Issues Confronting Local Installers of Clean Energy Technologies

An Interactive Qualifying Project Report
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Degree of Bachelor of Science
By

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Abstract

The growth of a local renewable energy market is major step towards reducing America's dependence on fossil fuels. YourEnergyOptions, Inc. aims to help jump start such a market in New England by fostering communication between local consumers, retailers, and installers using an online social networking website. However, the needs and desires of potential YourEnergyOptions users had only been given limited attention by the website founders to date. Through interviews, email questionnaires, and a focus group we learned how potential users might use the site, and what features they would find useful. With this information we then produced a series of recommendations that could be implemented by YourEnergyOptions in order to help the site become a successful tool in encouraging a thriving local renewable energy market.

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Executive Summary

America's ever increasing energy demands have to date been satisfied almost exclusively by the burning of fossil fuels. These fuels including coal, oil, and natural gas account for eighty five percent of current US energy usage (Union of Concerned Scientists, 2005). In addition to their negative environmental impacts, fossil fuels require thousands of years to form, and many fear we may be approaching the peak of their production. With domestic resources being depleted the US is forced to turn to imports as a primary source of these fuels. This in addition to increasing global demands raises costs and could be adversely affected by political issues (Shah, 2007). However; new sources of renewable energy have been making their entrance into the market over the past few decades. Solar power, wind power, hydroelectricity , and biofuels have been emerging as an alternative to fossil fuels. These sources produce little or no harmful emissions and are constantly renewable since they exploit resources that currently exist the world over. Despite the apparent benefits, renewable energy sources still only account for two percent of the world's energy generation.

There are still numerous obstacles that have hindered the growth of these renewable energy technologies. One of the largest barriers has simply been lack of education about these new technologies. Many people simply don't know what is available to them, how much it costs, or what regulations and incentives are in place regarding these new technologies. Likewise, the cost associated with installing such systems on a small scale is high (Dorian, 2006). Uncertainties surrounding payback periods for residential installations have prevented many interested home owners from making the large investment in their homes to install these renewable technologies. Incentives and financing options offered to home owners to mitigate these high fixed costs have also been minimal and information regarding them is not always easy to find.

The growth of renewable energy, particularly on a local, small-scale level, is more likely if there is a strong local market for these technologies. One of the most important issues in establishing such a market is connecting consumers, retailers, and installers with each other in such a way that they can communicate openly to help clarify uncertainties regarding renewable energy installations. The website, YourEnergyOptions.com, founded by Lance McKee in 2006, aims to do just that by providing an online location where consumers, retailers, and installers can gather and exchange information. His website, YourEnergyOptions.com, is the medium through which he wants to facilitate this cooperative environment.

Our goal is to provide YourEnergyOptions, Inc. with detailed recommendations as to how the site can be improved to accommodate the social networking and referral needs of local contractors, installers, and retailers. In order to accomplish this we needed to research the renewable energy market specifically the relationships between retailers, installers, and homeowners and learn how social networking can be used to enhance their interactions. We first evaluated the functionality of the current website based on four criteria; effective use, appreciation, usefulness, and functionality. Then through interviews with local contractors, installers, and retailers we identified content that these

users felt would be beneficial for them as users of the website. After gathering this information we formulated new content for the website, and developed new sample web site pages in cooperation with a second WPI student team. These pages were then used to gain additional feedback from local business people through a small focus group.

Based on our assessment and comparisons, we found the current site to be lacking in many areas, particularly in regards to its functionality. The sites mission was unclear, the user profile creation process was difficult to understand, and the communication portal was disorganized. Without these crucial areas, the site had limited functionality for its users and it could not be used effectively. The group's interviews with local installers and retailers further strengthened our initial analysis. We conducted three in-person interviews and obtained replies to emails with answers to our questions from two more people. Generally, users felt the site needed to be better organized and the key information and features needed to be presented more clearly. Specifically difficulties creating a profile and communicating with other users deterred site visitors from communicating with each other which is precisely the kind of communication YourEnergyOptions wants to promote. The interviewees also did not understand the mission of the site clearly and were unsure how it was intended to be used.

Based on these findings we developed revised content for the profile creation process, this included new fields that users are required to complete when creating a profile that is more applicable to their position in the market. For example, a user wishing to create a profile for his store that retails solar panels would be asked to complete a field specifically devoted to the types of renewable energy sources that a retailer most often carries. This content was forwarded to a second group of IQP students who created mock up web pages featuring color and layout using our content. This team then planned a focus group that was attended by a representative from each other team. The participants of the focus group were shown the new updated pages as well as the current site. The participants all found the new pages to be a huge improvement in terms of both usefulness and functionality.

Given all this feedback and testing, we developed a set of recommendations that could be implemented by YourEnergyOptions that would improve the functionality and attractiveness of the website and will help advance it towards the goal of a successful social networking site promoting local renewable energy markts. We determined that a new home page was needed to help new users understand the site more clearly and learn about its purpose. Likewise the profile creating process needed to be redesigned in order for it to be more concise for users. Retailers, installers/contractors, and home owners should each have a unique profile creation page that contains specific options applicable to each group. There should also be changes made to the portal page that returning users are taken to when they return to the site. This page should have more information such as maps and searches that users can used to find other people involved with renewable energy in their area. A rate-my-installer feature could also be added where homeowners can leave online feed back about there experience with an installer and other homeowners could review these rating to help them choose and installer. Our final recommendation is an advertising pamphlet that could be

distributed by YourEnergyOptions to help promote this site off line. We believe this would be a cost-effective way for YourEnergyOptions to spread the word about this site to people who might not otherwise find it online.

Authorship

Justin Blecharczyk

Justin was responsible for writing the background chapter and the long-range recommendations and conclusions. He did extensive research on renewable energy. He worked with Karen on identifying and interviewing local installers. He also contacted many of the installers that were interviewed.

Karen O'Sullivan

Karen created our weekly presentations and progress memos for out weekly meetings. She wrote the majority of the results and analysis chapter as well. She worked with Justin B. on interviewing local installer. She also developed interview questions for the installers and created the interview questionnaires that were emailed to additional contacts.

Chris Stefaniak

Chris wrote the introduction, executive summary, and methodology chapters as well as the abstract. He worked with Justin Thomas to identify and interview local retailers and supply houses. He sent emails to all potential interviewees.

Justin Thomas

Justin wrote the short range recommendations and conclusions. He was responsible for calling all of the potential interviewees after they were sent the initial email. He worked with Chris interviewing local supplier and retailers.

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CHAPTER 1: INTRODUCTION

America's ever increasing energy demands have to date been satisfied almost exclusively by the burning of fossil fuels. These fuels including coal, oil, and natural gas account for eighty five percent of current US energy usage (Union of Concerned Scientists, 2005). However these resources have some serious downfalls. First and foremost their combustion has numerous environmental impacts. Large quantities of carbon dioxide are released into the atmosphere which is a significant contributor to global warming. Oxides and hydrocarbons released into the air degrade air quality and spur numerous health issues. Additionally soil and water have been contaminated via runoff from mining and fuel spills (Union of Concerned Scientists, 2005). Secondly there are concerns regarding the security of America's energy supply. Fossil fuels are not a renewable resource, and many fear we may be approaching the peak of their production. With domestic resources being quickly depleted the US is forced to turn to imports as a primary source of these fuels. This raises costs and could be adversely affected by political issues (Shah, 2007). However; new sources of renewable energy have been making their entrance into the market over the past few decades. Solar power, wind power, hydroelectricity , and biofuels have been emerging as a solution to all the problems caused by fossil fuels. These sources produce little or no harmful emissions and are constantly renewable since they exploit resources that currently exist the world over. Despite the apparent benefits, renewable energy sources still only account for two percent of the world's energy generation.

There are still numerous obstacles that have hindered the growth of these renewable energy technologies. One of the largest barriers has simply been lack of education about these new technologies. Many people simply don't know what is available to them, how much it costs, or what regulations and incentives are in place regarding these new technologies. Likewise, the cost associated with installing such systems on a small scale is high. Uncertainties surrounding payback periods for residential installations have prevented many interested home owners from making the large investment in their homes to install these renewable technologies. Incentives and financing options offered to home owners to mitigate these high fixed costs have also been minimal and information regarding them are not always easy to find.

The growth of renewable energy, particularly on a local, small-scale level, is more likely if there is a strong local market for these technologies. One of the most important issues in establishing such a market is connecting consumers, retailers, and installers with each other in such a way that they can communicate openly to help clarify uncertainties regarding renewable energy installations. Lance McKee aims to do just that by providing an online location where consumers, retailers, and installers can gather and exchange information. His website, YourEnergyOptions.com, is the medium through which he wants to facilitate this cooperative environment.

To make the site educational for its users, some of whom might not have extensive experience with renewable energy technologies, it must be easy to use and hold the users interest. To do this the site should contain targeted and

concise information that will entice users to join and promote their discussions. Each type of user; retailer, installer, and homeowner, should have a specific set of criteria for creating a profile and should have a unique portal page that they see when they come back to the site. Graphics and ample amounts of dynamic information should help to keep the users interested in the site and keep them coming back. At present the website lacks many of these important features.

Our goal is to aid Lance McKee of YourEnergyOptions, Inc. in promoting clean energy technologies such as wind turbines and photovoltaic panels by providing Lance with detailed recommendations as to how his site could be improved to better accommodate the social networking and referral needs of local contractors, installers, and retailers. Together with Lance we hope this site will help to stimulate the growth of a local renewable energy market by helping connect installers and retailers with their potential customers thus aiding in reducing America's reliance on non-renewable energy sources and making our environment cleaner and healthier for all of its inhabitants.

