IMPACT INVESTING GROUP: ENERGY INDUSTRY REPORT

Authors: Gillian Cobb, Jennifer Schlafhauser, Sunanda Adibhatla, Elizabeth Fawley
Editors: Jiten Parbhoo, Sarah Carroll, Mehul Pandey and Scarlett Ong
Table of Contents

Introduction ........................................................................................................................................pg 3
Midwest Investment Potential........................................................................................................pg 4
Why Impact Investing? ................................................................................................................pg 5
Our Solution .....................................................................................................................................pg 6
Conclusion .........................................................................................................................................pg 7
Appendices .........................................................................................................................................pg 9
Renewable Energy Report

I. Introduction

Today, our society is heavily reliant on fossil fuels for energy, transportation, industry, and day-to-day living. Fossil fuels are used to make cars, warm houses, cook, produce plastic and much more. The combustion of fossil fuels emits carbon dioxide, which makes up 82% of all greenhouse gas emissions in the United States. The second most harmful greenhouse gas is methane, which is less prominent but even more potent and dangerous. Methane is commonly known as natural gas, and is used in heating and cooling systems. These greenhouse gases cause air pollution and trap heat in the atmosphere, which leads to climate change. The effects of climate change -- from drought to flooding, famine to the emergence of formerly eradicated disease, drastic natural disasters, the melting of icecaps, and the loss of essential ecosystems -- have already begun to occur.

Global carbon emissions have increased by approximately 90% since 1970, which correlates to a significant amount of data that shows an increase in global temperatures during that period. For example, all ten of the warmest years in history have occurred since 1998, and during the 2000s, there were twice as many record high temperatures as record low temperatures in the United States.

The United States is currently adapting to this problem by replacing coal plants with natural gas plants. Although coal is very inexpensive, the public has begun to recognize the extreme consequences that coal poses to the health of workers and citizens, as well as its environmental effects. The EPA has projected that the health effects of coal are so severe that, for every dollar spent on improving clean energy usage, we will save $4 on healthcare costs. Shutting down coal plants is certainly a step in the right direction, and currently natural gas is the next best option. However, we believe that investing in renewable technology is a better long-term solution because it will lead to a more significant reduction in carbon emissions.

Fossil fuels are nonrenewable, and are becoming increasingly harmful to extract and use for energy. For this reason, the need for renewable energy is greater than ever. Renewable energy sources offer a cleaner and more abundant supply of energy compared to coal and natural gas. Renewable energy comes in a variety of forms, such as solar, wind, and nuclear. These renewable energy sources drastically decrease carbon emissions, air pollution, and global warming. There are some concerns, however, that solar and wind do not eliminate greenhouse gas emissions as they cannot be considered “base load power”, which is considered a constant reliable energy source. This is because solar energy is reliant on the amount of sunlight on any given day and wind energy is dependent on the amount of wind it can generate and convert. These sources are weather dependent, have a low capacity factor, and cannot store generated energy for future use as well as nonrenewable energy can. The inability to store energy for long periods of time leads to insufficient battery capacity, which cannot be achieved for an
affordable price with the current technology available on the market. If solar panels could store the excess energy they harness during the day to use overnight when they can’t generate any, this could achieve base load power. As companies do not yet have this technology, however, they need capital to invest in research and development.

Wind and nuclear power also have extremely high upfront capital costs. Wind turbines need to be built up high from the ground and spaced far apart in order to maximize the amount of energy they produce. Each part of the wind turbine needs to be built and then brought to the onsite location to be assembled. The costs of construction, transportation, and assembly add up to be extremely costly, especially when a wind park could consist of hundreds of turbines. Nuclear plants are also extremely costly to construct, at approximately $4 billion for a standard reactor. This problem is exacerbated by extremely high costs of capital. Because nuclear energy still has a dangerous public image, companies that borrow money to finance nuclear power plant construction pay an interest rate that is up to 50% higher than if borrowing money to build a coal or natural gas plant.

In summary, the two main problems discouraging the widespread use of renewable energy sources to power the United States are insufficient technology and high initial costs.

II. Midwest High Investment Potential

The high initial costs of developing renewable energy require heavy investment from the public and private sectors to bring the project to fruition. In regards to availability of these investment funds, we believe the Midwest is lacking serious investment in comparison to the West and East Coasts. This lack of investment is exemplified by disparities in venture capital firms (VC). Currently, VCs are not nearly as large or numerous in the Midwest as they are on the West or East Coast. None of the commonly top ten ranked VCs are located in the Midwest, but rather are primarily located in California. The well-established West Coast VCs exemplify the current disadvantage the Midwest faces with regard to the access to investment funds.

