BOSTON COLLEGE SOLAR ENEGY (BCSE) REPORT

Environmental Seminar – Dan DiLeo

Abstract

This project analyzed the need for, feasibility of, and process by which solar (photovoltaic) energy can be used by Boston College on campus. By working with professionals both at Boston College and other organizations, we were able to collect data and information to create this report. Based on our research, solar energy is feasible for the 13 College Road properties which Boston College owns. This project is modeled after "Solar Street" at Georgetown University. There are multiple methods to secure finances for this and to organize the logistics of this process. If all goes well, within a few years, Boston College could have a reduced carbon footprint and energy cost by having multiple solar panels installed.

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I. Introduction

The current issue and focus of our research is a strong lack of renewable energy on Boston College's campus. For an elite university, this school has done very little to move itself into a more energy conscious 21st century. Other schools such as Georgetown University and University of Southern California have implemented renewable energy into their energy generation. While the case can certainly be made for solar panels because of their cost savings over their lifetime, the main reason for installing solar panels should be to improve life on campus and around the world. Reducing the carbon footprint of Boston College should be an important goal. With global warming and increasing CO2 concentrations in the environment, there are increasingly graver reasons for reducing emissions and one's carbon footprint. As a Catholic, specifically Jesuit, University, Boston College has a duty to help people around the world if it is in its power.

Today there are lots of solar energy opportunities with more solar panel financing and fabricating companies. Much of this is because many states have passed legislation which gives incentives such as tax credits for people and organizations whom buy solar panels and other renewable energy sources. To reduce financing problems, many investors pay for the panels to be installed on homeowner's roofs and then the homeowner pays a relatively-flat electricity fee over the lifetime of the deal. The investor also benefits by receiving the tax credits from the purchasing.

In determining the feasibility of installing solar photovoltaic systems on College Road, it was vital to assess financial practicality and sustainability. Because Boston College is a non-profit institution, many of the federal tax incentives for solar installation would not be of use for the institution itself. As such, mapping financial feasibility required creativity, brainstorming, and in-depth comparison. Through the process, we were able to research and identify two optimal methods by which solar panels can be funded on College Road. Through our analysis, we have identified a donor-based purchasing model and a power purchase agreement (PPA) model. It is important to note that a leasing option is also available; however, it is a subset of the PPA model that does not appear to be as practically and financially attractive.

We came up with a series of questions to answer with our research:

1. Is it possible for any buildings on Boston College to be powered by solar energy?

2. What BC-owned buildings make sense to study first for outfitting of solar panels?
3. What are the current expenses for electricity consumption of those buildings?
4. Is it cost effective or at least financially feasible to install and use solar panels at these buildings?
5. What is the best method for purchasing solar energy?

II. Methods

1. We worked with an expert to gain industry knowledge and guidance.
    a. We talked with Joe DiBiase, an employee of BluSel and Boston College Alumnus, to understand more about the solar panel industry and methods for financing the solar panels at Boston College.
    b. We reached out to John MacDonald, Energy Manager at Boston College, to gather data about current Boston College energy consumption rates.
2. We went to the locations of the buildings and assessed whether they were able to have solar panels.
3. We analyzed electricity needs and costs for each of the 13 selected properties.
    a. We created spreadsheets to breakdown and forecast their expected costs based on their current consumption rates.
    b. We then compared their average cost/KWH with the cost/KWH of solar energy.
4. We researched methods of financing solar panels and the implications of the two methods we decided were most practical.
5. We reached out to Georgetown and USC to use their solar panel programs as case studies for our own project.

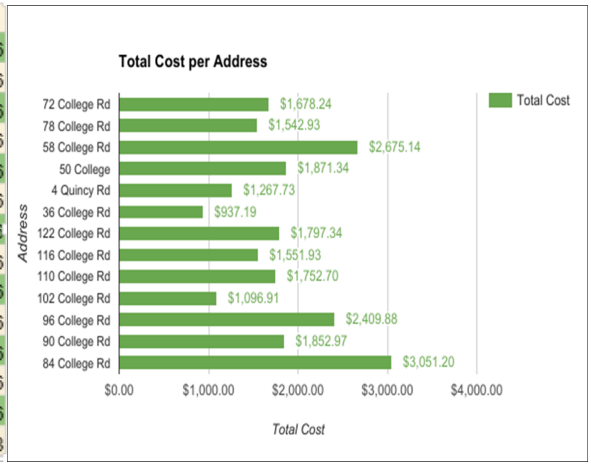
III. Results

1. Currently, Boston College spends about $23K per year on electricity for the 13 College Road houses listed.
2. It would cost about $25K a year for electricity from solar panels based on the average solar energy costs.

3. The two major methods for financing solar panels are through a Power Purchase Agreement (a form of leasing) or by purchasing the panels to own them.
4. The cost per KWH ranged from $.08 to $.19 for each property with the average being $.11 per KWH.
5. The cost for solar energy is estimated at around $.12 per KWH.

It may seem cost ineffective to purchase solar panels. However, over the long-term, we believe that both the social and financial benefits outweigh the short-term costs. We assume that the costs for traditional electricity will continue to increase in MA as they have historically (See Exhibit 5). We also believe that the social connotations of switching to renewable energy benefit all members of the Boston College community.