CHAPTER 2: BACKGROUND

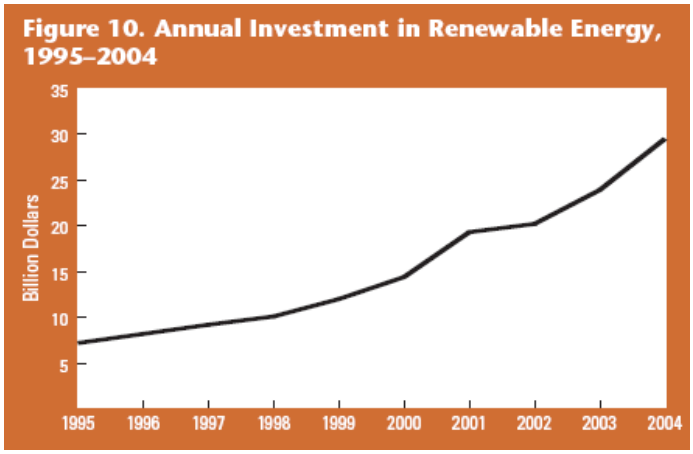
2.0 Introduction

Over the past few years, new technologies in the field of renewable energy such as solar cells, wind turbines, and bio-fuels have made it possible to produce energy without consuming fossil fuels or releasing large amounts of pollutants into the atmosphere (Kammen, 2006). These new technologies could make small-scale distributed energy generation and increased energy efficiency a viable option for the average homeowner (Kingston, 2006). However, adoption of these new technologies is a complicated process that doesn't occur overnight. One complication in this process is the familiarity that installers and builders have with these new technologies and their willingness to get involved with implementation. At present there are only twelve individuals in Massachusetts that are certified by the North American Board of Certified Energy Practitioners (NABCEP) as installers of solar photovoltaic and solar thermal systems (North American Board of Certified Energy Practitioners, 2007). Comparing this number to the number of Massachusetts residents employed in the construction industry, which stood at nearly one hundred and forty thousand in 2005, it is easy to see the apparent lack of participation in the renewable energy market (Commonwealth of Massachusetts, 2005). In this section we will explore some of the current trends in the market for these new renewable energy sources and explore how such factors have influenced the limited participation of installers.

2.1 The Renewable Energy Market

The market for renewable energy has seen significant growth over the past 35 years. With the rate of increase of world energy consumption at 5 percent from the 1950s to 1970s, means for producing more energy from new sources was needed. Renewable energy was the option available at the time. Renewable energy became more attractive once prices for fossil fuels began rising. After the Arab oil embargo, the cost of crude oil tripled to $10 per barrel between 1973 and 1974. By 1981 oil prices reached $40 per barrel (Golob & Brus, 1993). These economic demands pushed the national technological development and funding of renewable technologies, to secure the United States' energy supply base (Simon, 2007).

Tax credits were used as incentives in the late 1970s in the United States to promote energy efficiency. These tax credits were offered to households and businesses that made efficiency improvements to their property. Unfortunately, studies suggested that most household and businesses would have made the energy efficiency improvements without the incentives, as the incentives were broad and did not offer significant tax credits (H. Geller, 1999). Furthermore, the 1980s and 1990s saw a lack of government commitment to the development of renewable energy, mainly due to the fact of a thriving economy and acceptable fossil fuel prices (Simon, 2007). Since then, new tax credit proposals are aimed directly at



advocating certain technologies such as photovoltaic, hybrid cars, and biomass power (Quinlan, Geller, & Nadel, 2001)

Figure 1:Growing Global Investment in Renewable Energy (Renewable Energy Policy Network, 2005)

2.11 Trends & developments

When looking at the United States' renewable energy generation in recent years, hydroelectric exceeds all other sources (Energy Information Administration, 2007). Unfortunately, there are a limited number of bodies of water that can be dammed without sacrificing safety to the surrounding ecosystem and water needs of communities downstream.

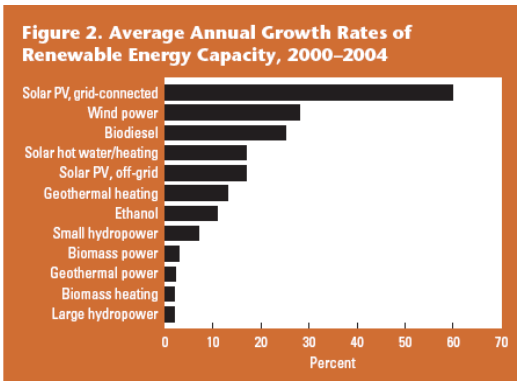


Figure 2:Global renewable energy growth in recent years (Renewable Energy Policy Network, 2005)

As seen from the above figure, solar and wind systems have seen the greatest amount of growth in recent years, when compared to other renewable sources. This is not to discourage investment in less popular renewable technolgies, but more so to realize the success of solar and wind power.

Wind power is used commonly for large scale generation- typical modern turbines generate between one and three megawatts of electricity. California was the first states to create wind farms in the United States. Within four years, wind capacity in California increased by a factor of 200 (Golob & Brus, 1993). There were multiple factors that fed the wind power development in California.

California has great geographic features for wind farms - large parcels of land in windy, unpopulated areas. California was also dependent on fossil fuels, which became expensive by the 1980s (Golob & Brus, 1993). During the early 1980s the federal government offered tax credits for 25 percent of the total investment for wind power in California. In addition to this federal incentive, the state offered an energy tax

credit of 25 percent. These financial incentives were responsible for the sudden increase of wind turbines. By 1985 these incentives were phased out (Golob & Brus, 1993). Unfortunately, these significant incentives caused a rush for manufacturers to produce wind turbines, many that were unreliable, improperly sited, and inefficient (Golob & Brus, 1993). Since then, newer, better designed turbines have been installed. Today, the turbines are available to run 95 percent of the time (known as turbine availability) (Golob & Brus, 1993), as opposed to 60 percent in the early 1980s. Installation costs decreased rapidly- by 1991 the average cost of installing and building a wind turbine was $1,000 per Kwh, as opposed to $3,000 in 1981 (Golob & Brus, 1993).

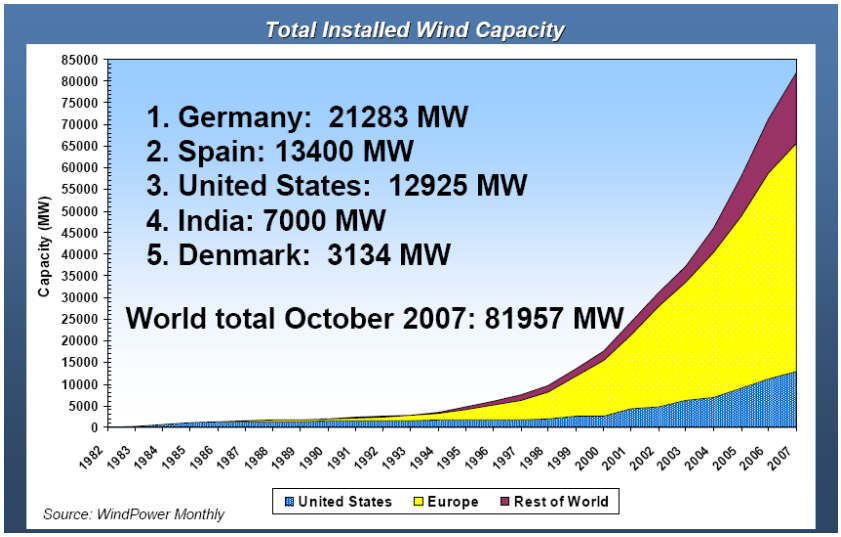


Figure 3: Total Installed Wind Capacity (Flowers, 2007)

With lower installation costs, installed wind capacity has steadily increased (See Figure 3). Installation costs are not necessarily responsible for this growth in capacity, but moreover the combination of decreased costs, increased oil prices, and various financial incentives that vary in significance. Looking at Germany in particular, Gipe (Gipe, 1995) identifies three factors for the huge German wind development- subsidy for research and development, a buyback policy similar to that in Denmark, and high utility rates. These subsidies, policies, and high utility rates shadow those in the United States, and are responsible for the difference in installed wind capacity. Also, like the United States, German government required utilities to buy a certain amount of energy from renewable sources, at 90 percent of the utilities' rates.

2.12 Where is renewable energy capacity going?

The renewable energy market is by no means stagnant. Solar capacity, in particular, is projected to at least double by 2010 (European Photovoltaic Industry Association, 2006). Such growth is reasonable to project, as the investment risk is lower than it was in the past. Long lasting growth in the photovoltaic

market has continued to make the market stronger and a more stable platform for investment (European Photovoltaic Industry Association, 2006).

Figure 4 shows two scenarios- an optimistic view where nations push their policies to stimulate market growth, and a pessimistic view where policy does not change, resulting in no increase in growth rate of the market.

