

The Effect of Inflation and the Pandemic on a Southern California Solar Company: A Case Study

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Supply chain issues are causing panic in certain sectors of the economy particularly the solar sector. Solar energy already has problems that can affect its growth in the long term such as lack of government incentives, high cost, and energy curtailment. These problems are becoming more pronounced as the pandemic is prolonged. California is a state that has been encouraging the use of solar energy and has introduced incentives for its citizens to install solar. Because of this, solar companies in California may be able to more adequately circumvent issues and excel economically than companies in other states. In interviews with Solar Optimum, a solar company in southern California, a discussion was had to see why they are doing so well while other industries struggle to keep up with the changing economy. Using their perspectives, a conclusion was drawn that the solar industry will see immense growth in the future despite the problems they now face. However, looking further into the future, solar will have to change drastically in order to fix the lack of profits energy companies will have when solar becomes used everywhere. Solar Optimum's responses were limited to residential and commercial solar installation in southern California.

Key Words: Solar Energy, Covid, Inflation, Energy Curtailment, Employee Retainage

Introduction

Solar power has become a popular way to harness clean energy in recent times especially in the state of California. The golden state has made it a mission to achieve a net-zero carbon economy by 2045 (Long, 2021). Harnessing energy that emits no greenhouse gasses will be required by the entirety of the state. Solar energy and wind energy are at the top of the list for energy solutions and rapid expansion of these industries is needed. While both energy sectors have seen powerful growth during the past decade, the uncertain economic and sociological state brought on by the pandemic has caused obstacles. The global pandemic created barriers for businesses trying to enter into the solar industry. Supply chain issues coupled with inflation and lowered employee retainage have made it hard to grow for some businesses. Because of these issues, many companies went under, but some companies managed to stay afloat amidst the chaos through certain means.

The solar industry is a relatively new industry in the construction field. It is a growing industry thanks to the increasing demand for renewable and sustainable energy. Solar energy provides strategic advantages in the search for sustainable energy. It is currently becoming less expensive to install and it runs on a free resource, the sun. Thanks to advancements in technology and political involvement, solar was achieving momentous growth in its sector from 2003 to 2016 in California (Sanchez-Perez, 2020). However, the pandemic changed its course. It made this growth unpredictable. The global pandemic caused a hiccup in the supply chain. In addition, the inflation coming from continued borrowing of assets has created an uncertain time in every industry and the solar industry is not excluded from these circumstances.

In this case study, how the pandemic is affecting solar companies in southern California was determined using interviews conducted with the solar company Solar Optimum. In addition, qualitative data was gathered about how solar companies are handling the effects of inflation and

supply issues. A hypothesis on future growth and economic resiliency was gathered based on responses conducted with the southern california solar company.

Literary Review

Solar's future growth is hindered by a variety of variables. It is an industry that is heavily affected by electricity demand and government intervention. The pandemic had an unprecedented effect on demand for electricity in that it created more of a demand in residential areas than before. This had a positive effect on solar. Government incentives can also have a positive effect on the solar industry by making solar more affordable for homeowners. However, there are still issues that need to be addressed such as that of energy curtailment which can be an economic problem for energy providers as time goes on.

The Global Pandemic and Electricity Demand

The global pandemic created an unprecedented need for electricity in residential areas. Electricity demand in residential areas skyrocketed as entire countries were placed under lockdown and confined in their homes. People needed to work from home and office buildings were vacant. The electricity that once served an entire office space was spread out into people's homes. While the change from commercial to residential space decreased energy consumption as a whole, residential energy consumption went up as much as 30% in some areas (Ku, 2022). Figure 1 and 2 below are graphs showing the change in energy use for residents in the state of Arizona when transitioning to a work-from-home lifestyle. While these graphs do not show California residents, they give a good idea of similar changes that occurred in California.