	Address	Total Cost	Variable Cost	Fixed Cost
1	72 College Rd	$1,678.24	$1,601.08	$77.16
2	78 College Rd	$1,542.93	$1,465.77	$77.16
3	58 College Rd	$2,675.14	$2,597.98	$77.16
4	50 College	$1,871.34	$1,794.18	$77.16
5	4 Quincy Rd	$1,267.73	$1,190.57	$77.16
6	36 College Rd	$937.19	$860.03	$77.16
7	122 College Rd	$1,797.34	$1,720.18	$77.16
8	116 College Rd	$1,551.93	$1,474.77	$77.16
9	110 College Rd	$1,752.70	$1,675.54	$77.16
10	102 College Rd	$1,096.91	$1,019.75	$77.16
11	96 College Rd	$2,409.88	$2,332.72	$77.16
12	90 College Rd	$1,852.97	$1,775.81	$77.16
13	84 College Rd	$3,051.20	$2,974.04	$77.16
Total Cost per year		$23,485.49	$22,482.41	$1,003.08



Graph 1: College Road buildings and estimated annual and monthly electricity

IV. Discussion

There are many methods to finance photovoltaic systems. Based on our research and the expertise provided to us, we looked in depth at a view of these methods. The methods explained below are the ones we deemed most feasible to Boston College.

Donor-Based Model (Self-Financing)

An important strategy for financing on-site photovoltaic systems on College Road is through a donor-based model. Under a donor-based model, a third-party donor is responsible for the purchase, installation, and maintenance costs of the photovoltaic system.

It is often the case under the donor-based model that a donor or a group of donors form a limited liability company (LLC). An LLC is a "corporate structure whereby the members of the company cannot be held personally liable for the company's debts or liabilities" (Investopedia). An LLC is particularly attractive because its legal structure allows profits to flow down to LLC members. In other words, any members of the LLC with personal tax liabilities can use the ensuing investment credit as a deduction. This reduces the individual tax burden, which is a large incentive for potential donor(s).

In addition to the federal and state tax credits available for the investment project, the potential donor(s) would also be able to collect a small payment from the consumer. Similar to the electricity bill a utility would send the consumer, the donor would charge the consumer for the energy produced. However, the energy bill would be fixed and at a lower cost than the utility.

One of the most attractive benefits under the donor-based model is the social renewable energy credits (SREC) that the donor would obtain.

Power Purchase Agreement Model

Another important strategy for financing on-site photovoltaic systems is through a power purchase agreement model (PPA). Under a PPA model, "a developer installs a solar photovoltaic system on a customer's property and sells any generated electricity to the homeowner at a fixed price over an agreed-upon time period" (Chen). This is different from a solar lease, in which a consumer "rents" the photovoltaic system. Under the PPA model, the consumer is not renting the system, but rather purchasing the energy generated from the system. The following exhibit models stakeholder positions and corresponding flow of money and electricity in a PPA model.

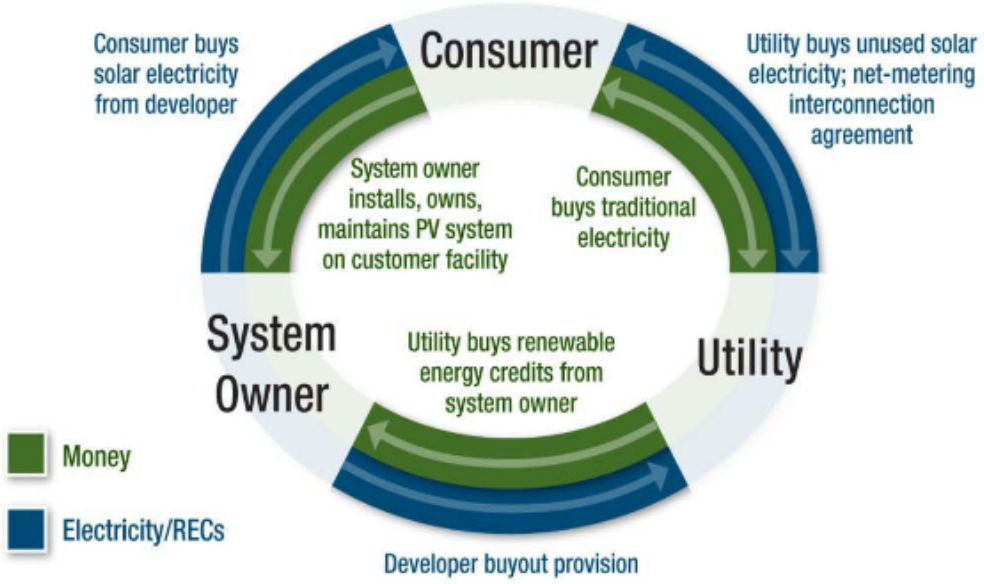


Figure 1: PPA Model showing the link between monetary and energy flow

Under this system, each individual stakeholder maintains a unique position. It is important to analyze the role of each stakeholder under the PPA model.