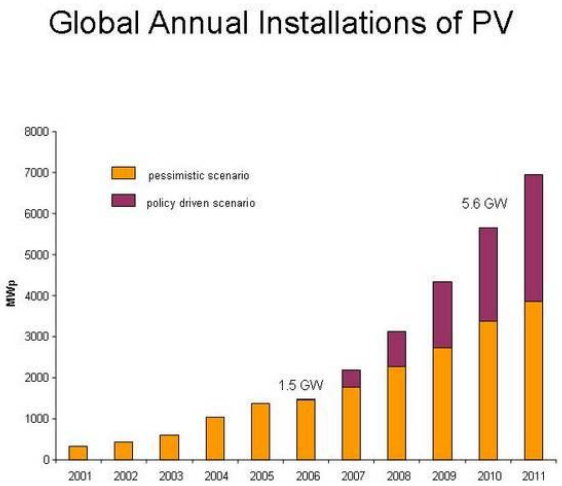


Figure 4: Global Annual Installations of PV (European Photovoltaic Industry Association, 2006)

Despite the continuous technological breakthroughs in renewable energy, renewable energy remains to be more expensive than conventionally generated electricity. As Figure 5 shows, renewable energy prices are usually about two cents more expensive per kWh of electricity than conventionally generated electricity.

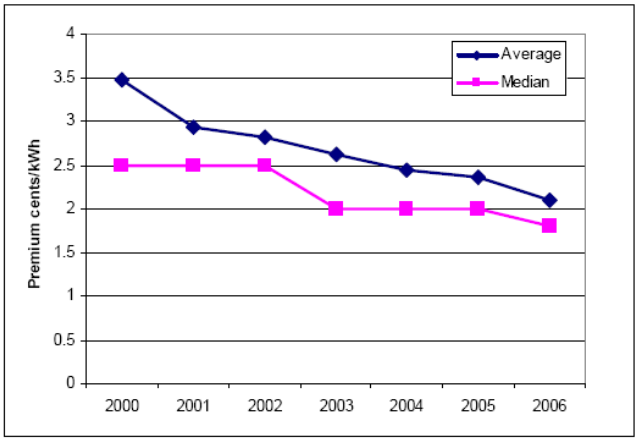


Figure 5: Trend in utility premiums in the United States for renewable energy (National Renewable Energy Laboratory, 2007)

For consumers, the price difference is a major barrier to switching to renewably generated energy. Mallon (2005) suggests that consumers waiting for the cost of renewable energy to be less than conventionally generated energy damages and slows down the development of renewable energy. Mallon (2005, p. 7) says, "waiting for further technical breakthroughs puts the cart before the horse, and in so doing distracts policy-makers from addressing market development issues that actually underpin the technical evolution and commodity price."

In order to battle the difference in energy costs, financial incentives are used to encourage the widespread use of renewable technologies and energy efficiency. Electric utility companies in the United

States offer incentives because it is less expensive for them to save energy than supply energy from new power plants (H. Geller, 2003). Incentives offered by the utility companies to its customers have also stimulated the sales of new technologies that include super-efficient refrigerators, washers, air conditioning systems, and lighting (Lee & Conger, 1996).

In order to successfully market renewable energy to the end user, electricity providers make use of three commonly used techniques. The first way is to offer renewable pricing options, where the end user specifies (H. Geller, 2003) where their energy comes from- whether it is from existing coal fired plants, or from renewable sources. The end user does not need to change its electricity provider, as the utility company in this case is required by law to make these renewable options available (H. Geller, 2003). If an end user specifies a renewable energy source, he will pay on average 2.62 cents more than the cost for non-renewably generated electricity (Energy Bulletin, 2004).

Secondly, some states have restructured the energy market so that there is competition between existing utility companies and renewable energy providers. This requires the end user to handle logistics of switching energy providers. Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, Texas, Virginia, and the District of Columbia have competitive energy markets that encourage end users to purchase renewable energy. Similar to the renewable pricing options, renewable energy prices cost on average one to two cents more per kilowatt hour of electricity.

Renewable energy certificates (REC) are the third method for marketing renewable energy to the end user. RECs are generated by the electricity producers, based on the output of renewably generated electricity. The electricity producers can then sell their RECs in order to offset the costs of producing more expensive renewable energy. The goal of RECs is to promote renewable energy generation by making them financially feasible. RECS are bought both because of regulatory and voluntary reasons. Those who buy RECs voluntarily may include homeowners, non-profit groups, government agencies, and companies. Reasons for purchasing RECs include lack of access to renewable pricing options and contributing to independence. In the situation where renewable portfolio standards (RPS) exist, electricity providers are required to meet a percentage of delivered renewable energy. The providers will purchase RECs in order to meet the RPS, if the actual delivered renewable energy is inadequate (Energy Bulletin, 2008).

2.14 Recent Renewable Projects

In order to meet energy renewable energy goals, new renewable energy installations have been built. Noticeable wind turbine projects typically involve large scale investments by energy companies. For example, the Colorado Green Wind Power Project, completed in late 2003, consists of 108 GE 1.5MW wind turbines. The project is owned by PPM Energy, Inc. and Shell Wind Energy Inc. and was an investment of more than

200 million dollars. The land for each turbine is leased for between two and three thousand dollars per month, serving as additional revenue for local farmers. As the county commissioner John Stulp of Prowers County said, "Converting the wind into a much-needed commodity while providing good jobs, the Colorado Green Wind Farm is a boost to our local economy and tax base(Noble Environmental Power)."

Smaller scale wind turbine projects are not publicized as much as the large scale wind farms. Currently, there are more than 50 proposals for wind turbine projects in Massachusetts. Currently, there are only four running commercial wind turbine projects in Massachusetts (Howe, 2007).

Small scale generation projects like the 600kW turbine that is being installed at Holy Name High School in Worcester, MA are important in reaching Massachusetts's 4% target of renewably generated energy by 2009 (Howe, 2007). An example of collaboration between state and community resources, the project is aimed to reduce the school's energy demands, as well as to feed energy back into the grid(Massachusetts Technology Collaborative). The feasibility of the project was made possible through intensive research dealing with economics, other options for reducing the school's energy demands, availability of sufficient wind, zoning, and compliance with the Federal Aviation Administration (Young, Jensen, Forbes, Foley, & Emanuel, 2006).

Princeton, Massachusetts, a town just north of Worcester, is an example of a community that has increased the percent of renewable energy it uses. Since 1984, a 320kW wind farm has been in operation. The wind farm was proposed and developed as an alternative to continued spending on nuclear power. In spring of 2007, groundbreaking for the replacement of the existing eight turbines with two, 1.5MW turbines took place. The new turbines will be in service as early as spring of 2008. They will provide 40% of Princeton's electricity demands (Booth, 2007).

2.2 Renewable Energy and Social Networking

Advocacy and awareness of renewable projects such as those mentioned above are currently available online. Online social networking is a successful means for users to be both consumers and suppliers of information (Walker, 2008). Popular social networking sites such as Facebook, MySpace, and Bebo have been able to extend their offerings to meet their users' desires. These sites are not just static means for users to meet other users; they are platforms for initiating participation and communication within local communities, and for bringing people together who share a common interest. Social networking sites even exist for people interested in green living and renewable energy.

2.21 Social networking recently

With the recent success of online social networking, green social networking has become very popular as well over the past few years. Popular sites include WorldCoolers, 2People, GUSSE, Zaadz, dotherightthing, GenGreen, EcoEarth, GreenSingles, Green-Passions, VeganPassions, and EWSingles. All of these websites have different purposes, however, they all have in common users who are advocates for green energy and each site has been able to acquire a broad range of users. Ray Valdes, an analyst, commented on the flexibility of social networking as "it accelerates the evolution of these sites and allows them to address a wider range of requirements: different types of users and of usage scenarios (Perez, 2007)."

Social networking has typically been seen as a consumer-driven online resource but businesses have also taken advantage of its offerings. For example, LinkedIn, an online network for business professionals: LinkedIn has successfully marketed its network to 350 corporate customers, who pay as much as $250,000 to advertise job positions (The Economist, 2007). The users of LinkedIn participate because they are looking for jobs, and can communicate with co workers and manage a contact list for referrals. Developers of successful social networks must make their products unique and desirable, in order to compete and grow on the internet. Successful networks rely on "founders whose focus and passion for that social network's specialty is reflected in the online product itself (Jaffe, 2006)." In short, social networks can generate revenue because they have a targeted audience with known demographics, and can sell parts of the site as advertising space.

2.22 Creating a successful social network

Creating a social network that is flexible enough to attract a wide age group of users is certainly a challenge. This is mainly due to the fact that those growing up with the internet rely on it to communicate with friends, share experiences, and learn interactively; where as older people who have not completely absorbed the internet may tend to use the internet for more basic purposes.

Resistance to the internet from the older generations is a real blockage- and so limits the demographics of web-savvy users. Catering the internet to a more diverse and less expert community such as the older generation has proven difficult (Adam, Awerbuch, Sonim, Wegner, & Yesha, 1997). Convincing people who have lived 40 years without the internet to suddenly incorporate the internet into their daily lives is indeed difficult. As Gurak suggests, "unless people become familiar with the social, rhetorical, and political features of digital communication, they will be led into cyberspace with only a limited understanding of both the power and the problems of this technology (Gurak, 2001), p.11." Furthermore, the excitement and nervousness about the internet's potentials creates a stalemate for potential users. The characteristics of the internet- speed, reach, anonymity, and interactivity (Gurak, 2001) are the reasons for its success. Considering

these issues, creating educational resources online is especially difficult, as the dynamic learning interface must communicate efficiently to all age groups (Adam et al., 1997).

With the internet being such a dynamic environment, it is difficult to designate standards and guidelines for website design. As Sarmento (Sarmento, 2005) suggests, good website design focuses on making information accessible and manageable- information being a currency, and the website design an interface to circulate the currency.

