The Next Big Step
A Guide for Graduates
Policy Analysis III
Carnegie Mellon University
Disclaimer and Explanatory Note

Please do not cite draft, cite, or quote this report, or any portion thereof, as an official Carnegie Mellon University report or document. As a student project, it is has not been subjected to the required level or amount of critical review.

This report presents the results of a one semester project, involving students from the Department of Engineering and Public Policy, the Department of Social and Decision Sciences, and the Heinz School of Public Policy and Management at Carnegie Mellon University. These projects help students gain experience in solving problems that require interdisciplinary cooperation. Thus, students must always consider the overall problem as they contribute skills from their individual disciplines. The projects are managed by graduate students and monitored by faculty advisors. An advisory panel of academic and industry experts provides suggestions, information, and expertise.

DRAFT: Not For Circulation
Students

Social and Decision Sciences
Rotimi Abimbola
Jun Chun
Paul Combe
Lucia Del Puppo
Matthew Glantz
Jeewon Sarah Kim
John Ray
Dexter Rietman
Daniel Sawl
Charles Shifrin
Jack Wang
Thomas Yu

Engineering and Public Policy
Chemical Engineering
Krystin Meidell
Stephen Vance

Civil and Environmental Engineering
Kishore Mahbubani

Mechanical Engineering
Nadir Sidi
Vidur Singhal

Materials Science and Engineering
Abigail Pellow

School of Public Policy and Management
Snigdha Verma

Faculty Advisors
Dr. Baruch Fischhoff, Professor of Social and Decision Sciences and of Engineering and Public Policy
Dr. Keith Florig, Senior Research Engineer, Department of Engineering and Public Policy

Project Managers
Ashwin Kumar, PhD Student in Engineering and Public Policy
Anu Narayanan, PhD Student in Engineering and Public Policy
# Table of Contents

Section I) Executive Summary  
Section II) Needs Assessment  
Section III) Strategy  
Section IV) Housing  
Section V) Transportation  
Section VI) Lifestyle  
   a) Utilities  
   b) Financial Literacy  
   c) Furnishing  
   d) Diet  
   e) Vacations  
Section VII) Decision Aid  
   a) Strategy  
   b) Design  
   c) Critical Review  
Section VIII) Policy  
Appendix  
Reference
SECTION I) EXECUTIVE SUMMARY

1.1 Introduction

The Next Big Step is the result of a semester-long project course involving undergraduate students from the Department of Social and Decision Sciences, Department of Engineering and Public Policy and graduate students from the Heinz College of Public Policy. The project centered on creating a lifestyle guide aimed at recent college graduates. There are many unfamiliar decisions that this group faces upon graduation, regarding their housing, transportation, and lifestyle. The Next Big Step provides information on how to make these decisions during this transition period. A concurrent aim of the guide is to make information about the environmental impacts of these decisions readily available to graduates, so that it is as easy as possible to consider them when making these decisions. The aid is illustrated with a case study of a version directed at graduates moving to New York City, the most common destination for Carnegie Mellon students.

1.2 Goals of the Aid

There are many resources available on making housing, transportation and lifestyle decisions and the environmental alternatives associated with them. None. However, centralize all these resources and pare the information down to what is directly relevant to recent college graduates. The Next Big Step’s goal is to aggregate the housing, transportation and lifestyle information that could interest and apply to our target group. The aim is to then simplify this information so graduates can interpret it more easily, making the aid as usable as possible. Additionally, its design and language are chosen to appeal to recent graduates.

Housing

The Housing portion of the aid divides options into four archetypes, among which students can choose that most relevant to their interests. These archetypes reflect whether they plan to live in a suburban or urban area and in an apartment or a house. Information is provided for each archetype, along with more general information, such as what to look out for when signing a lease and how to find a roommate. The New York case study that analyzes four different living areas in and around New York City, focusing on the following decision attributes: cost, education, diversity, environment, and safety.

Transportation

The Transportation section of the aid illustrates New York City decisions by analyzing three different trips are modeled, two involving a commute to work and one a night out. The analysis considers time, financial cost, safety, energy intensity, and carbon dioxide emissions of driving, taking the bus, taking the subway, walking, biking, and taking a taxi cab. Also available in this portion of the aid is general background information on the benefits and drawbacks of each mode of transportation. It provides links to information sources that our research found to be most valuable.
Lifestyle

The Lifestyle section of the aid is the most extensive and varied. Its components are Utilities, Financial Literacy, Furnishing, Diet and Vacations. Utilities are an aspect of living independently that can be novel to graduates and where their decisions will have a large influence on their environmental impact and finances. The Financial section addresses the basics of setting up personal finances, including credit cards, checking and savings accounts, taxes, government plans, investments, and retirement. The Furnishing section deals with non-durable goods, such as household products, and durable goods, including furniture and décor. The non-durable goods section identifies products with a low environmental impact and reasonable cost. The durable goods section describes options such as buying second-hand furniture. The Diet section considers the environmental impacts of (a) eating in versus eating out, (b) organic versus non-organic foods, (c) processed versus non-processed foods, and (d) vegetarian diet versus a non-vegetarian one. For each, it also considers the attributes of cost, taste and convenience. The Vacations section advises young college graduates on how to minimize the environmental impact of their weekend getaways without sacrificing fun.