Further, there are few firms in the Midwest dedicated solely to energy. The most notable is Foundry Energy, headquartered in Chicago. Huron River is another VC dedicated to Midwest investment. One of the fields they focus on is energy. The establishment of these firms represents progress for renewable energy development in the Midwest. The more VCs there are, the more resources can be used to invest in growing midwestern areas. Nonetheless, the lack of energy investment and VCs in the Midwest in comparison to the West Coast hinders the growth of renewable energy, as it is a developing industry that requires capital investment.

We believe that renewable energy development in the Midwest is a growing area in which to invest. The significant and attractive growth of “mid tech,” loosely defined as tech jobs requiring less than a college degree, is dominant in the Midwest. In a more narrow definition, mid tech is defined as computer and mathematics occupations “in
which 30% or more of those employed did not hold Bachelor’s degrees”. The growth of this field is attractive for the energy industry in particular, as it could aid in the development of renewable energy technology, energy storage, and grid systems. The number of startups is rapidly increasing in the Midwest due to the attractive economy ecosystem and low cost of living. This, combined with the lower cost of living in comparison to San Francisco, means that each dollar invested in startups has the potential to go farther in developing renewable and clean energy technology rather than just covering location expenses.

Accio Energy is an Ann Arbor start-up that illustrates both the potential in the Midwest and the lack of resources currently available. Founded in 2008, Accio Energy developed the first successful and most powerful electrohydrodynamic wind energy demonstrations. This technology basically functioned as turbine-free wind energy generation that had 50% lower costs, 40% higher capacity factor, and the benefits of being less visually unpleasant and difficult to place. However, in 2017, they were unable to secure the next round of funding they needed to conduct further research and ultimately construct their part-scale prototype. They were subsequently forced to stop operating. This demonstrates that there is tremendous opportunity for innovation in the Midwest that is currently being wasted due to a lack of funding sources.

III. Why Impact Investing?

With renewable sources becoming more prominent in the energy industry, there are many reasons why investing in renewable energy start-ups and companies can be profitable. Renewable energy is less risky than nonrenewable energy sources such as methane and fossil fuels because the latter have known negative consequences and are running out. “Peak oil,” the maximum oil that can be extracted before supply declines, has already been reached. Moreover, it is estimated that the amount of oil left for use will last only another 60 years. Additionally, renewable sources are safer to produce and cause less damage when being extracted from the environment than oil and natural gas. Oil extraction is expensive and can damage the environment, as demonstrated by the Deepwater Oil Spill in 2010 that caused damage to ecosystems, the fishing industry, and tourism, resulting in approximately $7 billion in compensation costs. Impact investing in renewable energy would generate a financial return while making a social and environmental impact. Investing in companies specializing in renewable energy would help to promote social causes by providing more jobs to communities and creating a larger platform for more renewable initiatives. Furthermore, renewable energy decreases fossil fuel use that greatly contributes to the excess of greenhouse gases in the atmosphere, and is easily accessible to lower socioeconomic neighborhoods.

Companies currently involved with renewable energy technology need capital to address the previously mentioned issues of insufficient technology and high startup costs. By investing in these companies, we can enable them to conduct research and develop more efficient and reliable technology, such as solar panels with a higher
capacity factor or batteries with a higher efficiency. By helping them grow, we can also improve access to environmentally responsible energy across the Midwest.

In Detroit specifically, green energy coalitions have implemented solutions that encourage the use of renewable energy by providing cost-cutting changes, renewable energy goals, and regulation of company energy use. For example, the Detroit Green Economy Initiative focuses on providing clean energy to Detroit, which makes the industry safer and provides more jobs. Clean Energy Communities invested in Detroit’s 36th District Court, with additional funds from Detroit’s Energy Efficiency and Conservation Block Grant and the Detroit Economic Development Corporation, to implement a 20 kW photovoltaic system that is similar to that used with solar energy. They expect financial returns within 3.5 years after contributing to the $1.7 million project, which aims to increase energy efficiency by reducing energy production, transmission, and operation costs and to provide renewable energy throughout the building and surrounding property. Companies are actively seeking to reach new heights to produce greater dividends and financial returns. Investing in these companies therefore offers a strong probability of sizeable profits soon.