Some key criteria in a web site are as follows: (Van der Geest, Thea, 2001)

Effective use- A website is designed to be used in a certain way, and users do not always take advantage of a site's capabilities. Users need to be able to teach themselves how to navigate a website, and this is done intuitively.

Appreciation- Users care about appearance, layout, and theme. Naturally, these things are the first to make an impression for the user- and therefore are important that they be impressive!

Usefulness- If a user does not find a purpose for the website, one will not return. Nor will the user refer the site to co workers, friends, and family. Usefulness is broad- a site can be useful for business, socializing, relaxing, and learning. If a site does not have a purpose, then it naturally does not need to exist.

Functionality- A website must be able to load quickly, allow the user to navigate smoothly through it, and do what it was designed to do. If it has special features, like uploading or messaging, the user should be able to manage the features easily.

These four criteria are just important in social networking sites, and can be used to make a report card style grading rubric.

Even with a successful social network, maintenance is required to keep it up to date and meeting the needs of its users. The difficulty in maintaining a successful website is the 3 step process, as suggested by Apis Design, Inc:

Figure 6: Website Life Cycle (Apis Design, Inc., 2008)

As the lifecycle suggests, the website process is a continuous synthesis of ideas, implementation of changes, and push for new

users. This process requires financial resources, which can be a barrier for small start ups that lack investment backing. Time is another consideration when putting together a website, as the longer it takes to release a website, the more time it gives for competing sites to fill the niche. Website creators must deal with these considerations when deciding when to release a website- too early and the website will not leave an impression, too late, and the website may no longer be unique.

2.3 YourEnergyOptions, Inc. Today and Tomorrow

YourEnergyOptions, Inc. is a community portal for renewable energy. Founded by Lance McKee and his daughters, YourEnergyOptions, Inc. aims to energize local initiative through its online social networking capabilities. YourEnergyOptions, Inc., uses user profiles and portals as a starting point for activism. Profiles are created by users and are their online identity for communication. The purpose of the portal is to serve as a unique homepage for each user, with the most relevant resources at their fingertips. As an interface for communication the intent of YourEnergyOptions is to raise local awareness, education, and participation in renewable energy.

The user base of YourEnergyOptions is still limited, as the website has not been released officially. However, the site's capabilities are expansive, and have much room for growth. Compared to other green social networking sites, YourEnergyOptions offers much more to a person looking to explore renewable energy.

2.31 Competitors of YourEnergyOptions, Inc.

Other online social networking sites that are of concern to the success of YourEnergyOptions, Inc. are: greenopolis, river-wired, and gengreen.

Greenopolis is a social network aimed to bring together people who support green efforts. Created by Waste Management partnered with SoL Sustainability Consortium, Green Mountain Coffee Roasters, Environmental Media Association, Cabot Cheese, Deans Beans, Seventh Generation, and Greener Media, Inc., it has a substantial base to implement changes and advertise.

RiverWired is a provider of "eco-friendly news, entertainment, and community to help people live just a little greener -- and have a lot more fun." As a social network, RiverWired keeps people up to date with green advocacy. Furthermore, it captures a large audience because its site offers a broad range of resources.

GenGreen is another green social networking website. Funded by the GenGreen Foundation, a non-profit organization in Ft. Collins, Colorado, the mission of GenGreen is localization: to connect the environmentally conscious and companies with their own communities.

Green social networking is not a new idea; however YourEnergyOptions, Inc. is unique because it focuses on renewable technologies more than green lifestyles and products. It serves as a referral service as well as a social network. As a referral service, installers and retailers of renewable technologies have profiles that users can browse and search. In this way, consumers, installers, and retailers all benefit from the site. Furthermore, by making use of social networking, user-generated content will prevent the website from becoming stagnant- a primary concern when creating an online community.

YourEnergyOptions, Inc. will continue to adapt to meet the needs of its user base, while continuing to acquire new users. Ultimately, with time and more users, YourEnergyOptions, Inc. will be a vital part of the local renewable energy market.

CHAPTER 3: METHODOLOGY

3.0 Introduction

The goal of our project was to aid Lance McKee of YourEnergyOptions, Inc. in promoting clean energy technologies such as wind and solar energy technologies by providing Lance with detailed recommendations as to how his site could be improved to better accommodate the social networking and referral needs of local contractors, installers, and retailers. The team developed new content for installer and retailer profiles on YourEnergyOptions.com in order to help connect consumers, contractors, and retailers to stimulate the market and help them make informed decisions regarding the purchasing and installing of renewable energy generation systems. In order to do this we identified the following objectives to guide our research.

- Evaluate the functionality of the current website
- Identify web content that will fulfill the needs of installers and retailers using the YourEnergyOptions website.
- Develop updated content for the YourEnergyOptions website that better reflects potential user's needs.
- Determine a unique niche for YourEnergyOptions in the renewable energy market

To meet these objectives we used various research methods to determine what content will be most appropriate for the website and to obtain valuable feedback from local installers and retailers regarding our proposed website updates. In this section we will explain which research methods we employed and how they helped us achieve our goals. We will also describe some of the outputs as a result of our efforts.

3.1 Evaluating YourEnergyOptions.com

In order to improve the current YourEnergyOptions website we first evaluated the current site in terms of how well it fulfills Lance McKee's goals for his business. First and foremost Lance aims to create an online social network for installers, retailers, and consumers, specifically the smaller local businesses that are struggling to compete with the retail giants such as The Home Depot©. Given the current layout of the site we evaluated where he stands in terms of accomplishing that goal. Based on our extensive experience with the internet since we have grown up while the internet was becoming prominent, we spent some time on the site and considered how useful we feel it to be as a social networking site and how easy it is to navigate. We used

the four criteria we identified through our background research; effective use, appreciation, usefulness, and functionality, to structure our reviews (Van der Geest, 2001). Our thoughts were purely our own individual opinions but through informal group discussions we came to a consensus about what could be changed. We discussed these ideas with Lance to help us understand what changes he is willing to implement and what changes he can afford now and what he might be able to implement in the future should he develop a stable revenue stream.

Our second measure of the current website was through researching what similar sites currently exist and determining where YourEnergyOptions can fit in with these sites. The goal of YourEnergyOptions is to have a website that is different enough that web users will want to use the site and will get new and valuable information from it. Through web searches we explored three existing green social networking sites; *Greenopolis*, *RiverWired*, and *GenGree*n and learned what content they have that is aimed at local installers/contractors and retailers. We wanted to learn what the current sites contain and whom they are catering to in order to develop a specific niche for YourEnergyOptions. Since Lance hopes to create a site that will be valuable for local small business we wanted to confirm that there isn't already a well developed site doing this, otherwise we would have had to rethink the role that we want the site to have and exactly how we could fulfill that role. Based on our findings we compiled our ideas through group meetings and presented them to Lance at our weekly meeting to get his thoughts as well.

3.2 Identifying User Needs

In order to develop content for the website that will be useful for the intended audience we first needed to understand what users might find important in a website like YourEnergyOptions. The group's focus was on the aspects of the site which are geared towards installer/contractors and retailers, and subsequently we worked to identify their needs.

The team divided into two smaller teams of two, one of which focused on installers/contractors, and the other focused on retailers. Each sub team was responsible for identifying the needs of each audience. To identify these needs each sub team compiled a list of local installers/contractors and retailers and conducted between two and four directed interviews with individuals from each group. To find these individuals we used magazines and trade publications such as *Northeast Sun* which is a magazine published by the Northeast Sustainable Energy Association twice a year. These resources often contain a sort of yellow pages for individuals and businesses involved in renewable energy, and thus were a valuable tool when identifying people from our target audience.

Once potential interviewees were identified we contacted them via email to provide them with some background information on our project and what we are doing as well as ask for their assistance (see Appendix A.1). If we received no response we contacted them by phone one to two days later to again ask them for their assistance.

The team created an interview plan that allowed us to conduct a fairly directed interview while still leaving ample opportunities to obtain the feedback we were interested in (see Appendix A.2). The plan focused on two main areas, the first of which was aimed at getting individual feedback on the current website and how useful installers and retailers currently felt it was. We wanted to understand if the site and its intended purpose was something that these individuals would be interested in and find beneficial. Additionally we wanted to learn what content and features these potential users would find useful on the site. In essence we wanted to understand what these individuals would like to see on the site that would make it more attractive for them. For in-person interviews we had the interviewee review the site prior to our meeting so that he or she had some experience and had a chance to get to know the site and see how it works. The team developed a list of questions along with the interview plan that helped us to gather this information (see Appendix A.2). We intended to have these interviews completed between January 28th and February 1st but encountered some difficulty trying to obtain interviews. To help us gather additional information we created a questionnaire (see Appendix A.3.) that was emailed to a few additional contacts who did not have time to meet with us in person but were still interested in giving us their feedback. These were contacts that we made after attending the Green Expo in Boston on February 3. These individuals were sent the questionnaire the day after the expo, and we followed up with a phone call the following day.

3.3 Sample Portal and Profile

Next, with the users' needs identified, we created specifications for the model user profile creation pages for both installers and retailers. We developed a list of criteria that should be included on the profile creation page that are more applicable to the target audience. We established these criteria based on the data we gathered during our interviews and on the different types of renewable energy technologies that are available locally.

A model of the profile creation page that contained layout and graphics was created by another IQP team whose focus was on the development of the site. We supplied the content and the web development team created the actual models. The model is invaluable for describing our ideas and obtaining further feedback. Microsoft PowerPoint was used, as advised by Lance, since the model will be used for implementing changes by his web developers in India.