1.3 Conclusion

The Next Big Step has created the structure for a decision aid that can guide recent graduates through their housing, transportation and lifestyle choices, while presenting them with environmentally conscious alternatives. The design of the aid and its content are specifically targeted at this demographic. The aid is unique in that many environmental lifestyle guides exist, but few are tailored to the recent graduates’ needs or describe the options in a neutral way, allowing users to decide how strongly to weight environmental concerns.

The decision aid currently analyzes New York City in detail, but this structure can be applied to other cities. We hope that the Career Center will take on The Next Big Step and expand our decision aid to the cities that are most relevant to our graduates, such as Washington, DC, Boston, MA, and San Francisco, CA.
SECTION II) NEEDS ASSESSMENT

After graduation, former students make important decisions regarding their future lives. Many of these decisions affect the environment; however, concern for the environment is not the only factor that individuals consider. Marketers sometimes call the age range 13-29 as Millennials. Among those between 22 and 29, which include recent graduates, over 80% believe that they can make a difference in the world. In one study (Generate Insight, 2009), 53% said that they were willing to pay higher prices for products that are beneficial to the environment. However, a majority found it confusing why “green” products are priced higher than conventional products (Generate Insight, 2009).

Approximately 71% of total consumption for the age group below 25 in the U.S. involves housing, transportation, and food and beverages (Consumer Expenditure Survey, 2007). The categories of utility and furnishing, which are a part of the lifestyle section, are included in the housing statistic shown above. Making environmental information readily available for graduates makes the decision processes easier for them.

Around 65% of Carnegie Mellon graduates relocate to the Mid-Atlantic and Northeast regions of the U.S. post-graduation (CMU Career Services). Because New York City is one of the most desired locations for graduates, we use this city as the case study for the region-specific guide.

2.1 Survey pretest

Sound analysis requires evidence. One way to supplement general information about graduates is to survey them about their post-graduation decisions. The appendix presents such a survey. This section shows illustrative results from a sample of 10 students in the class. It assumes that all decisions consider the five outcomes attributes in Table 1. A second version of the survey, also in the appendix, is designed to ask recent graduates about their experiences on the same issues. Comparing the two would show areas where current seniors particularly need information. The survey only asks about housing and transportation decisions. It could be expanded to include lifestyle decisions.

<table>
<thead>
<tr>
<th>Convenience</th>
<th>Social Interaction</th>
<th>Space</th>
<th>Economic Costs</th>
<th>Environmental Cost</th>
</tr>
</thead>
</table>

Table 1. Attributes that influence graduates’ decision-making process
2.2 Pretest Result

All 10 pretest participants completed all questions. Tables 2 and 3 show their demographics. Although the sample is too small for the results to provide any guidance, the analyses are presented here to show how a survey with a proper sample could be used to inform the design of a decision aid.

<table>
<thead>
<tr>
<th></th>
<th>Male (n=5)</th>
<th>Female (n=5)</th>
<th>RowTotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50.00%</td>
<td>50.00%</td>
<td>100% (n=10)</td>
</tr>
<tr>
<td>Ethnicity-U.S</td>
<td>40% (n=4)</td>
<td>30% (n=3)</td>
<td>70% (n=10)</td>
</tr>
<tr>
<td>Ethnicity-outside U.S</td>
<td>20% (n=2)</td>
<td>10% (n=1)</td>
<td>30% (n=3)</td>
</tr>
<tr>
<td></td>
<td>60% (n=6)</td>
<td>40% (n=4)</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2. Demographic between male and female by their ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Male (n=5)</th>
<th>Female (n=5)</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>50.00%</td>
<td>50.00%</td>
<td>100% (n=10)</td>
</tr>
<tr>
<td>(n=6)</td>
<td>40% (n=4)</td>
<td>20% (n=2)</td>
<td>60%</td>
</tr>
<tr>
<td>Non-Engineering</td>
<td>20% (n=2)</td>
<td>20% (n=2)</td>
<td>40%</td>
</tr>
<tr>
<td>(n=4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60%</td>
<td>40%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3. Demographic between male and female by their majors
These four charts below show the different attributes preference among female, male, engineer majors, and non-engineer majors. It shows the result for ranking in order of important factors that our samples will choose their future housing and transportation decisions. Among genders, there were no correlation between females and males. Furthermore, this was tested by doing ANOVA which is indicated in Table 4. Every question had P-Value above 0.5. It revealed that while males thought proximity to job is the most important factor, females response as price of housing is the most influential factor. Also, engineer majors thought proximity to job was the most influential factor to make their decisions while non-engineering majors indicated price of housing is the most important thing. Even with these differences, there were no significant difference between engineers and non-engineers that were done by ANOVA test because the p-value was above 0.5.