I. System Owner

The system owner is responsible for most, if not all, of the up-front cost of installation. The system owner is also responsible for maintenance throughout the life cycle of the system. In return, the system owner charges the consumer a fixed price for electricity generation and is guaranteed a set amount of income. Further, the system owner is granted tax deductions as well as renewable energy credits that he or she is free to sell on the market.

a. Solar Renewable Energy Credits (SREC)

i. The federal government requires a utility portfolio comprising of a certain amount of renewable energy. The Public Utilities Commission (PUC) enforce this, requiring utilities to prove that a certain proportion of energy they have provided for consumers has come from renewable sources. In

> order for the utilities to achieve this standard, the utilities purchase SREC's. Each additional SREC is granted to the photovoltaic system owner for every megawatt hour of electricity produced by the solar generator (Williams). Right now, in Massachusetts, the price for these credits range from $270-$320 per credit, depending on market demand and SREC categorization (SREC I or II). See the appendix (figure 2) for a twelve month graphic of the SREC market in Massachusetts.

Overall, the PPA model allows for increased efficiency in capital expenditure as well as the use of federal credits and related incentives.

II. The Consumer

The consumer, or receiver of the photovoltaic system, has the benefit of a consistent electricity bill. Thus, the consumer has a mechanism of hedging against any increases in electricity prices (Chen). In addition, the fixed energy costs for the consumer are typically lower than the utility. The PPA system also allows the consumer flexibility through the minimization of up-front capital expenditure and low operating risk. Finally, the consumer may benefit from an increase in property value as a result of the photovoltaic installation.

III. The Utility

Under the PPA model, the utility buys unused solar electricity from the consumer. The utility also purchases renewable energy credits from the system owner. In addition, the utility continues to provide energy to the consumer. The utility also provides net metering, which credits photovoltaic consumers for the energy they add to the grid under this system.

Leasing Model

The major difference between the PPA model and the leasing model is the status of the photovoltaic systems in relation to the consumer. In the PPA model, the developer owns and maintains the system, charging the consumer for power. With the rental model, the consumer pays to "rent" the system, and usually does not pay anything for power. In addition, under the lease model, the consumer typically will pay nothing up-front. With the PPA model, the

consumer may come up with capital to decrease the energy bill. Finally, the consumer is usually responsible for operation and maintenance of the systems under the leasing model. Under the PPA model, the developer is responsible for the operation and maintenance of the systems. Overall, the PPA model and the leasing model share many similarities, making the two models--or combinations of them--very viable options.

Competitive Benchmarking

Overall, there are many synergies that exist in examining shareholder positions with a PPA model. With that being said, it is important to analyze a competitive benchmarking table to analyze the viability of alternative options.

The exhibit below models three potential photovoltaic installation options (self-financing, third-party ownership PPA, solar lease). The exhibit compares the financing mechanism incentives to the particular installation options. As such, this competitive benchmarking table will be interpreted unique to each proposed project.

Financing Mechanisms	**Self-Financing**	**Third-Party Ownership PPA**	**Solar Lease**
Incentives			
State Cash Incentive (production-based or upfront)	Yes	Yes	Yes
Use of Federal ITC	Requires large tax liability	Yes	Yes, except on government or non-profit property
Accelerated Depreciation	Yes	Yes	Yes, except on government or non-profit property
State Tax Credits	Yes**	Yes**	Yes**
Responsibilities			
Upfront Costs	Yes	No*	No
O&M	Yes	No	Yes, unless contracted to the developer

* The lower the up-front costs, the higher the price of electricity, therefore up-front costs depend on the contract arrangement between the third-party owner and the customer to meet the goals of both parties.
** Requires a larger tax liability within the state the system is located.

Graph 2: Benchmarking financing models and incentives

After understanding the basic mechanisms of the donor-based and PPA models, it is useful to research cases involving these models. In particular, it is useful to examine other universities and institutions that have implemented the models. Through our research, we identified two university projects that utilized the PPA and the donor-based model.

Cases

Image 1: Georgeown University's "Solar Street"

Georgetown's Solar Street

Georgetown University provides an example of a university pursuing photovoltaic systems via the PPA model. In 2013, Georgetown completed a giant renewable sustainability project, equipping six university-owned townhouses with solar energy. University facilities officials say the student households will produce "nearly 20,000 kilowatts of electricity each year, with solar power providing 27 percent of the electricity" (Georgetown).

Because of the apparent success Georgetown had in this project, it was important to reach out to the Georgetown University Office of Sustainability for financial inquiry. According to a representative from this office, Gregory Miller, the project was funded through a student activity

fee. In this case, the university was seeking proposals for a quasi-endowment type of fund of around $2.5M that had been collected for over a decade and was collecting interest. One of the proposals and projects selected for use of this fund was the “Solar Street” project.

Ultimately, the project went forward as a pre-paid PPA under which GU paid approximately $45K up front. The solar company assigned to the project, SolarCity, will own and maintain the panels over the project’s 20-year life. SolarCity charges $0 for power over the length of the contract--due to the initial investment that Georgetown made towards the project. According to Gregory Miller, SolarCity will be responsible for the maintenance and end-of-use decommissioning. Georgetown required SolarCity put a small amount of money into escrow to pay for the decommissioning in case they were to go out of business before the end of the term.