3.4 Website Feedback

In order to get the necessary feedback on the YEO sample website that was created, a focus group was conducted. In cooperation with the other two project groups one focus group with three people was conducted. New individuals were chosen who had not been previously interviewed in order to get a new set of prospective on the website. The planning for the focus group was handled by the web resources team and our team was responsible for supplying any specific questions for contractors/installers and retailer that we wished to have answered by the focus group. Usability testing was also preformed where two of the focus group participants were introduced to the current site as well as mock ups of some of our ideas.

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Successful Green Social Networking Websites in Existence:

In order to determine YourEnergyOptions' ability to fulfill a unique niche within the green social networking industry, it is important to analyze existing green social networking websites to ensure a unique niche and to examine the execution of similar missions. Through web searches, word of mouth, and attending the green expo our team chose three successful social networking websites that we felt as a collection would be a quality representation of the success YourEnergyOptions, Inc. plans to one day achieve. Each social networking website fulfills its own unique niche within the green energy market, just as YourEnergyOptions, Inc. potentially will.

Each website was evaluated based on four criteria: the websites appearance, content, functionality, and defined purpose. These criteria were developed from background research and can be found, describe in depth, in the background chapter of this report. In order to evaluate each website a team member created a profile on each site to gain full access to the websites' capabilities. The full evaluations of each website can be found in Appendix B.

Overall from evaluating three major social networking sites in the green marketplace the most apparent advantages these sites hold over YourEnergyOptions are credible sponsors or developers with noticeable funding and developed business plans. These business plans are presented to the sites users in two ways, by the use of "place marks" or pages with a description of what is to come and a mock-up of the intended development and a detailed mission statement presented clearly on the site. Having a credible name associated with the site makes uncertain users more comfortable when becoming a member and denotes financial security to the developers. Additionally, having "place marks" to represent a well-developed business plan also helps eliminate user uncertainty and encourages the members to stay interested.

4.1.1 www.Greenopolis.com

Greenopolis is a social network created by Waste Management partnered with SoL Sustainability Consortium, Green Mountain Coffee Roasters, Environmental Media Association, Cabot Cheese, Deans Beans, Seventh Generation, and Greener Media, Inc. "Greenopolis is an interactive, collaborative and educational "green" community web site bringing together individuals, communities, organizations and corporations to help people learn, partner and make incremental, positive environmental changes in their daily lives and communities (www.greenopolis.com)." This online social network can be best described as broad going-green advocacy community for users of all ages.

The online network is still in the developmental stages, just as YourEnergyOptions is. The site has almost three thousand members and relies on these members for a substantial amount of its content. The intent of the website is clear, with "place marker" sections with an explanation of what will be found in the different undeveloped areas. Greenopolis' function of being a general online green community is very clear from the home page; there is no confusion in knowing the websites purpose. YourEnergyOptions is very similar in mission as Greenopolis; however the audience of YourEnergyOptions is much more specified, targeting users interested in green technology implementation.

A major advantage Greenopolis has over YourEnergyOptions is its ability to develop with a capital base because of its well known and financially viable sponsors. Another benefit of being sponsored by known names, such as Waste Management and Cabot Cheese, is the credibility that comes along with such names being associated with a new site. YourEnergyOptions is a fresh company with no well-known names attached to it.

4.1.2 www.RiverWired.com

RiverWired is a social network founded by Catherine Billon in 2006 out of the desire to connect people, ideas, and information around a movement of positive social and environmental change. Billon has over twenty years of experience devising and launching businesses in the media and entertainment industry. RiverWired.com is sustained by a large staff of experienced and focused individuals along with a large user base.

RiverWired's social network focuses on bringing together various resources to compile pertinent information, news, and activities associated with all things green for its users. The site is well developed and user friendly, even though it has only been in existence for less than two years. However, the sites social networking intent is not apparent from the homepage. At first glance it appears to be strictly a news site about different green topics, with no community capabilities. After exploring the site we found that there was a registration area and became members. Being a member did not grant any obvious or significant privileges to the site, we were able to explore the content as freely as members as we did as visitors.

As YourEnergyOptions exists currently there are the same clarity issues of the social networking intentions of the website. The registration process, for both YourEnergyOptions and RiverWired, is initially not apparent and then lengthy with unnecessary fields. Although the focus and audience of the two sites is very different, RiverWired primarily focusing on reporting news and YourEnergyOptions primarily focusing on compiling contacts within the renewable market, they are both are fighting the same online social

networking battle of making the community aspect of the sites clear to its visitors. However, RiverWired is more successful because it contains a robust amount of content that is frequently updated.

4.1.3 www.gengreen.org

GenGreen is a social networking site founded in 2006 by Charisse McAuliffe out of a desire to help people find the "green" people, products, and places they were looking for in their own backyards. The website is developed and operated by GenGreen Foundation, a non-profit organization in Ft. Collins, Colorado. GenGreen is similar to YourEnergyOptions.com in the sense that it strives to connect people by not only their personal interests, but also their location.

GenGreen is similar to both YourEnergyOptions and Greenopolis in the fact that the site is still being developed. However, just as with Greenopolis, the plans for different areas of the site exist and hold a place mark on the site with a description of what the members can look forward to enjoying in the near future. This is an important tool that both Greenopolis and GenGreen have taken advantage of to encourage users to not only join but to continue using the site. However, at this stage YourEnergyOptions has not shown their users a plan or any indication that the sites developers have intentions of expanding.

In conclusion, after evaluating three successful green social networking sites that relatively inclusively represent the available online green social networking opportunities available to date, it is apparent that YourEnergyOptions has a definite niche in the industry. The current green online social networks target very general or broad audiences concurrently containing a broad spectrum of material, whereas YourEnergyOptions targets a specified audience of individuals interested in clean energy technologies. This concentration of audience and content represents a unique niche in the green social networking. Greenopolis, RiverWired, and GenGreen all focus their content on all things green, not a specific element of the green movement. YourEnergyOptions is unique in focusing solely on the technology of the green movement.

4.2 Potential YourEnergyOptions, Inc. Users:

In order to evaluate the successfulness of the website in fulfilling its niche in the green energy market we must fully understand what the relationship between the various types of users is. YourEnergyOptions intends to connect consumers, retailers, and installers to one another through an online social networking site.

Currently in the Renewable Energy Market each group of users already interacts with one another to an extent, on a need-to-interact basis. The interaction simplistically represents a chain reaction between the three groups of interest. There are various forms of this simple reaction, in some cases the reaction may only call for two groups, removing the "middle man" of the process. For example, Tom Stewart, owner of a local supply house, makes sales exclusively to homeowners directly. This is not a business plan but rather just the way the market has shaped his business naturally.

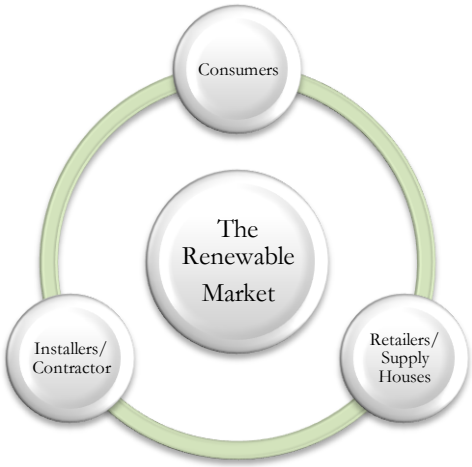


Figure 7: The Renewable Market Players

It is quite obvious that interaction between these groups exists without an online social network; however it is limited and restricted to necessary processes and there is minimal to no interaction within each group of users. This is an important hole in the market that could potentially be filled by YourEnergyOptions. From our interview with Larry Haley we learned that as a contractor he interacts with consumers, primarily residential consumers who contact him from personal referrals, and a quality supply house, with which he has worked the majority of his career. Larry is self-employed, does not advertise, and he secures jobs primary from personal referrals from previous customers. However, Larry never interacts with contractors with similar interests as him which hinders the renewable market because he doesn't know how to break into the industry of renewable installations.

Currently the interaction between these groups comes from word of mouth (personal referrals), cold calling (trade organization listings), or cumbersome internet searches. According to Richard Breagy, construction administrator for the Archdiocese of Worcester and building inspector, in this industry it is important to have a few reliable contractors/installers to deal with on a regular basis because he needs to be able to trust the quality of work that is being done. Therefore, two of the three main techniques of contacting these people within this market are insufficient because cold calling and internet searches typically do not promise any sort of reassurance that a promising contact is being made. In a market where the price tag is a matter of thousands of dollars per transaction, quality assurance is very important.

4.3 Internet Use of Local Clean Energy Entrepreneurs:

YourEnergyOptions, Inc. aims to connect its users via online social networking. In order to accomplish this goal the internet capabilities and usage of YourEnergyOptions' users was analyzed, using

results from three in-person interviews, two email questionnaires, and one phone interview. These interviews and questionnaires had two aspects- an internet use aspect and YourEnergyOptions feedback. Internet use questions were aimed at better understanding how a typical potential user of YourEnergyOptions uses the internet. This information is important because it helps YourEnergyOptions better fulfill the needs of its users. The information obtained from the interviews does not in any way represent all the users of YourEnergyOptions, but instead it represents a typical installer's and retailer's feelings.

4.3.1 Installers of Clean Energy Technologies

Larry Haley, an architect and contractor of sustainable design, was one of the interviewees. He owns a desktop computer, and mainly uses it for business reasons. He uses his computer to keep track of jobs, bills, and to create invoices for building jobs.