<table>
<thead>
<tr>
<th>By Gender</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity to amenities</td>
<td>.564</td>
</tr>
<tr>
<td>Security of location</td>
<td>.571</td>
</tr>
<tr>
<td>Proximity to nightlife</td>
<td>.638</td>
</tr>
<tr>
<td>Access to public transportation</td>
<td>.241</td>
</tr>
<tr>
<td>Proximity to job</td>
<td>.594</td>
</tr>
<tr>
<td>Price of housing</td>
<td>.134</td>
</tr>
<tr>
<td>Environmental impact of housing</td>
<td>.878</td>
</tr>
</tbody>
</table>

Table 4. Anova test by gender
Respondents ranked the seven attributes in Table 5 in terms of their expected influence on where they would choose to live. The mean rankings was highest for proximity to job and price of housing, while environmental impact was lowest.

Virtually all seniors expected to live in urban areas and use a car, with 50% expecting to use a car as their primary mode of transportation. Half expected to have one housemate, and 20% expected to have no housemates.

Figure 1 shows respondents expected mode of transportation for different uses. Most expect to walk for nightlife and amenities, take public transportation to work. Interestingly, 50% of people indicated to take car for amenities.
Figure 1. “If you were able to live in the city of your choice, what mode of transportation do you expect to use most often to get to the following destinations once you graduate?”

2.3 Survey pretest discussion

As mentioned, the sample was too small for the results to be used in any way. What follows is a brief discussion of what such results would mean in a survey with a proper sample. They suggest issues, not conclusions.

There was no significant gender differences between gender and preferences of their attributes and majors and preferences of their attributes. Thus, the same guide could be used for males and females.

Respondents expected environmental impact to be the least important in choosing where to live (Table X). This result suggests the importance of informing graduates about the environmental impacts of these choices, a task undertaken in Chapter 2.

Also, if the bigger sample size shows the same result that preferring proximity to job and price of housing as their priority, these factors could be put into bigger emphasize in our future product.

2.4 Future work

A revised version of this survey could be distributed to undergraduate seniors and recent graduates. It would be most effective if an authorized college body regularly collects and analyzes this data on an ongoing basis, revealing changing needs of graduating seniors. Its plain language and concise questions are intended to make it easy to complete. Open-ended response options allow respondents to add issues that the structured questions might have missed.
SECTION III) STRATEGY

3.1 Our Brand and Target Audience

Our brand centers on empowering graduates to help make some important life choices as they come out of college. This will be done by providing them a decision aid in the form of a website with information that is relevant, concise and full of factors that the graduates may or may not have thought of themselves. Making environmental concerns a natural part of all decisions is the major underlying focus of the aid. However, the environmental aspect is tackled in a subtle and not very pushy manner so that our product is not mistaken for a guide to environmentally friendly living. But instead a comprehensive source of knowledge for making decisions in different areas of one’s lifestyle.

In this way, we hope to assist college graduates in making more informed choices that may help them in leading better, healthier, safer, cheaper or ‘greener’ lives.

Our target audience is recent college graduates and college seniors. There is a plethora of websites that provide users with tips and advice on how to lead an environmentally friendly lifestyle. There are none, however, that target this section of the population. This project’s aim is to fit into that niche.

3.2 Architecture of Our Aid

Our aid will be divided into three sections: Housing, Transportation, and Lifestyle. These are three areas in which graduates will be making decisions and in which they will be able to have the most environmental impact. Within these categories there will be general information that is applicable to all users in search of housing, transportation or lifestyle solutions. There will also be city-by-city case studies that will be more specific and will provide details for each decision specific to that city. With this format, users can to gain access to two different levels of information, local and national; depending on where in the decision making process they are at the time. Once a user decides to live in a certain place they will be able to consult the case studies and make their housing, transportation and lifestyle decisions with information that is relevant to that area.

3.3 New York as an Example

New York City is being used as a demonstration case to which all of these archetypes can be applied. According to the Career Center a high percentage of recent graduates from Carnegie Mellon move or intend to move to the Northeast. This demonstration case is an opportunity to provide them with very specific information and also see how well these archetypes actually fit into a real-life situation, not just a theoretical one. The demonstration case includes key information relevant to housing, transportation, or lifestyle decisions, for graduates moving to New York that also fits into the archetypes or structured categories mentioned above. Additionally, each section of the demonstration case includes a set of metrics that are key in
structuring the background information. This background information is meant to assist users who have not yet made the decisions about housing, transportation or lifestyle.

### 3.4 Facebook

The final product of this project is a decision guide for graduating college seniors and young adults making decisions with energy and environmental impacts. Whether all of this information is compiled into a booklet, website, or other medium (or a combination of formats), it will be necessary to disseminate information and tools to our target demographic.

As seen in the graph below, of the approximately 30 million Facebook users, more than half are from our target demographic (18-25 year olds). Furthermore, according to a GenX2Z College Study by Anderson Analytics about 80% of college students use Facebook, with 74% of students accessing the site at least once a week. This is compared with only about 40% of college students who use MySpace, the next highest-rated social networking site. (http://campustechnology.com/).