In terms of financial benefit from the project, the student government recoups the "savings" in the form of an annual payment from the University's utility budget -- projected to be about $3,500 per year in the early years of the project and declining over time as production decreases. The following figure exemplifies a realistic savings platform Georgetown could expect from the project. The figure incorporates a depreciation of the solar panels over the 20-year life. As Gregory Miller mentioned, the savings are expected to decline on a straight-line basis through the life cycle. According to this estimation, Georgetown will recoup approximately $36,750 from the project. As such, the net present value of the project is a loss of $8,250. Georgetown must value the external benefits of the project as greater than $8,250 in order to make the project feasible.

Annual Savings	Total Savings
$3,500.00	3500
$3,453.80	3325
$3,408.21	3150
$3,363.22	2975
$3,318.83	2800
$3,275.02	2625
$3,231.79	2450
$3,189.13	2275
$3,147.03	2100
$3,105.49	1925
$3,064.50	1750
$3,024.05	1575
$2,984.13	1400
$2,944.74	1225
$2,905.87	1050
$2,867.51	875
$2,829.66	700
$2,792.31	525
$2,755.45	350
$2,719.08	175
Sum Savings	**36750**

Chart 1: Solar Street Predicted Savings

Georgetown’s Future PPA

In addition to “Solar Street,” Georgetown has recently signed another PPA with Community Renewable Energy to install what Xavier Rivera, director for Georgetown’s department of energy and utilities, says is the largest rooftop solar system installation in the

District of Columbia to date (Georgetown). This solar project will add six panels to Georgetown University buildings this summer. This project exemplifies the success that Georgetown has experienced in "Solar Street," as well as the University's willingness to commit to sustainability through the PPA model.

USC's Wrigley Marine Science Center

The University of Southern California's Wrigley Marine Science Center lies approximately 22 miles off the coast of Southern California. This building, which serves as a marine and environmental research center, recently activated is photovoltaic system. Last March, Helix Electric, a national electrical contractor, donated a 23 kW solar energy system which "includes 88 solar panels generating an average of about 98 kilowatt hours of electricity per day, or nearly 3 megawatt hours each month" (USC). The energy output for the solar systems "covers about 20 percent of the electrical burden for the center's dormitory and kitchen and dining facilities" (USC). According to Jerome Jontry of USC's Capital Construction, "the system has a mechanism that will send energy produced past the building's demands back into the Catalina Island power grid" (Velazquez). While Helix Electric provided the solar module, inverter, and racking system, USC provided installation and other costs. As a result of this donation, USC will receive the photovoltaic systems, benefit from renewable energy credits, and remain responsible for operation and maintenance. Helix Electric will receive a tax deduction from the donation as well as positive public publicity. Albeit successful and effective, this donation would be difficult at Boston College without the necessary dedicated up-front capital to cover installation as well as the connection to an altruistic donor. With that being said, receiving a donation is an extremely cost-effective way for a university to support its photovoltaic installation.

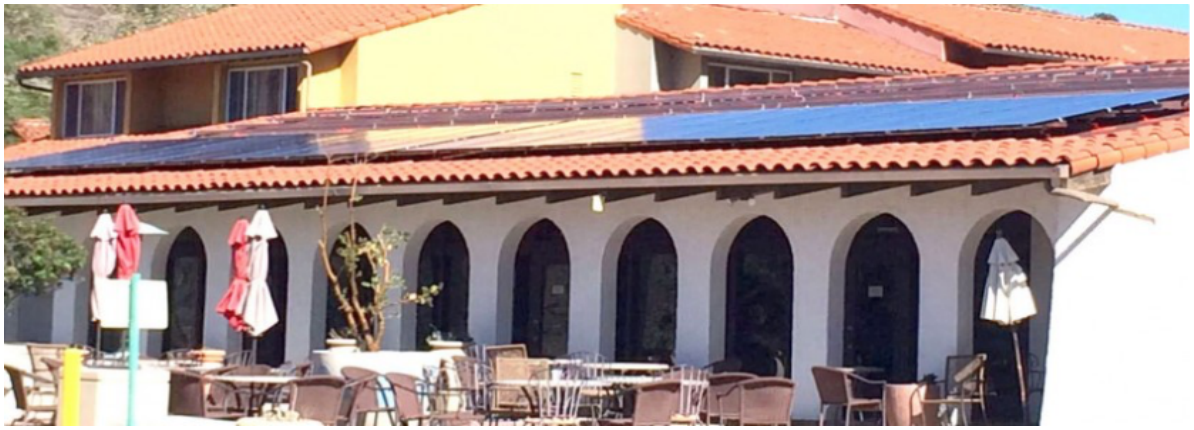


Image 2: USC's Wrigley Marine Science

V. Recommendations

After our research, we recommend that Boston College pursue the PPA method of financing these systems. This will be similar to what Georgetown University did with their "Solar Street". This will involve creating a student organization and will take place over multiple years. Because the organization will have minimal starting capital, a PPA model will allow the solar developer to absorb the cost and tax credit benefits.