He typically spends 30 minutes a day online. Most of the time he uses online stores- Amazon and iTunes. Things he buys online are typically books and music. He would like to spend more time on the internet learning about renewable energy and green building techniques. He checks email daily, but does not like to use his email. He feels that communication through email is limited and basic, and he tries to avoid emailing whenever possible. He was not aware of online forums and social networks. He uses Google as his main search engine, along with YouTube for videos. Except for creating user accounts on sites that he shops on (iTunes and Amazon), he has not created accounts on other websites. When it comes to online ratings, he has not rated any products he has bought online, nor does he use product reviews when considering buying products online. The reason for this is that he does not trust product ratings from consumers. He trusts reviews from printed sources, such as magazines and trade journals. When asked about privacy concerns, he responded "I don't think about security at all." He asked afterwards if he should be concerned with online privacy. The issue of privacy was brought up because it was a topic that was discussed in the early stages of the project. He created a profile on YourEnergyOptions, and did not have much trouble. He liked YourEnergyOptions but did not understand why and how he should use it. He suggested a tutorial page to help confused visitors, like himself, learn how to use the site.

4.3.2. Retailers of Clean Energy Technologies

In order to connect with the retailer end of YourEnergyOptions' user base, we conducted an interview with Tom Stewart of Your Green America. Your Green America is an exclusively online retailer of various green energy products including wind turbines, photovoltaic panels, and solar attic fans. Tom started his company roughly two years ago and it has always been an exclusively internet based company. He uses internet searches to find manufacturers for his products, and spends time on his site where he is available for online chat sessions with potential clients. Tom also uses various other internet social networking sites such

as MySpace and in general he spends a good deal of time on the internet and is a proficient user. Tom thought that YourEnergyOptions was a great idea, and he created a detailed profile as a source for advertising for his business. He especially liked the map of YourEnergyOptions users. He did not like the homepage, as the mission of the site was not made clear. Furthermore, he found the profile creation section to be problematic and confusing.

Similarly, all of the other retailers we contacted had well established sites on the internet. Since we used off line sources such as trade presses to identify these suppliers, the fact that they all have a web presence leads us to believe that they all at least have a basic knowledge of the internet. Experience levels will vary but most retailers have sufficient internet capabilities to use YourEnergyOptions.

4.4 Online Needs of Local Clean Energy Entrepreneurs:

The online needs of local clean energy entrepreneurs must be identified and analyzed in order to make recommendations for the improvement of YourEnergyOptions. Questions that were brought up during interviews tried to answer key questions that are important to the future development of YourEnergyOptions. They include:

How will installers and retailers use YourEnergyOptions?

What content should be available on YourEnergyOptions?

What improvements would you like to see on YourEnergyOptions?

4.4.1 Social Networking Needs

Out of all the interviewees, Tom Stewart was the only person to use online social networking. As an entrepreneur he uses MySpace to network with other business professionals. He supports the social networking that YourEnergyOptions offers. He sees it as a way to gain visibility and communicate with others in the renewable energy market. He would like to see the user base on YourEnergyOptions grow, as the site is a valuable tool for those involved in the renewable energy market.

Larry Haley expressed concern with the use of social networking and forums to share knowledge. His concern was the validity of information that users provide. As a contractor, he relies on printed materials to learn about new building techniques. He trusts printed materials much more than online documents. With a webmaster, forum content can be moderated, as well as false information disproved. Larry did not understand that the role of forums is to share experiences and knowledge, not to be a reliable source of knowledge.

Larry Haley and Richard Breagy did not know much about social networking sites. Neither expressed interest in the sites, as they consider them not useful for their professions. We believe that their views reasonably represent most views of contractors and installers. YourEnergyOptions does not need installers and contractors to actively use the site for social networking- it needs them to create profiles so that consumers can reach out to them. The consumers who spend more time online for personal use would be more likely to actively use the site for social networking.

4.4.2 Advertising Needs

Interviewees saw the social networking aspect as a free form of advertising. While Larry Haley would not use the social networking to find others in his area, he created a profile for himself as a way for others to find him. Moreover, the prospect of YourEnergyOptions offering web hosting space for businesses in the renewable energy market was brought up. He suggested that YourEnergyOptions offer web space and development as a service for small businesses. Like his own business and many independent contractors that do not have web sites, Larry pointed out that websites are becoming a standard for new businesses that now have an edge on older contractors who are not available online. To fulfill their needs and generate a revenue source, YourEnergyOptions would create web pages for small businesses and manage the page hosting.

4.4.3 Issues Arising from the Focus Group

A focus group was conducted with the help of the other two IQP groups and Lance McKee. Members of the focus group were selected by Lance McKee. During the focus group it became clear that the objectives of the website are not completely clear and result in confusion and frustration of the users. Furthermore, focus group members noticed broken links and unnecessary content. During the usability testing portion of the focus group, a participant pointed out that the profile creation system needs to be clearer. Another problem brought up during the focus group was the search function and how it does not find the specific profile that a user is looking for; rather it pulls up the list of all the YourEnergyOptions users.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

There are conclusions and recommendations that can be made from the results and analysis from the last chapter. Some of these conclusions and recommendations can be helpful to Lance and the YourEnergyOptions website in both the short term as well as the long run. Two of the recommendations which can be implemented immediately are improvements of the homepage and the profile system. There are also recommendations which may benefit Lance and the website long term as well. They range from changes to the portal system to adding a rate-my-installer feature and the creation of a pamphlet. These conclusions and recommendations to the website will help people better understand and use the website. Also these recommendations may allow for more people to use the website, which is the goal or all social networks, bringing people together.

5.1 Short Term

5.1.1 Homepage Conclusions:

The current homepage offers many options for the users, however, there are changes that can be made to simplify the page, as well as help guide users around the website. Through the current website, users can become a member, look at the forums, and can even see the types of green advocacy and businesses there are in their area. From the homepage, some of these options are hard to find, especially with the various ads and media which may distract some users from finding what they are looking for. Another problem which has occurred with the current website stems from the links and web content that is available to the users. The site's links to content should be checked as well because many sites like wikipedia, currently one of the linked sites, are not always a reliable source and may lead to false information.

5.1.2 Homepage Recommendations:

The YourEnergyOptions website links should be checked, because many of the links are either dysfunctional or bring users to the wrong place or back to the page that they were currently look at. Some users who might have minimal experience with the internet and web use may find the site confusing and not know or understand the options available. Therefore, steps should be taken to simplify the site. Web content should be updated, and links for content should be linked to credible sites, like MTC (Massachusetts Technology Collaborative) or National Grid, not to websites like Wikipedia, where any user can change definitions.

5.1.3 Profile Conclusions:

The current profile system for the YourEnergyOptions website consists of a generic social-networking profile format with minimal variation for the different users registering on the site. There are many useful questions on the profile registration form as it is currently, however there are many problems with it as well. This profiling system should be based around the user and should tailor to consumers, retailers and installers differently. The current system has too many options that are not relevant to people using the website. It asks for favorite movies, music, books, TV shows, etc. This does not help the mission of YEO and should be removed and perhaps be replaced with books, publications and even websites that pertain to renewable energy technologies. The profile system currently does not allow users to narrow a search for a specific user; rather it lists all of the users. Currently a messaging system between users sends messages to an inbox, which may be a hassle to users.

The profile system does have positive aspects. These being the contact information as well as a checklist of what advocates are interested in. This allows for keyword searching as well as using the map system to locate people in your area. This two perks are important to the YEO niche in the social networking and renewable technology scenes.

5.1.4 Profile Recommendations:

The profile registration system should be set up with the option for three distinct profiles. The three profile types should be ones for consumers, installers and retailers. This will allow the different types of people coming to the website to have a unique profile tailored to their interests. There should be slightly different questions and fields for the profiles. For example, a retailer should put the types of products sold, and an installer might put the kind of product installation or services they offer. There should also be the option to search the site, using keyword search to easily find users, installers and retailers.

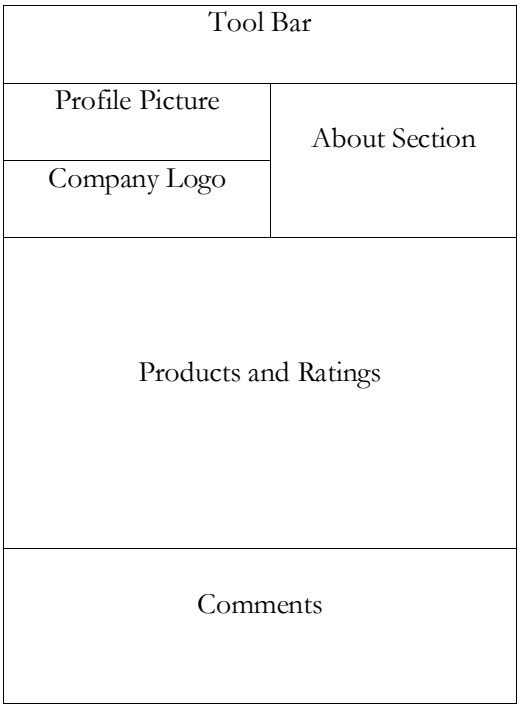


Figure 6: Profile Layout

The diagram above is a suggested concept for the profile system

The profile system should be set up with the main toolbar at the top of the page. Directly below that there should be either the profile picture or company logo on the left and directly to its right there should be an about section, which either outlines the company or about the installer or consumer. Under that there should be the products and ratings section. Here, there should be a list of the products sold or services provided as well as a brief description and picture. Along with this there can be some user ratings about the product or service provided. Below that there should be a comments section for other users to leave comments about the company, or installer as well as possibly ask questions for the retailer and installer to answer.