**US Facebook Users By Age Group and Gender (9/18/08)**

*(InsideFacebook.com)*

<table>
<thead>
<tr>
<th></th>
<th>55-65</th>
<th>45-54</th>
<th>35-44</th>
<th>26-34</th>
<th>18-25</th>
<th>13-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>260,500</td>
<td>519,180</td>
<td>1,416,760</td>
<td>3,607,420</td>
<td>9,133,120</td>
<td>2,942,480</td>
</tr>
<tr>
<td>Male</td>
<td>197,260</td>
<td>316,700</td>
<td>1,078,920</td>
<td>2,692,800</td>
<td>7,649,529</td>
<td>2,003,720</td>
</tr>
<tr>
<td>Total Users</td>
<td>518,200</td>
<td>935,880</td>
<td>2,577,680</td>
<td>6,300,220</td>
<td>17,782,649</td>
<td>5,046,200</td>
</tr>
</tbody>
</table>

*Figure 2. Facebook users*
Many viable options exist for marketing our final product; however, based on some key trends in how young people spend their time and how they choose to gather information in decision-making, it is obvious that the social networking site Facebook will give us the most marketing impact for our time and energy.

Many organizations, events, companies, and university offices are beginning to utilize the far-reaching impact of Facebook on students for recruitment, education, and networking. Even now, the Carnegie Mellon Career and Professional Development Center has a widely-used and utilized Facebook page, with over 200 fans and growing. This is a great starting place for a university-specific organization; however, considering that Carnegie Mellon University has a Facebook page with over 8400 fans (http://www.facebook.com/carnegiemellonu?ref=search&sid=4811477.1584974894..1&v=wall), there is clearly room to grow. A Facebook tie-in for our project could take at least 2 forms: a tie-in with the Career Center Facebook page; or a separate stand-alone page that deals exclusively with our particular decision-aid. All of the desirable qualities of Facebook as an advertising would be applicable to other campuses, should they decide to take on this or a similar project. The suggestions for integrating this project into Facebook are applicable to iterations of our project at Carnegie Mellon, as well as on other campuses.

Since its launch in 2004, Facebook has seen a seemingly exponential climb in the number of users. For the past 8 quarters, Facebook has been the most visited site by US college students, with 300 million “users” (not necessarily discrete users) spending an average of 8 billion minutes on the site per day (26 minutes per day per user). Clearly, Facebook is a high-traffic website that is routinely attracting a large number of people from our target demographic.

(techcrunchies.com)

![Figure 3. Total Facebook User trend](image)
Although Facebook is a social networking site, there are many features that make it an attractive marketing and information-disseminating tool for whomever takes on this project. Recently, Facebook has developed a "Pages" feature that allows users with common interests to connect with each other. For example, a Facebook search for "Ice Cream" will show as a result a Facebook Page dedicated to ice cream with over 2 million fans. Facebook pages come in a wide variety, from health care reform, to abortion rights, The Beatles, and even going green. There are many aspects of Facebook pages that make it an attractive option for our project, including becoming a “Fan” of a page, the “Newsfeed”, and several others.

What it means to become a "Fan"

The most important part of creating a Facebook page is to accumulate as many "Fans" within our target demographic as possible. This can be done in one of three ways: the admin for our page can invite individuals to become fans of our page; users who are already fans can recommend that their friends become fans; or, users who navigate to our page can click a link to become a fan.

Once a Facebook user becomes a fan, he or she will be notified every time the administrator updates the page. This includes "tagging" them in photos, videos, or notes, creating or updating events, posting a "status" (a small clip of text), posting links, or sending messages to fans. In this way, college students and recent alums can be constantly updated as to the status of our project, events that could possibly be hosted, or even be given information in the form of a direct message.

The News Feed:

Perhaps most attractive about the Facebook outlet is the ability to reach members of our demographic who are not inclined to seek this information out themselves. A Facebook user who becomes a fan of our page, or participates in activities on the page (i.e. participates in message board discussions, posts comments or links to page, etc.) has friends who will see this activity on their News Feed. The News Feed is the default page that is displayed when a user logs in. It shows the recent activities of their friends and pages they are fans of.

Useful Features to Utilize:

While Facebook will be an invaluable tool in promoting our website (and potentially other deliverables), there are features on Facebook that can act as an extension of our decision guide. For example, there are many web resources that have greatly contributed to the Next Step project. On Facebook, links to helpful websites can be posted so that fans of the page will be made aware of them. The links are cataloged on the page so that any Facebook user can access any link that the page has posted.

The key component that maximizes the Facebook effectiveness is the existence of an attentive Facebook Page Administrator. In order for the page to reach its full potential of effectiveness, it would require an administrator who updates the page and sends messages at
least a few times a week. Should Carnegie Mellon decide to take on this project, the administrator could be a student volunteer, or a member of a student-run organization. That person would also have to be reasonably computer (and Facebook) savvy; Facebook tends to update their layouts and features quite frequently, and the administrator of the page would need to adapt to it.