This student organization will exist with the purpose of seeking funding every year to create solar panels. According to Boston College, a student organization is "defined as a group of currently enrolled, full-time undergraduate Boston College students who unite to promote a common interest, and is registered by the Office of Student Involvement" (BC Student Affairs 6). The requirements to become a student organization at Boston College include:

1. A clear purpose that does not duplicate the purpose or mission of an existing student organization
2. At least three (3) undergraduate student officers; including a President, Treasurer, and Vice President
3. A list of at least ten (10) current undergraduate Boston College students (including the three officers) who are participating within the group
4. A current copy of the organization's constitution and bylaws uploaded to MyBC each year
5. Official meetings, no fewer than two (2) times each semester
6. Have an advisor who is full-time faculty or staff at Boston College.

One of the largest goals of student organizations is to “contribute to the intellectual and social growth and development of members of the Boston College community” (8). By making Boston College Solar Energy (BCSE) an official organization it will provide benefits for both Boston College and its members. Boston College will be able to reduce its electricity bills and carbon footprint and the renewable energy also increases the reputation of the University. The members of the community benefit from not only this increased reputation, but also because the reduced carbon emissions from energy production improves the environment around them. The students who are members of BCSE receive the most benefit because they learn the whole process of researching, financing, and installing the solar panels, as well as gaining the pride of leaving a physical, positive impact on campus. Upon graduation, they will leave Boston College better than when they entered, and they will have gained practical skills which can be useful in their future careers and are sought out by employers.

When forming a student organization, students must plan both long and short-term goals for success. The short-term goals of BCSE might include research on solar energy and having numerous Boston College buildings outfitted with solar panels. Based on funding limitations, these goals may take several years to accomplish. They can be adapted to long-term goals which may include having the majority, if not all, Boston College-owned buildings outfitted with and powered fully by solar panels. If these goals are done to the best of the organization's ability, they can be expanded to encompass assisting other properties not owned by Boston College to make use of solar energy.

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Appendix

Table 1: College Road buildings and estimated annual electricity cost

	Address	Total Cost	Variable Cost	Fixed Cost		Cost/KWH	Total KWH/year	Cost/KWH solar	Cost/year solar
1	72 College Rd	$1,678.24	$1,601.08	$77.16		$0.08	19976	0.12	2397.12
2	78 College Rd	$1,542.93	$1,465.77	$77.16		$0.11	13727	0.12	1647.24
3	58 College Rd	$2,675.14	$2,597.98	$77.16		$0.19	13467.30652	0.12	1616.076782
4	50 College	$1,871.34	$1,794.18	$77.16		$0.11	16801	0.12	2016.12
5	4 Quincy Rd	$1,267.73	$1,190.57	$77.16		$0.10	12231	0.12	1467.72
6	36 College Rd	$937.19	$860.03	$77.16		$0.11	8055	0.12	966.6
7	122 College Rd	$1,797.34	$1,720.18	$77.16		$0.11	16039	0.12	1924.68
8	116 College Rd	$1,551.93	$1,474.77	$77.16		$0.08	17732	0.12	2127.84
9	110 College Rd	$1,752.70	$1,675.54	$77.16		$0.08	20809	0.12	2497.08
10	102 College Rd	$1,096.91	$1,019.75	$77.16		$0.11	9550	0.12	1146
11	96 College Rd	$2,409.88	$2,332.72	$77.16		$0.11	21844	0.12	2621.28
12	90 College Rd	$1,852.97	$1,775.81	$77.16		$0.11	16629	0.12	1995.48
13	84 College Rd	$3,051.20	$2,974.04	$77.16		$0.11	27852	0.12	3342.24
Total Cost per year		$23,485.49	$22,482.41	$1,003.08	Average Cost	$0.11	210445.8083		$25,765.48

Table 2: 72 College Road Estimated Monthly and Yearly Electricity Cost

Month												
KWH	1252	1560	1405	1314	1292	1264	2120	2083	3030	1908	1485	1263
Distribution	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296	$0.05296
Transition	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984
Transmission	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435	$0.01435
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$100.35	$125.03	$112.61	$105.32	$103.55	$101.31	$169.92	$166.95	$242.85	$152.93	$119.02	$101.23
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$106.78	$131.46	$119.04	$111.75	$109.98	$107.74	$176.35	$173.38	$249.28	$159.36	$125.45	$107.66
Variable per Yea	$1,601.08											
Fixed per Year	$77.16											
Total Year Cost	$1,678.24											
Cost/KWH	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08