Figure 1: Daily Power Consumption After Covid Policy Change (Ku, 2022)

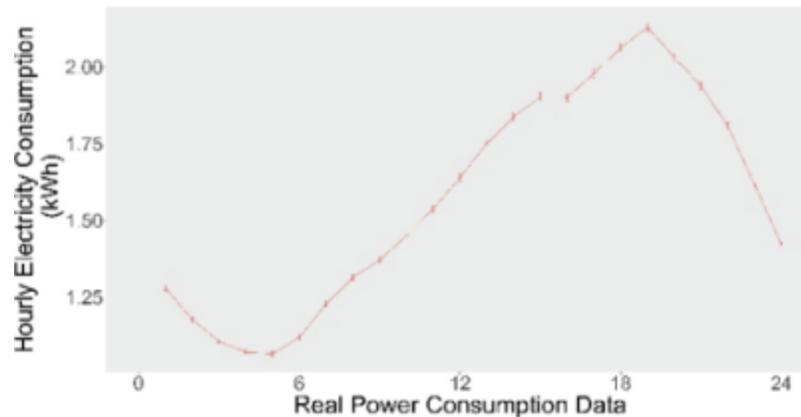


Figure 2: Daily Power Consumption Before Covid Policy Change (Ku, 2022)

These graphs show that energy demand in residential areas grew with covid. With demand rising, a lot of individuals sought new ways they could save on their electric bill. Solar became an option for many who acted early in the pandemic, but, as the economic impact of covid was realized, it no longer made financial sense for most individuals to install solar into their homes.

California Incentives for Solar

California is a state which has approached solar in an inviting way by offering incentives to individuals who are considering switching to solar energy. Among these incentives is a plan to cost-effectively build net-zero homes. Although this grandiose gesture would create a cleaner California, it is tone-deaf to the harsh reality of cost. Significant problems exist that need to be addressed by the state. One of the primary problems which has been addressed is cost. Building a net-zero home is a turn away from the traditional form of building. Contractors will need to spend time and money on research and development in order to front these costs (Wei, 2021).

On January 1, 2020, California enacted the California Solar Mandate which has a statewide goal of reaching carbon neutrality by 2045 through the use of solar panels in residential buildings (Ybarra 2021). They are also in talks to craft new regulations that would restrict natural gas connections in new buildings. These regulations have greatly incentivized investment into solar projects in California. There has been an increase in solar installations from 2009-2021 because of the regulations and the solar industry has no signs of stopping (Ybarra, 2021). The size of solar panel installations have also greatly gone up and with the price of solar panels falling, more and more customers are finding it affordable to place solar panels on their homes. In addition, solar customers can find benefits in net metering. Net metering is a tariff which customers can utilize to sell their excess energy to energy companies. This stopped in 2016, but legislators are in the works to reenact this tariff in 2022 which will be beneficial and attractive to new customers who want solar panels in their homes (Ybarra, 2021).

Another incentive California has introduced is the Federal Solar Investment Tax Credit (ITC). This policy gives you 26% of your solar installation cost back in the form of a tax credit. It is a significant measure that the state is taking to incentivize individuals to install solar in their home. The tax credit

goes down every year and more and more people that were considering solar are deterred away from the cost. Other policies like the Self-Generation Incentive Program (SGIP) offer rebates for buying and installing a solar battery. The Solar Energy System Property Tax Exclusion offers tax exclusion on the added home value from the rooftop solar system. The Single-Family Affordable Solar Housing (SASH) also offers cash incentives to low-income homeowners. While these are great incentives, are they enough to make the millions of Californians switch to solar in an unpredictable economic climate (Long, 2021).

Hyperinflation, Supply Chain Issues and Their Effects on Solar

Economic uncertainty is plaguing the United States. The unprecedented, rampant distribution of low-interest business loans and stimulus checks have caused a bubble that has made a lot of economists worried. Business loans during the pandemic were given out freely and unsparingly with some of the lowest interests in history. This type of activity has historically led to hyperinflation. This is the type of thing that Japan was doing post-WW2 which made the yen plummet in value. Although rampant distribution of loans will affect the whole country, the solar industry which, at this time, is relatively young will have to pivot in a new way to overcome this obstacle.

Cost is a key factor in determining if solar is right for the user and it is being affected by supply chain issues brought on by the pandemic. Solar photovoltaic modules and solar inverters make up approximately 65-75% of the total cost of solar (Das, 2020). These specific parts of solar power are dependent on China and need to be imported. Because of this, the price of modules and inverters are going up. With the cost of the most vital part of solar energy increasing, it is becoming more and more difficult to convince the layman to consider solar as a possible solution to their energy problems. Wealthy customers are more likely to purchase solar panels and are more likely to benefit from the tax incentives proposed by the state. This is also impacted by the climate zones in which the residents reside. People in hotter climates are more likely to see the benefit of solar panel adoption.