Although DTE Energy is a government-regulated utility, the progress it has made in Southeast Michigan demonstrates that renewable energy can be successful in the Midwest. Public renewable energy companies can be key players in the implementation of similar and contrasting initiatives to develop reliable renewable energy in communities. Before government policies started mandating cuts on carbon emissions, DTE Energy implemented carbon reductions. The company recognized that it would be financially beneficial since renewable energy in large quantities greatly outweigh the costs of nonrenewable energy sources, thereby demonstrating the promise of renewable energy’s expected financial benefits. As the cost of manufacturing the supplies that go into renewable energy decreases with continued technological, governmental, and economic advancements, the profit on renewable energy will most likely skyrocket.

IV. Our Solution

The Midwest is an undervalued asset that is rich in markets, new business ideas, and budding entrepreneurs. Right now, more entrepreneurs are building billion-dollar companies in the Midwest than in the last 50 years combined. This area is vibrant with talent from local colleges and universities, such as the University of Michigan, University of Wisconsin, Notre Dame, University of Chicago, and Northwestern, and features a low cost of living. Based on these factors, we believe that the Midwest should receive more seed funding. Seed funding has the highest potential returns of any investment stage. Seed funds and angel investors can do a lot of deals with a few million dollars. Therefore, a first-time seed fund centered around clean energy could exploit the unfulfilled niche of the rich technical talent, but cheaper startup valuations, that are found in the Midwest.
To help this seed fund gain credibility, it should build a relationship with great investors already in the Midwest such as Drive Capital, a venture capital firm based in Columbus, Ohio. Drive Capital’s portfolio is centered around technology and sustainability, but currently does not have an investment in clean energy. If there were to be more seed funding in the Midwest, we believe that these funds should invest in local clean energy startups.

One Midwest startup that our fund could consider for seed funding is SiNode Systems. Based in Chicago, Illinois, SiNode is an innovative young company that develops advanced, high capacity batteries that can be used to power electric vehicles. One major source of carbon emissions in the United States is transportation. Plug-in hybrid vehicles are gaining popularity, but their widespread usage is prohibited by the high cost of batteries. In regular hybrid vehicles, gasoline primarily powers the car because batteries are very small and typically power the vehicle only during acceleration and to store energy. SiNode’s battery material can achieve capacities of three to seven times the current graphite battery material. This technology could have a massive impact on the viability of electric vehicles, and could be used for the storage of other renewable energy sources. For example, if this battery technology was further developed, it could lead to the storage of solar and wind energy to be used during dark, cloudy, or low wind days. This would reduce the problem of intermittency, and over the long term, could lead to a renewable energy base load power grid. However, to develop on a large scale, continue improvements in their technology, and create partnerships with retailers and electric vehicle companies, SiNode needs capital to expand. They may be able to attract this capital based on the awards they have received showing that industry experts view their technology as a promising potential solution. SiNode has already been recognized as the 2017 Startup Story of the Year by Greentech Media Energy Gang, and was awarded $4 million by Fiat Chrysler, Ford, and General Motors in partnership with the US Department of Energy.

Another company we would consider is NETenergy. Also, based in Chicago, this company is developing a thermal battery that can store cold energy to save building owners 30% on their energy usage, and reduce carbon emissions by 50%. NETenergy has already been awarded $500,000 by the Wells Fargo Innovation Incubator, and has also received smaller grants from various CleanTech and Innovation challenges and competitions around the Midwest. With additional capital, NETenergy could grow their company, perfect the manufacturing process of thermal batteries, form partnerships with larger companies and retailers, and ultimately work towards widespread adoption.

V. Conclusion

Seed funding in the Midwest region of the United States presents a unique opportunity for financial returns with both social and environmental impact. Interest in renewable energy will continue to increase dramatically as the dangers of fossil fuels become more apparent every day. The high cost and insufficient technology associated with renewable energy sources is currently slowing down the progress in
this space, but impact investing poses an amazing opportunity to help the industry continue to advance. As our fossil fuels continue to be depleted, the cost of extracting and processing them to produce energy will soon surpass the cost of producing renewable energy. Therefore, impact investing in renewables will very soon generate a significant financial return while simultaneously making a social and environmental impact. Investing in companies specializing in renewable energy will produce benefits far beyond merely improving our environment’s conditions. It will also create new jobs and improve the stability of our world's energy infrastructure. Due to these factors, we the University of Michigan's Impact Investing Group Energy Team recommend that seed funding be invested in renewable energy startups in the Midwest, a region budding with talent and low-cost opportunities.
Works cited


Olsen, C. (2017, May 30). In 5 years, the Midwest will have more startups than Silicon Valley. Retrieved April 12, 2018, from https://venturebeat.com/2016/08/28/in-5-years-the-midwest-will-have-more-startups-than-silicon-valley/