Table 3: 78 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03									
KWH	1125	1062	953	1052	1388	1414	1204	901	1103	1302	1155	1068
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136
Transmission	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483
Renewable Ene	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049
Energy Conserv	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$120.13	$113.40	$101.76	$112.33	$148.21	$150.99	$128.56	$96.21	$117.78	$139.03	$123.33	$114.04
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$126.56	$119.83	$108.19	$118.76	$154.64	$157.42	$134.99	$102.64	$124.21	$145.46	$129.76	$120.47
Variable per Yea	$1,465.77											
Fixed per Year	$77.16											
Total Year Cost	$1,542.93											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 4: 58 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	864	1062	953	1052	1388	1414	1204	901	1103	1302	1155	1068
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00135	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136
Transmission	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483
Renewable Ene	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049
Energy Conserv	$0.00702	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703
Generation Chai	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615	$0.08615
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$166.67	$204.89	$183.86	$202.96	$267.79	$272.80	$232.29	$173.83	$212.80	$251.19	$222.83	$206.05
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$173.10	$211.32	$190.29	$209.39	$274.22	$279.23	$238.72	$180.26	$219.23	$257.62	$229.26	$212.48
Variable per Yea	$2,597.98											
Fixed per Year	$77.16											
Total Year Cost	$2,675.14											
Cost/KWH	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19	$0.19

Table 5: 50 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	1103	1123	972	1819	2096	2162	1311	898	1025	1438	1420	1434
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136
Transmission	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484
Renewable Ene	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049
Energy Conserv	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$117.79	$119.93	$103.80	$194.25	$223.83	$230.88	$140.00	$95.90	$109.46	$153.56	$151.64	$153.14
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$124.22	$126.36	$110.23	$200.68	$230.26	$237.31	$146.43	$102.33	$115.89	$159.99	$158.07	$159.57
Variable per Yea	$1,794.18											
Fixed per Year	$77.16											
Total Year Cost	$1,871.34											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 6: 4 Quincy Road Estimated Monthly and Yearly Electricity Cost

Month	04/05	03/04	02/04	01/06	12/07	11/04	10/05	09/03	08/05	07/06	06/08	05/06
KWH	827	923	907	916	960	830	1052	1083	1582	1243	990	918
Distribution	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681
Transition	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227
Transmission	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$80.50	$89.84	$88.29	$89.16	$93.45	$80.79	$102.40	$105.42	$153.99	$120.99	$96.37	$89.36
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$86.93	$96.27	$94.72	$95.59	$99.88	$87.22	$108.83	$111.85	$160.42	$127.42	$102.80	$95.79
Variable per Yea	$1,190.57											
Fixed per Year	$77.16											
Total Year Cost	$1,267.73											
cost/KWH	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10

Table 7: 36 College Road Estimated Monthly and Yearly Electricity Cost

Month	04/05	03/04	02/04	01/06	12/07	11/04	10/05	09/03	08/05	07/06	06/08	05/06
KWH	827	923	907	916	960	830	1052	1083	1582	1243	990	918
Distribution	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681	$0.06681
Transition	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227	$0.00227
Transmission	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526	$0.02526
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$80.50	$89.84	$88.29	$89.16	$93.45	$80.79	$102.40	$105.42	$153.99	$120.99	$96.37	$89.36
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$86.93	$96.27	$94.72	$95.59	$99.88	$87.22	$108.83	$111.85	$160.42	$127.42	$102.80	$95.79
Variable per Yea	$1,190.57											
Fixed per Year	$77.16											
Total Year Cost	$1,267.73											
cost/KWH	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10

Table 8: 122 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/03	12/03	11/03	10/03	09/03	08/03	07/03	06/03	05/03	04/03	03/03	02/03
KWH	1472	892	830	1383	2134	1969	1141	1030	1038	1126	1496	1528
Distribution	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514	$0.07514
Transition	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181	$0.00181
Transmission	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504	$0.02504
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476	$0.00476
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$157.87	$95.67	$89.02	$148.33	$228.87	$211.18	$122.37	$110.47	$111.33	$120.76	$160.45	$163.88
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$164.30	$102.10	$95.45	$154.76	$235.30	$217.61	$128.80	$116.90	$117.76	$127.19	$166.88	$170.31
Variable per Yea	$1,720.18											
Fixed per Year	$77.16											
Total Year Cost	$1,797.34											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 9: 116 College Road Estimated Monthly and Yearly Electricity Cost

Month	12/07	11/04	10/05	09/03	08/05	07/06	06/05	05/06	04/06	03/05	02/05	01/07
KWH	1238	1311	1980	2234	2088	1767	1466	1306	1160	988	996	1198
Distribution	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197	$0.06197
Transition	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095	-$0.00095
Transmission	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915	$0.01915
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250	$0.00250
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$102.96	$109.04	$164.68	$185.80	$173.66	$146.96	$121.93	$108.62	$96.48	$82.17	$82.84	$99.64
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$109.39	$115.47	$171.11	$192.23	$180.09	$153.39	$128.36	$115.05	$102.91	$88.60	$89.27	$106.07
Variable per Yea	$1,474.77											
Fixed per Year	$77.16											
Total Year Cost	$1,551.93											
cost/KWH	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08

Table 10: 110 College Road Estimated Monthly and Yearly Electricity Cost

Month	07/06	06/06	05/07	04/04	03/07	02/03	01/06	12/06	11/04	10/05	09/03	08/05
KWH	2021	1592	1487	1396	1687	1330	1439	1324	1440	1994	2230	2869
Distribution	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335	$0.05335
Transition	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984	$0.00984
Transmission	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434	$0.01434
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249	$0.00249
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$162.73	$128.19	$119.73	$112.41	$135.84	$107.09	$115.87	$106.61	$115.95	$160.56	$179.56	$231.01
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$169.16	$134.62	$126.16	$118.84	$142.27	$113.52	$122.30	$113.04	$122.38	$166.99	$185.99	$237.44
Variable per Yea	$1,675.54											
Fixed per Year	$77.16											
Total Year Cost	$1,752.70											
cost/KWH	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08