5.2 Long Term

5.2.1 Portal Conclusions:

The current portal system for the website is a very interactive and link oriented. The setup however, lacks aesthetics and appears to be too basic. There is a unique part of the profile system, which is the map function. A person can enter in a zip code, or a city and state, and will get a map with the local, installers, retailers and advocates of every type of renewable energy technology. The portal system should be where the

users go to find out where other users are or advertisements from the other various users on the website. Currently, much of this information is scattered around the website and useful tools might be hard to find. YourEnergyOptions can fulfill its niche by revamping the portal system. It can be a useful tool that grants the users access to the entire renewable energy market.

5.2.2 Portal Recommendations:

In order to get the portal system to the point where it will be a useful tool, there are some things that should be redesigned. First of all there should be a link on the tool bar, which brings the user directly to their portal. This would allow for easy and instant access to the renewable market.

<table>
<tr><td>Profile Picture</td><td rowspan="2">Toolbar & Options</td></tr>
<tr><td>Company Logo</td></tr>
<tr><td rowspan="2">Options</td><td>Maps & Advertisements</td></tr>
<tr><td>Comments</td></tr>
<tr><td colspan="2">Google Advertisements</td></tr>
</table>

Figure 7: Portal Layout

There should be a tool bar at the top right at the page, with the profile picture and company logo to the left of the tool bar. Underneath that on the right is the map and advertisement section where it can pull up the map of the user's local area as well as a list of advertisements from installers and retailers in the area. Directly below the map and advertisements is the comments section. This section will be used to post comments for the other users and to see what other users have posted for comments. Google advertisements are at the bottom of the page.

5.2.3 Pamphlet Conclusions:

Visibility is crucial to the success of something new. Visibility has been a topic of concern for Lance McKee since the website was created. There have not been any aggressive forms of advertising for YourEnergyOptions. Search engine optimization and web advertising was not within the scope of this project; however, a pamphlet was originally a proposed deliverable. A general advertising pamphlet aimed at the members of the community would provide a form of cheap advertising. Such a pamphlet could be

distributed at town halls, do-it-yourself stores, and green product stores. As Richard Breagy said, education and marketing of renewable energy need to be more aggressively pushed. YourEnergyOptions in this case is the source of education, and the pamphlet serves as a marketing tool. A trend seen from research and interviews is that blue collar workers- specifically contractors, and green-collar workers- installers of renewable energy typically do not use the internet for more than checking email. This is the audience that YourEnergyOptions needs to reach out to. Conventional print advertising would reach out to this user group that is more familiar and receptive to printed material. The goal of the pamphlet is to convince blue and green collar workers to become registered users of YourEnergyOptions.

5.2.4 Pamphlet Recommendations:

As a long-term change, the pamphlet should be printed on 8 ½ x 11 inch paper, and tri-folded. This is the most economically efficient choice, as it can be conveniently printed in color, for 20 cents a page. The pamphlet would contain basic information to get people excited about YourEnergyOptions. It summarizes the purpose of the website, and imprints a mental image of the site in the readers' minds. The pamphlet has three parts: cover and introduction, about the founders and contact information, and a summary of the site's offerings. As an entrepreneur would have an elevator speech, the pamphlet is a 1 minute elevator speech for YourEnergyOptions. Refer to Appendix C for a mockup of the pamphlet.

5.2.5 RateMyInstaller Conclusions:

Finding a reliable and quality installer is a concern for consumers. Richard Breagy, for example, only hires contractors that have worked for his friends and co workers, or have done previous work before for him. His reason for not hiring new contractors is the risk of hiring one who does not do work of professional quality. As a building manager of all the buildings owned by the Catholic Archdiocese in Worcester, Richard knows who his preferred contractors are. For the homeowner though, the case is much different. The homeowner faces the task of finding a contractor through word-of-mouth, or by locating one in an online or Yellow Page listing. The homeowner does not know about the quality of the contractor, unless through word-of-mouth. YourEnergyOptions can fulfill the consumers' needs by offering a rating system. Some contractors may not want to be part of YourEnergyOptions, as they could be singled out and rashly criticized by unhappy customers. However, empowering the consumer with tools to browse through and select a contractor further develops YourEnergyOption's niche of being a referral service.

5.2.6 RateMyInstaller Recommendations:

As many online stores such as Amazon, Office Depot, Staples, Ebay, BestBuy, etc. offer online ratings for their products and vendors, YourEnergyOptions needs a rating system to accommodate feedback for its installer and contractor profiles. The rating system will allow registered users to rate installers and

contractors on a 5 star scale, along with a few sentences about their experience. Having a rating appear in an installer's profile will immediately be noticed by other users. The feature would have a slogan such as 'RateMyInstaller,' and would appear in the installer's profile. The 'RateMyInstaller' feature will further strengthen the referral niche of YourEnergyOptions. Currently there are no other comparable rating systems for installers of renewable systems. Of course, only registered users would be able to rate installers. Motivation for users leaving false feedback is uncertain, but malicious feedback would be monitored and edited by the webmaster. Also, users who are skeptical about reviews can visit the reviewer's profile, and send a message concerning the review. This feature is a long-term recommendation, as the structure does not currently exist on the website, and would require monetary funding that currently is unavailable. Refer to Appendix C for a mockup of the 'RateMyInstaller' feature.

Currently, YourEnergyOptions does not fulfill its niche. While it has the social networking and referral capabilities in place, they have not been developed to their full extent. YourEnergyOptions will fulfill its niche of being a referral and social networking site once the recommendations in this chapter are put into place. Short term recommendations should be put into place immediately, followed by the long term recommendations, as YourEnergyOptions' budget permits.

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APPENDIX A: METHODOLOGY DOCUMENTS

A.1: Email to potential interviewees

Dear Sir or Madam,

We are WPI students currently working on a project to identify opportunities to create a stronger, local market for renewable energy technology. As part of this project, we would like to interview you about your experiences in the renewable energy market, and if a web-based referral system to potential customers would interest you, particularly if it allowed you to advertise on the site. We were hoping to conduct a brief phone interview since we are based in Worcester and don't have the means to make it to your location. We will be contacting you within the next two days by phone to determine if you are interested in assisting us. Thank you in advance for your time and assistance.

Regards,

Justin Blecharczyk (Mechanical Engineering)

Karen O'Sullivan (Civil Engineering)

Chris Stefaniak (Mechanical Engineering)

Justin Thomas (Civil Engineering)

A.2Interview Plan for Installers/Contractors/Retailers/Supply Houses

General Interview Plan

1. **Feedback on Current Website**
    - Inform the interviewees about YEO's mission and their future.
        i. Talk about social networking and YEO's niche
        ii. Local advocacy on clean energy technologies
        iii. Advertising for those who do not advertise on the internet
    - Talk to the interviews about the YEO website currently.
        i. Show them the current portals and profiles pages
        ii. Show them the rest of the website, such as homepage, forums, etc
        iii. Let the retailers interact with the website
            1. This allows for the potential users to gain a feel for the site as well as formulate an idea on what they think the website could do for them
2. **Feedback on Content Users Want**
    - Ask the users their likes and dislikes about the website
        i. Ask questions about portals and profiles
        ii. Get their opinion on the homepage, forums, etc
    - Do they feel like the website is a useful tool for their business
        i. If not, what YEO can do to change their opinion

- Find out the type of information they would like to see on the website
    i. Changes to the website as a whole, i.e. portal, profile, homepage, profile, etc
- See what features users would like to have and use of the site
    i. In addition to changes they propose, ask if there are things that are not on the website that might be useful to the users
- Ask how YEO could better serve their interests, while keeping the mission of the website in focus
    i. This can address any other questions, comments or suggestions that they have about the website or even the project

3. Sample Questions

- The interviewee's role in the renewable energy market.
    i. How many years have you been working in the renewable energy market?
    ii. What do you consider your role to be in the renewable energy market?
    iii. Who is your audience within the renewable energy network?
    iv. How long have you been involved in the promotion and/or implementation of renewable energy products and/or sources?
- The interviewee's internet background.
    i. How often do you use the internet? How long is a typical internet session for you?
    ii. What is your main use of the internet?
    iii. Would you consider yourself a proficient internet user?
- The interviewee's previous social network use.
    i. Are you familiar with any social networking websites? If so, which ones?
    ii. Have you ever been a member or an online social network before?
    iii. If so, what social network and what was your main intention as a member?
    iv. If not, why have you not taken advantage of the available social networks on the web?
    v. Does YEO's intended network appeal to your interests? If so, do you think it could be success as a part of the renewable energy market?
- The interviewee's interest in YourEnergyOptions, Inc.
    i. Do you see a place for a website with YEO's intent in the renewable energy market?
    ii. Would you consider becoming a member to a social network with YEO's goals?
    iii. How do you typically get your information pertaining to renewable energy right now?

A.3 Questions Sent to Interviewees That Could Not Meet in Person

Dear Green Expo Attendee,

We are WPI students currently working on a project to identify opportunities to create a stronger, local market for renewable energy technology. We received your contact information at the Green Expo in Boston this past Sunday, one of our team members spoke with you. Our projects main objective is to make constructive suggestions to YourEnergyOptions, Inc.'s owner, Lance McKee to help in the development of his web based social network. As part of this project, we are hoping you would be kind enough to spend a few minutes of your valuable time to answer a few questions regarding your internet use, your place in the renewable market, and the current website. Thank you in advance for your time and assistance.

