure 6, there has been a steep decline in the price of installations across the country both in the corporate and private industry, which directly correlates with the steep increase in solar installations.

Successful University Application

A solar installation company named Solar Liberty out of New York has had a number of successful solar projects throughout the northeast of the United States. Many of these installations have been in the education sector. One important installation was the St. Joseph’s Collegiate Institute, a small, private school in Buffalo, New York. They installed a 25kW solar array at the college, one very similar to the size of the panels that could be installed on the new Daisy Hill dorms. According to Solar Liberty, this system has 108 solar panels. These panels generate an average of 26,448 kWh a year, which translates to over $3,000 a year in savings. On top of the energy created and money saved, the project is doing a great deal to benefit the environment and the surrounding communities of Buffalo. Every year the school alone decreases their CO_2 emissions by 18.2 tons. Every year, that amount of carbon dioxide is kept out of the surrounding areas, creating a cleaner living environment for the city and its people. In the lifetime of the panels, the school has created a C02 offset which is equal 1,202 trees and a total of 47 tons of CO_2. Since the installation of these solar panels in August of 2011, this school has also generated enough energy equal to 5,410 gallons of gasoline.

One can surely see the difference that a small system can make over time, not just in terms of saving money but also in terms of making a positive impact on the environment. According to the solar radiation map (Figure 7), KU is located in a geographical region with a higher solar radiation potential, meaning that with a system around the same size KU could produce more electricity and have greater success

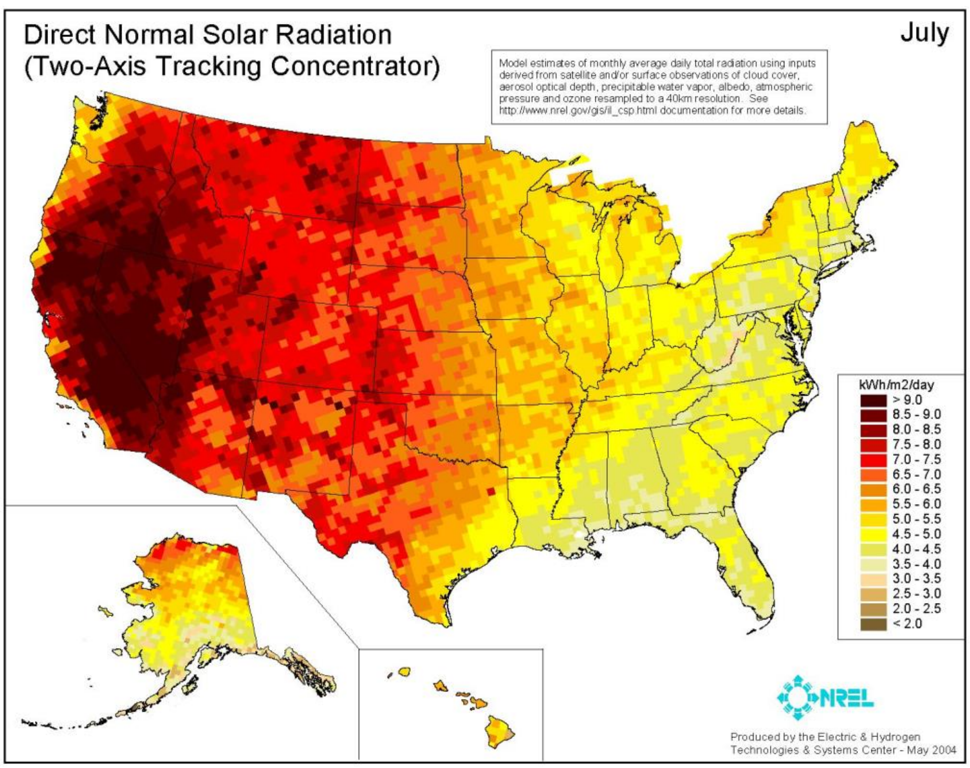


Figure 6: Solar Radiation Map of the United States Source: NREL

**Figure 7 shows a map displaying concentration of solar radiation across the United States. The difference between the state of New York and Kansas is significant, showing that solar installed in Kansas has the potential to produce more electricity. This increases the overall value of the solar panels and can increase savings.*

compared to this New York school. If a system in New York can make this much of an impact, imagine the impact KU could make, both financially and environmentally.

Promoting a green campus environment

Green practices are crucial to a well-functioning and sustainable campus and university experience. Adopting more solar on campus is a way to promote these green activities. The KU Sustainability Plan states “By including environmental, economic and social responsibility in [the campus] experience, students will realize the benefits of sustainable behaviors and adapt their lifestyles both on campus and beyond” (KU 21). This will set a positive example for the students on campus, in hopes that they take the strides the university is making to heart. Letting students know that the university takes pride in their efforts to preserve the environment could potentially alter the overall behavior of the student body, creating a more sustainable attitude campus wide.

In a report written in Global PhotoVoltic Business Magazine, the U.S. Green Building Council cites studies that find schools with a higher focus on sustainability and renewable energy see many positive effects within the student body and staff. For example, health and performance have increased, including a better learning experience and a higher teacher retention rate. Implementing solar panels will aid in the University's overall efforts to increase sustainability, not only by increasing the health and morale of the campus body, but also in terms of promoting the students to do their part in keeping the beautiful campus green. Goal 1 of the Student Life section in the Sustainability Plan is to “Foster the development of an engaged, sustainability literate citizenry” (KU 22). There are a number of ways that the university can use solar energy to promote these behaviors, which will be presented next.