Table 11: 102 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	743	789	693	831	1434	1060	713	613	645	693	685	651
Distribution	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308	$0.07308
Transition	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135	$0.00135
Transmission	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484	$0.02484
Renewable Ene	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049
Energy Conserv	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$79.34	$84.25	$74.00	$88.73	$153.12	$113.19	$76.13	$65.46	$68.87	$74.00	$73.14	$69.51
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$85.77	$90.68	$80.43	$95.16	$159.55	$119.62	$82.56	$71.89	$75.30	$80.43	$79.57	$75.94
Variable per Yea	$1,019.75											
Fixed per Year	$77.16											
Total Year Cost	$1,096.91											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 12: 96 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	963	1507	1674	2544	3752	3289	2505	1518	1084	952	1097	959
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137	$0.00137
Transmission	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483
Renewable Ene	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049	$0.00049
Energy Conserv	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$102.84	$160.93	$178.77	$271.67	$400.68	$351.23	$267.51	$162.11	$115.76	$101.66	$117.15	$102.41
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$109.27	$167.36	$185.20	$278.10	$407.11	$357.66	$273.94	$168.54	$122.19	$108.09	$123.58	$108.84
Variable per Yea	$2,332.72											
Fixed per Year	$77.16											
Total Year Cost	$2,409.88											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 13: 90 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	1115	1207	1143	1427	2049	2082	1738	1197	1093	1247	1041	1290
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136
Transmission	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703	$0.00703
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$119.07	$128.90	$122.06	$152.39	$218.81	$222.34	$185.60	$127.83	$116.72	$133.17	$111.17	$137.76
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$125.50	$135.33	$128.49	$158.82	$225.24	$228.77	$192.03	$134.26	$123.15	$139.60	$117.60	$144.19
Variable per Yea	$1,775.81											
Fixed per Year	$77.16											
Total Year Cost	$1,852.97											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Table 14: 84 College Road Estimated Monthly and Yearly Electricity Cost

Month	01/06	12/06	11/03	10/05	09/06	08/04	07/05	06/03	05/05	04/05	03/04	02/04
KWH	3690	3140	1697	1847	3330	3539	2521	1646	2864	1247	1041	1290
Distribution	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307	$0.07307
Transition	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136	$0.00136
Transmission	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483	$0.02483
Renewable Ene	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050	$0.00050
Energy Conserv	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702	$0.00702
Customer Charg	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Variable Cost	$394.02	$335.29	$181.21	$197.22	$355.58	$377.89	$269.19	$175.76	$305.82	$133.15	$111.16	$137.75
Fixed Cost	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43	$6.43
Total Cost	$400.45	$341.72	$187.64	$203.65	$362.01	$384.32	$275.62	$182.19	$312.25	$139.58	$117.59	$144.18
Variable per Yea	$2,974.04											
Fixed per Year	$77.16											
Total Year Cost	$3,051.20											
cost/KWH	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11

Exhibit 1: Email from Greg Miller at Georgetown University:

GU Office of Sustainability <sustainability@georgetown.edu> Feb 21

to Gregory, Austin, me

Hello Austin,

Thanks for reaching out!

Although the students who were involved with the project have since graduated, our office was also involved and can offer a little bit of information. The project was funded through essentially, a student activity fee - in our case the university was seeking proposals for uses for a quasi-endowment type of fund of around $2.5M that had been collected over a decade ago and was collecting interest. The solar project was one of the proposals for use of the funds. Ultimately the project went forward as a "pre-paid PPA" (similar to a pre-paid lease) under which GU paid approximately $45K up front and the solar company continues to own and maintain the panels over the project's 20-year life, charging $0 for power over the length of the contract. Some benefits of this model as opposed to an outright purchase include the company's responsibility for maintenance and the company's responsibility for end-of-use decommissioning. We required the company put a small amount of money into escrow to pay for the decommissioning in case they were to go out of business before the end of the term. The student government recoups the "savings" in the form of an annual payment from the University's utility budget -- projected to be about $3,500 per year in the early years of the project and declining over time as production decreases.

Please let us know if we can be of any further assistance!