YourEnergyOptions, Inc. is a web based corporation interested in connecting individuals interested in the implementation of clean energy technologies, particularly Installers, Retailers, and Consumers of these technologies. YourEnergyOptions.com is a developing social network sustained by user generated content. Our team is focused particularly on creating a Profile and Portal system that will meet the needs of Installers and Retailers in the renewable market. If you could please take the time to answer the following questions concerning your role in the renewable market and the current YourEnergyOptions, Inc. website your effort would be very valuable to our goal.

Your role in the "Renewable Energy Market":

- How many years have you been working in the renewable energy market?
- What do you consider your niche to be in the renewable energy market?
- What type of people do you interact within the renewable energy network?

Your internet background:

- How often do you use the internet?
  - How long is a typical internet session for you?
  - What do you primarily use the internet for?
  - How do you find information you are looking for?
- Would you consider yourself a proficient internet user?
  - Do you use search engines such as Google?
  - Do you shop online?
  - Have you ever created an account on a website?
  - Do you use online product reviews?

Your Social Networking Background:

- Are you familiar with any social networking websites? If so, which ones?
- Have you ever been a member of an online social network before?
- If so, what social network and what was your main intention as a member?
- If not, why have you not taken advantage of the available social networks on the web?
- Does YEO's intended network appeal to your interests?
- If so, do you think it could be success as a part of the renewable energy market?

YourEnergyOptions.com

- Do find the website easy to navigate?
- Is YourEnergyOptions, Inc.'s intention of being a social network apparent when you arrive to the site?

- Are the current fields of the profile application relevant to you as an installer?
- What are your main concerns, if any, that you have pertaining to the profile application?
- What, as an installer, would you want to get out of a social network?

Appendix B: Results and Analysis Documents:

B.1 Website Review – Greenopolis.com

Appearance

Are colors appropriately chosen?

- Yes, the site has a green theme, but the green is not overwhelming.

Do graphics imprint an image or logo for the website?

- Yes, the website has a definite graphic to go along with its name.

Is the site unique looking, or does it seem unoriginal?

- The site appears to be original.

Are themes effectively used to compliment website layout?

- Yes, each page follows a constant theme through-out the website.

Do the graphics hinder load times noticeably (using a DSL connection)?

- No.

Is the site professional looking?

- Very.

Content

Is the content on the website original?

- The content is original, there are a few features that are "coming soon" which when complete will be very unique to any other sites I have viewed.

Does the site link excessively to other sites for content citation?

- No, I did not find any links for content citation.

Is content up to date?

- Yes, the site in still in its construction stage.

Does the content have validity?

- The majority of the websites content is from blogs, forums, and other member posts, so the validity lies in the hands of the members.

Functionality

Is the site navigated easily?

- Very.

Is there a sitemap for users who are not as visually-inclined?

- No.

Describe the learning curve associated with using the site.

- The site is very easy to understand and navigate, it is not completely developed yet, but the features that are available are very easy to use and the purpose of each function is clear. After just a few minutes of navigation I felt confident in my usability of the site.

Is the flow logical when performing tasks on the site?

- Yes, very.

Can content be searched and browsed effectively?

- The search bar is not labeled, but when used does seem to search effectively.

Defined purpose

Is the purpose/use of the site immediate?

- "Greenopolis is an interactive, collaborative and educational "green" community web site bringing together individuals, communities, organizations and corporations to help people learn, partner and make incremental, positive environmental changes in their daily lives and communities."

Is the purpose for the site convincing?

- Yes, the site has almost three thousand members and several impressive partners.

Is the owner's story and website bio convincing and impressive?

- Yes, the founder has an impressive background.

B.2 Website Review – RiverWired.com

Appearance

Are colors appropriately chosen?

- There doesn't seem to be any

Do graphics imprint an image or logo for the website?

- The site has a definite logo, but the over look of the site isn't representative of its mission.

Is the site unique looking, or does it seem unoriginal?

- The site's appearance seems pretty generic.

Are themes effectively used to compliment website layout?

- Yes, the theme of the site remains consistent but generic.

Do the graphics hinder load times noticeably (using a DSL connection)?

- No.

Is the site professional looking?

- The site is very professional but does not appear like a social network typical does.

Content

Is the content on the website original?

- The content is not necessarily original, but brings together a lot of other sources to focus on different aspects of the green world in one place.

Does the site link excessively to other sites for content citation?

- There are a lot of links for citation; however the full articles are displayed on the site to read.

Is content up to date?

- Yes, the articles are very recent.

Does the content have validity?

- Yes, the majority of the sites content is articles and the articles are all from well known sources.

Functionality

Is the site navigated easily?

- Yes,.

Is there a sitemap for users who are not as visually-inclined?

- No.

Describe the learning curve associated with using the site.

- The site is very is to navigate because the two menus, main and portal, never leave the top and side of the page making it very difficult to get "lost" in the site.

Is the flow logical when performing tasks on the site?

- Yes, very.

Can content be searched and browsed effectively?

- The site is very easy to search and browse through; key word searches are very efficient.

Defined purpose

Is the purpose/use of the site immediate?

- "RiverWired.com provides must-see, eco-friendly news, entertainment, and community to help people live just a little greener -- and have a lot more fun."

Is the purpose for the site convincing?

- No, the site does not seem to be much of a community but rather a site of compiled green information and sources.

Is the owner's story and website bio convincing and impressive?

- Yes, the founder has an impressive background in launching successful businesses within the media and entertainment world. The site also has an extensive and experienced staff that works solely on the site.

B.3 Website Review – GenGreen.org

Appearance

Are colors appropriately chosen?

- Yes, the site has a green theme, but the green is not overwhelming.

Do graphics imprint an image or logo for the website?

- Yes, the website has a definite graphic to go along with its name.

Is the site unique looking, or does it seem unoriginal?

- The site appears to be original.

Are themes effectively used to compliment website layout?

- Yes, each page follows a constant theme through-out the website.

Do the graphics hinder load times noticeably (using a DSL connection)?

- No.

Is the site professional looking?

- Very.

Content

Is the content on the website original?

- The content is original, there are a few features that are "coming soon" which when complete will be very unique to any other sites we have viewed.

Does the site link excessively to other sites for content citation?

- No, the site does have a resource page with useful links but does not rely on these links for content.

Is content up to date?

- Yes, the site in still in its construction stage.

Does the content have validity?

- The majority of the websites content is from blogs, forums, and other member posts, so the validity lies in the hands of the members.

Functionality

Is the site navigated easily?

- Very.

Is there a sitemap for users who are not as visually-inclined?

- No.

Describe the learning curve associated with using the site.

- The site is very easy to understand and navigate, it is not completely developed yet, but the features that are available are very easy to use and the purpose of each function is clear. After just a few minutes of navigation I felt confident in my usability of the site.

Is the flow logical when performing tasks on the site?

- Yes.

Can content be searched and browsed effectively?

- Yes, the search results seemed very inclusive.

Defined purpose

Is the purpose/use of the site immediate?

- "GenGreen began by focusing on the needs of its immediate community and creating a model that could be duplicated throughout the United States. McAuliffe brought together a large group of green leaders in the area and analyzed the various needs and desires of these important people. Through this process the concept for network continued to develop and grow into the functional tool it is today."

Is the purpose for the site convincing?

- Yes, the content is very impressive.

Is the owner's story and website bio convincing and impressive?

- Yes, the founder has an impressive background in media development and the site has an impressive staff that works on the site.

Appendix C: Conclusions and Recommendations Documents

C.1 Sample Pamphlet

The cover contains the website's logo, slogan, an image of renewable technology, and a list of purposes for the site. The middle section contains a quote from the founders of company, accompanied by a picture and contact information. The third section summarizes the breakdown of the potential users of the website, and how they will be able to use the site.

Why YEO?

Consumers:

Create a profile to link up with others in your community. Create events, share thoughts with others, and find local renewable technology retailers and installers.

Installers:

Create a profile as a way to define your business in the renewable energy market. Use YourEnergyOptions to connect with potential customers.

Retailers:

Create a profile so consumers can locate you.

"We envision a world in which life on Earth is continually enhanced by people becoming ever more efficient in their use, collection, storage, transmission, conversion and buying and selling of non-polluting renewable energy."

Meet the founders:

Lance McKee and his daughters, Emily and Caitlin

And

collaboration with Worcester Polytechnic Institute students

YourEnergyOptions, Inc.

10 Circuit Avenue East
Worcester, MA 01603
Phone: 508-752-0108
E-mail: lancemckee@charter.net

YourEnergyOptions, Inc.

The renewable energy resource: referrals and social networking for a cleaner future.

Connecting consumers with local retailers, installers, and contractors of renewable energy technologies

Making pertinent resources available at the fingertips

Supporting local economic growth

A place to discuss advocacy, policy, and ideas

Meet others in your area

The pamphlet is a convincing argument for the reader to visit YourEnergyOptions.com. Green colors match the website's look, and a picture of the founders is important for the reader to realize that the website is the result of a family's work and will, not from the funding of a large corporation. The pamphlet does not explicitly explain the features on the website, as the site is dynamic and will see many changes before the printing of the newsletter. Also, the website will explain itself once the reader visits.

C.2 Sample RateMyInstaller Page

Courtesy Patrick Benson

RateMyInstaller allows registered users to leave feedback on installers' profiles. The rating system will operate on a five stars, and every rating will be accompanied by a paragraph of feedback. The user leaving feedback will be visible in the rating, so that other users can contact them with questions, as well as reducing anonymous malicious feedback.