Finally, one of the biggest issues with Facebook is that nobody knows how long the usage trends will last. About 5 years ago, Facebook didn't even exist. Five years from now, there is no way to say with certainty that it will still be around. However, because of the updates and expansion of Facebook, one can suspect that it may be around for a while. Facebook originally started as a networking site for Harvard students. It has gradually expanded to now allow anyone with a valid email address to create an account. While there is a chance that in coming years, Facebook could become inappropriate for our project or even obsolete, the same could be said for our decision aid, based on the fluctuating nature of the information and social trends surrounding energy usage and green practices.
SECTION VI) HOUSING

4.1 Decision Process

The main decisions that graduate face in choosing where to live as they take a new job (Figure 4) are four-fold. The first is which region or city to live in. This is usually dictated by job offers. There are many sources for finding out which cities are the most livable. For example, the Mercer Consulting Group does a yearly study aiming to give firms an idea of where to place employees and to expand their business. These scores also offer graduates a resource to look to for finding a city that fits their expectations. Once the location is set, there are three additional decisions that need to be made: the type of housing, the location, and the number of roommates. An individual’s ranking of these subsequent decisions creates a structure based on availability and the individual’s expectations.

Figure 4. Likely Decision Tree

The decision of type of housing involves a choice between a house and an apartment. This is specifically linked to the decision about roommates, since the more roommates one wants, the more space that is needed to accommodate them. The housing location decision in our aid is a decision between urban and suburban locations. This takes into account the choices made by a majority of graduates and allows comparing the different styles of living that go with those areas. Also, this particular decision should depend on distance from work, the budget for transportation, and the willingness to travel. The aid provides this information. The decision
regarding number of roommates is one that is often neglected. In college, students are surrounded by peers, so even if their university does not provide them with a roommate, it is easy enough to meet someone else who is looking for a place to live. Everyone is the same age and the environment is conducive to social interaction; this advantage is often taken for granted. Finding roommates after college can be relatively easy, but not quite as easy as in college, therefore, it is important that this decision be included in our guide. Roommates can help in making a greater variety of housing areas available to a graduate, as shared living cuts costs.

4.2 Key Environmental Issues

*Resource consumption and Waste Production*

As graduates face the aforementioned housing decisions, the aid provides them with information regarding the environmental implications of their decisions, along with other needed information. Whether recent graduates choose to live in an urban or a rural area, a house or an apartment, they will make housing and lifestyle decisions that will have environmental impacts, consuming resources and producing waste. Our aid seeks to help recent graduates by making environmental information readily available when they make these choices. We are not, by any means, dictating which decisions are best for our target population to make.

In addition to affecting the environment, graduates are affected by it. For example, they will lead healthier lives in cities with clear water and air. Graduates who use the aid will be able to learn about environmental issues that might not otherwise be visible. For example, graduates moving to Brooklyn could find out the median air quality, average CO2 emissions, and other environmental facts. Thus, the aid makes it easy for graduates to understand how they will affect their environment (e.g., ecological disruption, resource depletion, inadequate waste management) and how their new environment will affect them (e.g., polluted water, indoor air pollution). Doing so will help them to decide how important these issues are. In addition, to the information that it presents directly, the aid provides reputable websites that serve as resources for graduates to further their knowledge on environmental issues.

According to Glaeser (2009), Manhattan is one of the greenest places in America. His analyses suggest that households in densely populated urban areas have significantly lower carbon emissions per capita than do households in the suburbs. We do not know to what extent that is a reflection of Manhattan residents having particularly good environmental practices, the local government taking various green initiatives, or the high cost of living space, which, has places constraints on residents’ resource consumption and waste production.
The type of housing that graduates choose will have major implications on their environmental impact. For example, if a graduate makes the decision to move into an old poorly insulated and drafty building, she may use substantially more energy for heating and cooling than would be required in a newer structure. The larger the living space, the greater the amount of energy needed for heating. The number of housemates that the graduates choose will also affect the energy used. (See the Lifestyle section)

Our target population will be most interested in information that provides cost-efficient alternatives to the choices they face once they make the big move. Energy efficient choices are also cost-efficient. If graduates choose to live in an apartment with newer (or Energy Star) appliances, lighting, and heating, their decisions make less of an impact on the environment and they also save money. Our aid also provides our target population (graduates) with energy and water conservation tips to reduce the economic and environmental impacts of their decisions.

4.3 Proposed Aid

The goal of the Housing section is to assist graduates in structuring their decisions regarding housing, lead them to information that is unfamiliar, provide them with access to helpful resources, and finally, direct them to the available housing options. Included in all of this would be options that are environmentally friendly. By outlining what decisions need to be made and in what order, we plan to provide graduates with a starting point on how to tackle this decision (see Figure 4). The region or city in which one lives is usually the first decision that graduates make depending on their job or graduate school. Decisions regarding neighborhood type, dwelling type, and number of roommates can be made in any order or simultaneously. We provide the students with the options associated with each decision because much of the information may be unfamiliar. For example, many recent graduates might not be familiar with the idea that housing is generally more expensive in suburban areas because of the larger spaces, despite the fact that...
cost per square foot is much greater in urban areas. Included in the decision aid will be information regarding general issues such as signing leases and finding roommates.

To aid the decision we have created four archetypes that graduates can use to find the information most relevant to their circumstances. The archetypes allow users to say whether they will live in either an urban or suburban area and then within those locations, whether their housing will be an apartment or a house. If users are undecided about which archetype, they can learn more about which best suits them and their needs.