Best,

Greg Miller

Exhibit 2: SREC market prices over the last twelve months

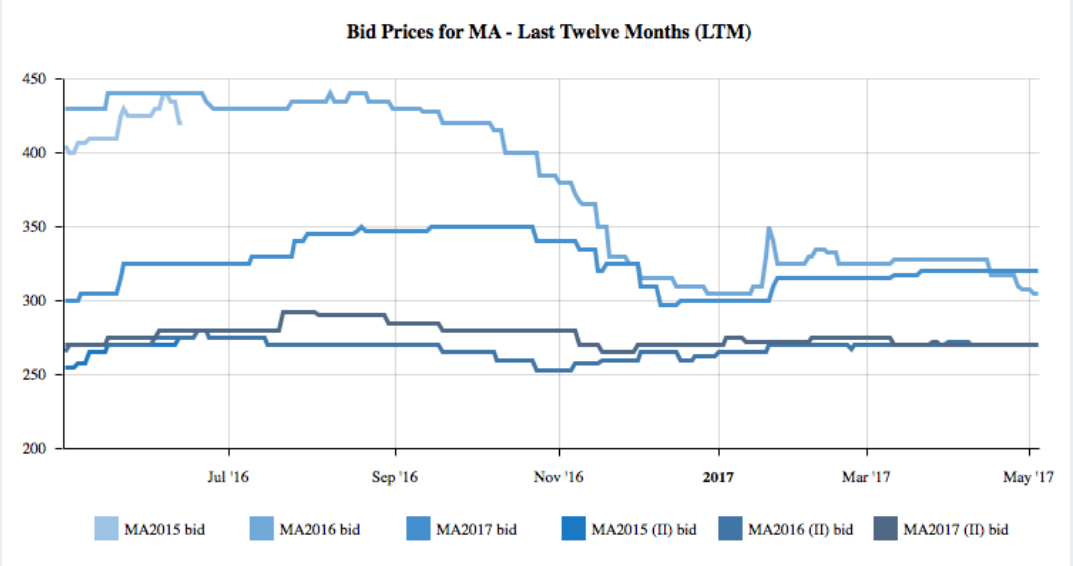

Exhibit 3: Example of Boston College Electricity bill from John MacDonald

EVERSOURCE

PO Box 660369
Dallas, TX 75266-0369

Account Number

04 80 2604 923 9990

000221 000000012

BC BROCK HOUSE
140 COMMONWEALTH AVE
CHESTNUT HILL MA 02467-3800

Electric

This Detail Bill is for Your Records Only. Do Not Use this Stub for Payment.

Account Number	Billing Date	Next Read Date
2554 749 1008	Jan 7, 2017	Feb 6, 2017

Service Provided to

BC BROCK HOUSE
78 COLLEGE RD
CHESTNT HL MA 02467

Account Summary

Previous Bill	73.99
Payment - Thank You	-109.10
Total Delivery Charges	126.58
Delivery Svcs Balance	**$91.47**

Electricity Used

Rate A1-Residential
Meter 1199589

Jan 06, 2017 Actual Read		72607
Dec 06, 2016 Actual Read	-	71482
31 Day Billed Use		1125

1199589	KWH
01/06	1125
12/06	1062
11/06	953
10/06	1052
09/06	1588
08/06	1414
07/06	1284
06/06	901
05/06	1105
04/06	1302
03/06	1166
02/06	1068
01/06	1052

Cost of Electricity

Delivery Services (PRORATED)

Customer Charge				6.45
Distribution	.07307 X	1125 KWH		82.21
Transition	.00156 X	1125 KWH		1.55
Transmission	.02483 X	1125 KWH		27.94
Renewable Energy	.00049 X	1125 KWH		0.56
Energy Conservation	.00783 X	1125 KWH		7.93
Delivery Services Total				**126.58**

EVERSOURCE

CUSTOMER SERVICE CENTER 800-592-2000
BUSINESS CUSTOMERS 800-348-9822

Exhibit 4: Boston College Map with the 13 houses highlighted

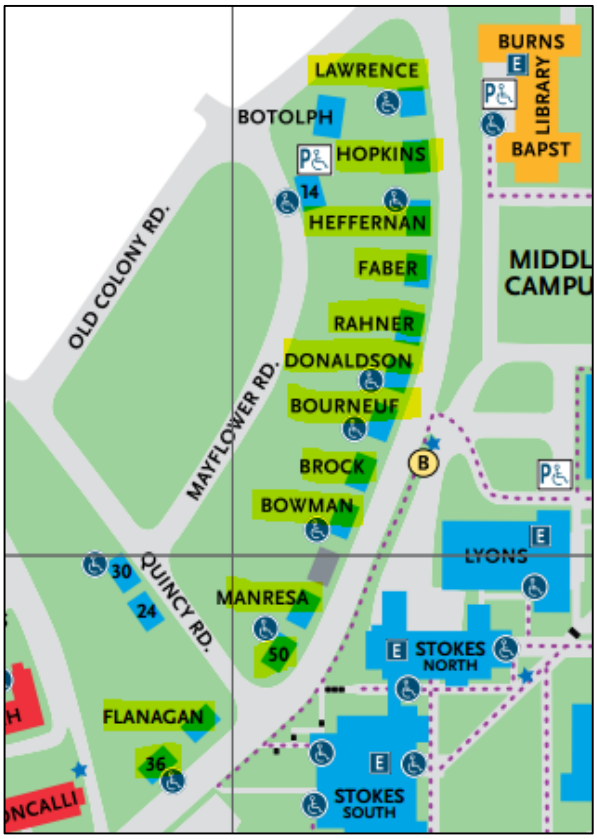

Exhibit 5: Percent increase of electricity cost in Massachusetts