The school can use visual stimulants to promote new practices and their results. These visual stimulants could be in the form of stickers on light switches, for example, stating that, “This electricity was made by the sun! Join us in saving the sunlight!” With the prompts and visual stimulants, students across campus will begin to take part in saving even more electricity. The goal is to increase a green attitude, a sustainable population across campus, increasing efficiency overall and lowering the university’s footprint on the planet. Creating a student body of caring individuals whose actions are based on an effort to preserve the planet.

Another way that the solar panels could be used, is by making it more of a focal point when giving campus tours, especially during new student orientation. Bring the students to the site and show what KU is doing to make a positive impact on the environment. Handing out a flyer with some green initiatives might not make as big of an impact as showing the students firsthand what the University is doing to be sustainable. This shows the students that the University is taking matters into their own hands and hopes that they will do that same. Using a new solar array to promote these behaviors could be very effective in that regard.

Education

“With on-site solar arrays at more schools, a tremendous opportunity exists to take the next step toward ensuring our clean energy future: investing in solar education for our students through hands-on, experiential learning regarding the mechanics and benefits of solar.” (Karren and Walters 7)

Implementing more solar energy on campus will also provide ample learning opportunities for the student body. Providing the student body with an example will teach them not only how to be sustainable on campus, but also on how they can be more sustainable in their own personal lives, positively impacting the planet outside the campus boundaries. Not only is this a learning opportunity for the students' lives down the road, but this could also be useful hands on learning experience for those students looking to learn how to develop and maintain these types of renewable energy technologies. For example, the engineering department could potentially be an effective housing center for a solar installment, allowing students to work on and learn from this sustainable technology, as well as generating clean energy for the school.

There are other potential educational benefits outside the engineering school for that solar panels could provide. First, the University could implement a required course on sustainability for new students, with some of the main focuses being on what KU has done to improve its environmental footprint. Second, there are many environmental courses that could benefit from a larger solar installation. For example, there could be hands on live system monitoring projects to give students firsthand experience with renewable energy. Integrating this solar installation with education is another good way in which the university could generate funds for this project. In an interview conducted with the Director of the Center for Sustainability, Jeff Severin, he stated that a good way to bring in funds for a solar project like this could be to connect it with a need for education. Promoting a solar project for educational benefits could bring in some donation money as well as potential grant opportunities from nationwide sources. (Severin 2014)

World Record Solar Success at KU

The University of Kansas is playing a major role in the development of solar power. Dr. Ren, a Professor of Chemistry, is a leading scholar in the field of solar power. According to an article written by Sandra Henderson, “Researchers at the University of Kansas... broke the all-carbon PV efficiency world record with a 1.3% efficient solar cell built from nanocarbons, materials that could help drastically reduce the cost of PV technologies in the future” (Henderson). This record of 1.3% is a steady step up from the previous record of 1%. In an interview with Dr. Ren, he discussed how this technology not only will make solar power cheaper to obtain because of the ease of nanocarbon production, but that they are attempting to push into a market of personal solar power, such as a way to charge a cell phone (Ren 2014).

Since Dr. Ren agrees that more solar should be implemented on campus grounds. He sees solar as a very useful form of energy for the campus, and a powerful way that KU can make a positive impact on the environment. He believes there is a very large need for renewable energy and solar is one of the best methods of obtaining that type of energy. KU needs to ask itself a very serious question. We are breaking world records in solar technology, and what do we have to show for it? We feel that if scientists at the university are making such great strides in an important field both for energy and for the environment, we should strongly consider implementing more solar installations on campus.

Setting an Example

Implementing a solar array on campus would be a wonderful opportunity to make a statement to surrounding communities and other Universities across the country. The university can set examples for others to follow, not only by making solar seem more accessible but by taking the lead in campus sustainability. KU should want other universities striving to meet their sustainable example. With Lawrence community having a respected environmental attitude, it is only fitting that the university push for that goal as well. It will also draw some attention to the University from prospective students. More people are becoming more environmentally conscience and there are going to be future students looking at how sustainable a university is. Thus, the installation of solar panels could attract new students. If these panels are implemented onto dorms, it would also potentially increase the demand and usage of the on campus dorms, generating even more income for the university as well as building an even more sustainable student body.

Conclusion

It is imperative that the university comes up with an alternate energy plan that is sustainable for the future. We have to find a way to harness energy and use it more efficiently, starting here at KU. In this report we have provided a study of the feasibility as well as the incentives for the implementation of solar energy on our campus. With declining prices of solar technology, we recommend that now is an excellent time to pursue large scale sustainable energy use. With the information provided, we have determined that the implementation of a solar array on the new Daisy Hill dormitories being built is a good idea. It will save cost from retrofitting on previously built establishments and avoid any visual infractions. In doing so, this has been proven to be cost efficient and more sustainable for the environment. Increasing technology will also produce figures that will pay for themselves within a short period of time. Now that we have this detailed information, these findings can be looked upon for future planning. Although there are obstacles to getting solar implemented on campus, this report could be referred to and can be highly beneficial to the University in the future.

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