Energy Curtailment

An aspect of solar energy that is troublesome in the long term is energy curtailment. Energy curtailment is the act of intentionally decreasing energy production in order to balance energy supply and demand. It is more of a business problem than an energy problem. In some parts of California, solar panel energy output has sometimes outpaced energy demand. Falling power demand has been noticed in the bay area and in southern California due to the pandemic. Less commercial space is being used and residential consumption is taking over. There is a reduction in energy needs. Solar and wind energy is being overproduced in certain areas to meet the needs of California legislation (John, 2020). Curtailments of energy have been rising every year so it is not a new phenomenon. Energy companies have had difficulty managing the excess energy and are confronting the problem. Energy can sometimes drop to negative prices and companies often navigate the energy needs to higher priced areas (John, 2020). Some companies have also incentivized the cutting of power production in order to keep prices higher (John, 2020). These economic effects can be detrimental to the energy industry because their business must be profitable. Having excess renewable energy can affect industries that rely on energy to make profit. The demand is also difficult to quantify which will only become harder to quantify as the golden state's legislation comes about.

Methodology

The methodology for the research was mostly qualitative. Relevant information was gathered through scholarly articles. The case study was done through formal interviews with Solar Optimum. A contact at the company allowed for easier access to employees who were eager to answer questions about the issues they were having. Questions about the pandemic, supply chain issues, retainage and future growth were asked mainly on the phone except for a few cases where they were asked through email. Interviews were conducted with the site survey manager, the material manager, general manager, and two ground level employees from Solar Optimum in order to figure out everyone's point of view on certain key topics that will have a lasting effect on the industry. After responses were delivered, the data was reduced down to combine similar responses and point out differences. With this, it was qualitatively measured how Solar Optimum is performing and how they have overcome the difficulties that have arisen in the industry. Because only one company was interviewed, the data is biased and a formal overview of the entire southern California area will be limited.

Case Study

Solar Optimum Inc. is a solar company based in Glendale, California. They perform a wide range of solar jobs which are composed mainly of residential solar installation as well as some commercial. Their expertise in solar has allowed them to serve the greater Los Angeles area for years and their connections in the industry has allowed them to succeed amidst a period of economic uncertainty in Southern California. Solar Optimum is resilient and is continuing to find success even when obstacles like varied demand, rising subcontractor expenses, and material slowdowns get in the way.

Handling a Pandemic

The pandemic hit Solar Optimum Inc. better than most companies. Their activities were stopped for only a month, but after that month their business resumed as usual. During the month of April, nobody worked and everyone was sent home. After the short recess, Solar Optimum Inc. resumed their activities of acquiring new business. The company's production went up after the month of April. They were acquiring jobs consistently and it became difficult to keep up with the demand. The site survey manager of the company mentioned that they think it was because of the fact that most people were working from home and could actually let the workers into their home to examine the premises.

With this increased demand, there came a problem in the form of workload and lack of resources. The shortage of employees at the company required them to shift from a solar installation company to more of a site survey and sales company. Instead of doing everything involved with the solar installation process, Solar Optimum began managing the sales of solar installations. Solar Optimum still acquired the jobs and resources, but subcontracted most of the work. With this method, they took a cut of profit and mitigated risk at the same time. Because they were among the few able to receive the materials needed for solar installation, they acquired jobs, did estimates and hired subcontractors to perform the work for them. This method was brought up in the interview with the general manager. He said he saw no other way to become profitable again without being swamped with jobs they could not complete.

Subcontractors and Materials

Solar companies have seen an increase in costs due to the pandemic and material scarcity. The aforementioned modules and converters that are essential to solar installation have sharply risen

during the pandemic. Another essential material for solar installation is batteries. They allow for the storage of energy which is required for solar panels. The materials manager mentioned that the batteries were extremely difficult to come by during the pandemic. However, he also mentioned that they were able to circumvent the lack of these materials through a contact they had at Tesla. While many solar companies were struggling to buy batteries, a manager's contact had a seemingly limitless and inexpensive supply from the motor company. Many companies do not have this form of contact. Being able to acquire an elusive part through Tesla puts Solar Optimum at an advantage over other mid-size solar companies in the area. Figure 3 shows an example of what a solar battery can look like. These units are expensive with many batteries costing upwards of \$5,000.