![Figure 6. Archetypes](image)

The Urban/Apartment archetype, for example, is typically characterized by a great number of options, few roommates, and less space to heat and cool than in a house. The Urban/House archetype tends to be characterized by older buildings than in a suburban area, more roommates than in an apartment and a large space to heat and cool. In the Suburban/Apartment archetype, there are usually fewer options and many are community and family centered. The Suburban/House archetype tends to be more family-centered with larger, newer buildings. Suburban development began in the 1950’s; therefore, most buildings in suburbia are no more than fifty or sixty years old. The age of a building, the number of roommates and amount of space all affect the use of energy in a space.
With those three guiding principles in mind, the aid uses the following attributes, defined by the metrics that graduates might want to use when evaluating a living location:

- Cost
- Education
- Diversity
- Environment
- Safety

New York City was chosen as a sample city to demonstrate how these metrics would apply.

**Cost**

Although many young people have their early living decisions subsidized by their parents, cost information is still paramount to housing decisions. Once a graduate transfers from the status of student to the status of salaried employee, finance becomes a primary concern (see our **Finance** section). As such, our data are presented in straightforward presentation of the cost of housing in different areas in and around New York City. Additionally, because graduates may have a hard time understanding how much of their income they should expect to spend on rent, this aid helps them understand how much other people in those same neighborhoods make.

**Education**

Graduates will want to know who their neighbors will be. The aid provides data on the average education level in a neighborhood, which is a potentially useful characteristic of the people who live there.

**Diversity**

This section provides information on the ethnic and gender diversity of different locations that may be of interest to recent graduates.

**Environment**

The aid includes environmental options and impacts, of all decisions, in an easily understandable, non-intrusive way. Interpreting environmental information may be difficult because data is rarely kept in a single metric. Water usage is measured in gallons, electricity in kwh, carbon in tons, etc. For the sake of simplicity, the aid uses ratings scales that reflect overall environmental quality for America’s top fifty cities as provided by the EPA, the Brookings Institute, Forbes, the American Lung Association and Popular Science. Framing environment as a health issue combines personal and public interests, when graduates make housing decisions.
Safety

A concern that young graduates may have when moving to a new area is the level of safety of the neighborhood they are moving into. The aid provides crime rates for each area.

Sample of Aid: Brooklyn

Figure 7. Brooklyn Aid
4.4 Critical Review

The weakest aspect of the Housing section arises from missing data on some of issues. Although there is much information on housing and environmental factors for certain cities, like New York, there is relatively little for some outlying areas.

The issue of renting versus buying was not approached in the Housing section of The Next Big Step, because according to the U.S. Department of Labor, Bureau of Labor Statistics, Customer Expenditure Survey 2007, the majority of recent graduates rent homes rather than buy them. A more comprehensive decision aid would address the issue of buying.

The aid examines only one city in detail. However, it should be straightforward (although not simple) to replicate the analyses for other cities, assuming that equivalent data are available for them.

4.5 Policy

A recent college graduate has somewhat limited control over their housing environmental impact. They can initially decide what building to live in and how many roommates to have. For many recent graduates, cost is a large restraining factor.

The State of New York has an Affordable Housing Directory (AHD), which might be helpful for recent graduates because it is a resource designed to assist people in locating affordable rental housing. NYHousingSearch.gov is a website recommended by the State of New York website that will allow graduates to look at accessible rental units. The State of New York places a major focus on trying to provide affordable housing options for those that need them, but they do not really touch on environmentally friendly housing options. This is an area in which our product will serve as a unique and useful tool, because it will allow graduates to make considerations regarding their environmental impact while making decisions regarding their living options.

The Department of Conservation for the State of New York enacts policies regarding green living. For example the Department of Conservation (DEC) is currently working on regulations for New York State's Green Building Tax Credit program. The DEC believes that the program will encourage those building new buildings to make them green buildings. “Green buildings use resources-energy, water, materials, and land more efficiently and effectively and they provide healthier environments for working, learning and living. By building green, developers can save money and reduce construction costs while creating sustainable buildings. Owners save money by reducing operation and maintenance costs and lowering utility bills”. (Taken from the DEC website) The DEC also provides practical green living tips that encourage people to make environmentally conscious choices in their daily lives.

Such tips can be useful for recent graduates, and there is room to incorporate them into the aid, such as ones for homeowners, such as fertilizing lawns in the fall or eating local produce throughout the winter. Regulations that facilitate living green and reducing carbon footprints would encourage the creation of options that many graduates would find attractive.
In terms of transportation, college graduates, policies that might encourage options relevant to graduates include subsidies for low mileage cars, tax incentives to move to high population density regions with good transportation networks, or tax incentives to live in close proximity to their job.