Figure 3: Solar Battery (Shopsolarkits.com, 2022)

In addition, subcontractors that the company is using are increasing costs. This is due to the competition that is in the industry. Solar Optimum always welcomes new work that comes their way. Due to their continued acquisition of new jobs, more employees are needed. In order to remain competitive, everyone has increased wages and this hurts profits for many companies. Homeowners don't want to spend a lot of money to install solar and companies want to keep acquiring new customers. The solar company also said that they have been taking less profit than they did before the pandemic. While there are more jobs being done, profit margins have decreased and profit in general is not substantially more than before the pandemic because of rising wages and the cost to do jobs.

Handling Retainage

The pandemic caused issues with retainage. That is a tough problem to navigate when increased demand requires more employees. Because of the new demand, Solar Optimum did have to employ more individuals. They increased wages to help retention and shifted their plans to accommodate new work. The two ground level employees and the site survey manager had only been there for a few months and they seemed to be fond of the company so far. However, the general manager said that one of the ground level employees that was interviewed had quit suddenly. It is unfortunate that companies are having trouble keeping employees, but avoiding these issues has become increasingly difficult due to the pandemic. Furthermore, the competition in the area has risen. Large companies are paying better than smaller companies. This is causing smaller companies like Solar Optimum to take profit cuts to stay afloat. Even with the strategies the company has taken to help stop employees from leaving, Solar Optimum saw a sharp decrease in employee retention due to the pandemic. However, not all of these issues are bad for employees who want to stay. With a company that is starting to see

growth and decreased retainage, it is easier to climb the ranks and find yourself in a higher position. One company that was mentioned in an interview went under because of low wages and poor management. Employees were being underpaid and the company was accepting more jobs than they could handle. This affected retainage which in turn affected the jobs the company could take on. This slippery slope causes major issues that can make a company go bankrupt.

Solar Optimum's Future

Solar Optimum will still be around in the future. The managers seem competent and have enough experience through poor market conditions to excel. The fact that they subcontract a lot of work out to smaller companies is telling on where their priorities lie. It shows that they avoid risk in most of the jobs they do, thereby leaning into the profitable side of solar energy. By avoiding risk in the short term and building relationships to acquire materials in the long term, Solar Optimum will be commercially successful in the future. They are mainly trying to get past the issue of employee retainage and rising costs for materials. Solar companies are also struggling to compete with giant companies like Sun Run, but that can be avoided through proper management, competitive pricing, and competitive wages.

Conclusion and Future Research

Based on Solar Optimum's responses, the solar industry in Southern California is doing well considering the market conditions. Reliance on residential energy due to the pandemic has created an enormous opportunity for those involved in solar. Although profit margins have shrunk due to unforeseen costs, solar companies have a bright future thanks to new laws. The state of California's incentives have made it more affordable for homeowners to install solar. More incentives are still needed for average homeowners to be able to afford solar. However, various citizens that are wealthy and/or live in warmer climates are still installing solar. Without more incentives, California may not be able to achieve their goal of net-zero carbon economy by 2045.

The pandemic caused issues for solar companies due to the closing of businesses. However, most solar companies in southern California like Solar Optimum saw an increase in sales thanks to the stay-at-home mandate. With more people working from home, more energy was used in residential spaces and it made more financial sense to install solar.

A few obstacles like energy curtailment will still need to be addressed in the coming years, but this economic issue leans more towards energy companies like Southern California Edison which have been around for a long time. These companies will need to find a way to be profitable in the long term when energy supply outpaces energy demand. Moreover, these companies will do anything in their power to influence government policy and avoid having to deal with these issues entirely. This can be detrimental to the health of the solar sector, but, alas, the economic problems they may bring will have to be dealt with as they come.

If this study were to be redone there are a few more things that would be considered. More companies in Southern California would be interviewed in order to get a broader view of what solar companies went through during the pandemic. The company that went under as mentioned by an employee would be a particularly interesting interviewee. Their response would effectively help to avoid the survivorship bias of talking only to the successful companies in this sector. One question that was not asked was about energy curtailment. It is a leading concern to many experts on solar and was not mentioned during the interviews. In order to future-proof the solar industry in California, one must acknowledge the issue of curtailment and find a way to solve the main problem with renewable energy.

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