4.6 Annotated List of Resources

- **U.S. Census- Brooklyn**
  - This website offers information regarding the people and businesses of Brooklyn. Unfortunately, because Brooklyn is considered a borough of New York, NY the U.S. Census does not find diversity statistics for it. Regardless, it does offer some useful information.
  - [http://quickfacts.census.gov/qfd/states/36/3651002.html](http://quickfacts.census.gov/qfd/states/36/3651002.html)

- **U.S. Census- Manhattan**
  - This website offers information regarding the people and businesses of Manhattan. Unfortunately, because Manhattan is considered a borough of New York, NY the U.S. Census does not find diversity statistics for it. Regardless, it does offer some useful information.
  - [http://quickfacts.census.gov/qfd/states/36/3651003.html](http://quickfacts.census.gov/qfd/states/36/3651003.html)

- **U.S. Census- Stamford, CT**
  - This website offers extensive U.S. Census information about the demographics of Stamford, CT. Therefore, there are plenty of statistics on diversity, levels of education, age and diversity of businesses.
  - [http://quickfacts.census.gov/qfd/states/09/0973000.html](http://quickfacts.census.gov/qfd/states/09/0973000.html)

- **U.S. Census- Nassau County, NY**
  - This website offers extensive U.S. Census information about the demographics of Nassau County, NY. Therefore, there are plenty of statistics on diversity, levels of education, age and diversity of businesses.
  - [http://quickfacts.census.gov/qfd/states/36/36059.html](http://quickfacts.census.gov/qfd/states/36/36059.html)


- Homefinder
Homefinder is a useful tool for the real estate search. Aside from offering information on properties it also provides demographic information as well as information on the surrounding community (i.e.: schools).

- **Manhattan:**
  - [http://www.homefinder.com/NY/Manhattan/local-real-estate](http://www.homefinder.com/NY/Manhattan/local-real-estate)

- **Brooklyn:**

- **Neighborhood Scout**
  - Neighborhood Scout is an excellent source of information on crime rates and the level of safety in cities across the country. Below is the link for Neighborhood Scout’s information on New York State.

- **The Black and White Report- Citi-Habitats**
  - The Black and White Report, published by Citi-Habitats is an up-to-date guide on Manhattan and its real estate. The link below provides information on the median rent in Manhattan for different types of apartments.

- **Rentbits**
  - Rentbits can be used to find helpful information about a variety of areas. The link below provides rent prices for Brooklyn.

- **Air quality: Uses Air quality Index (Use footnotes)**
  - The EPA (Environmental Protection Agency) maintains all kinds of environmental data. It is extremely easy to observe high / low / median AQI data for one’s location. The Air Quality Index (AQI) (also known as the Air Pollution Index (API) or Pollutant Standard Index (PSI)) is a number used by government agencies to characterize the quality of the air at a given location. As the AQI increases, an increasingly large percentage of the population is likely to experience increasingly severe adverse health effects.
• **New York Department of Sanitation**
  
  o Department of Sanitations Annual Report presents tons of waste per day by borough.
  

• **Environmental Protection Department, Landfills, Solid Waste Management Statistical Information**
  
  o Solid waste management systems report for the state of Connecticut.
  

• **Blogs by fellow graduates**
  
  o [www.gradspot.com](http://www.gradspot.com)
  
  o Making the move: [http://www.gradspot.com/Apartment/Making+the+Move](http://www.gradspot.com/Apartment/Making+the+Move)
  
  o Finding an apartment: [http://www.gradspot.com/Apartment/Finding%2BAn%2BApartment](http://www.gradspot.com/Apartment/Finding%2BAn%2BApartment)
  
  o Survival Guides: [http://www.gradspot.com/survival_guides](http://www.gradspot.com/survival_guides)
  
  o Pets: [http://www.gradspot.com/Lifestyle/Socializing/LowMaintenance+Pets+that+Won%27+t+Break+the+Bank](http://www.gradspot.com/Lifestyle/Socializing/LowMaintenance+Pets+that+Won%27+t+Break+the+Bank)
  
  o Setting up your pad: [http://www.gradspot.com/Apartment/Setting%2BUp%2BYour%2BPad](http://www.gradspot.com/Apartment/Setting%2BUp%2BYour%2BPad)
  
  o Roommate Finder: [http://www.gradspot.com/roommate_finder](http://www.gradspot.com/roommate_finder)

• [http://newyork.craigslist.org/](http://newyork.craigslist.org/)

• **Lifestyle guide to Manhattan**
  
• www.nybits.com
• Manhattan Apartments, Houses, Sublets & Roommates
  o http://manhattan.sublet.com/

• MIT Study on Urban environment
  o http://web.mit.edu/urbanupgrading/urbanenvironment/issues/key-UE-issues.html

• http://www.gardenstateapartments.com/

• www.apartmentratings.com/

• www.metroroommates.com/

• http://www.demographia.com/db-nyc-employ.pdf data

• Maps:
  o http://www.liu.edu/cwis/cwp/library/exhibits/census/n_housin.htm
  o http://www.liu.edu/cwis/cwp/library/exhibits/census/s_housin.htm

• Long Island Housing:
  o http://www.nassaucountyny.gov/agencies/YouthBoard/Docs/PDF/Stats/LIProfile.pdf

• http://quickfacts.census.gov/qfd/states/
SECTION V) TRANSPORTATION

5.1 Decision Process

When recent college graduates make decisions about their post-graduation lifestyle, transportation is one of the most basic decisions they have to make. The U.S. Census Bureau reports that the average American spends approximately 25 minutes a day just getting to work (American Community Survey 2008). When one includes travel for errands and social experiences, transportation becomes a non-trivial part of daily life. The goal of this section of the aid is to provide graduates with a structure for evaluating their transportation options and making educated decisions based upon standard metrics that inform on their priorities. Part of the goal for this aid is to increase graduates’ green IQ, so ideally this aid will lead to graduates also considering the environmental impacts of their transportation decisions.

While making this guide, the assumption was made that transportation is not a primary decision for most graduates. That is, recent college graduates will first make choices that steer their lives, such as where to work and where to live, and then look at secondary decisions such as transportation. Using a standard set of decision metrics, this aid provides a framework to help graduates compare their options based upon their priorities and the restrictions caused by their primary decisions. The metrics, which are explained in detail below, include financial cost, time investment, safety, energy intensity, and greenhouse gas emissions.

5.2 Key Environmental Issues

In line with the project goals, this analysis includes two environmental factors: Carbon dioxide emissions per trip and energy intensity per trip. While these metrics may not be useful for all graduates, providing this information gives graduates a choice of whether to consider environmental impact when choosing their mode of travel.

Transportation emissions account for almost a third of US carbon emissions and energy use, therefore, this report focuses on two important measures: Carbon dioxide emissions and energy intensity. For comparative purposes, CO2 emissions will be measured in kilograms of CO2 per trip. Though the term greenhouse gases includes nitrous oxide, methane and HFCs (hydrofluorocarbons), these are dependent solely on vehicle miles driven, not gallons of gasoline consumed, and only make up approximately 5-6 percent of all GHG emissions from vehicles. As a result, carbon dioxide alone will be used as the metric (Environmental Protection Agency [EPA], 2005).

Energy Intensity measures how much energy it takes to travel using a given form of transport. While this is related to CO2 emissions, it is not completely analogous. For example, an electric subway train and an electric car powered by energy from a nuclear power plant may not emit any CO2, but analysis of their respective energy intensities will show which is more efficient. One important reason for using energy intensity is that the sources of electricity vary widely by region, and are often a mix of different fossil fuel plants, with different efficiencies.
and CO₂ emissions. Energy intensity analysis measures relative efficiency which allows direct comparisons. Energy intensity is measured in mega joules per passenger kilometer traveled, representing each passenger’s share of the energy required to travel a kilometer.

### 5.3 Decision Aid

The main benefit of this aid is to serve as a model for graduates to follow when evaluating their transportation decisions. Using a case study focused on New York City transportation, this aid examines three different scenarios and walks a graduate through the analytical procedure for comparing transportation options using the five metrics previously mentioned. Sample calculations are given as well as primary sources for the input data so that graduates can replicate the analysis for their own specific needs.

### New York City: Case Study

This case study is included in order to demonstrate the application of the process and metrics described above. It is impossible to describe all possible trips a graduate in New York City may take, so the case study examines three scenarios that will serve as examples for aid implementation:

1. Someone who lives in Alphabet City, on the island of Manhattan, and works downtown in the Financial District.
2. Someone who lives across the river in Hoboken, New Jersey, and works in the Financial District in Manhattan.

### Survey of Transportation Options

The city boasts a well-developed public transit system that includes buses, commuter trains, and a subway system. Because New York City is a large, dense, urban area, walking is also a popular option for traveling short distances. Similarly, biking is another viable choice for getting around and is aided by the 620 miles of bike lanes the city offers. Finally, there are over 12,000 licensed taxi cabs that serve the city and provide another option for getting around.

While the three scenarios were chosen to highlight the diverse transportation needs for residents in the New York City metro area, the transportation options are the same for all three. Therefore, what changes is the viability of each, as reflected in the five decision metrics.
Simplifying Assumptions and Methods

In order to bound the analysis, it is necessary to make some simplifying assumptions. Actual graduates could replace these assumptions with ones fitting their situations.

For each location in the scenarios, a specific intersection was chosen in order to estimate distance and time. These intersections were chosen using the center of each neighborhood, as determined by Google Maps.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Intersection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphabet City</td>
<td>10th Street &amp; Avenue B</td>
</tr>
<tr>
<td>Financial District</td>
<td>William Street &amp; Maiden Lane</td>
</tr>
<tr>
<td>Hoboken, NJ</td>
<td>6th Street &amp; County Road 675</td>
</tr>
<tr>
<td>Williamsburg</td>
<td>Broadway Avenue &amp; Hewes Street</td>
</tr>
</tbody>
</table>

Table 6. List of origins and destinations for the three transportation scenarios

Time

To calculate time for each transportation type, various resources are easily accessible to anyone with internet access. A great resource for calculating travel times is Google Maps. It was used to calculate the travel time for graduates traveling by motor vehicle, public transportation, and walking. For driving, Google uses its map software in combination with traffic patterns to calculate approximate driving times. For public transportation, Google integrates public transit schedules and includes walking and wait time. The Google Maps interface is very intuitive and easy to use, so that it provides a simple way for users to estimate the time for any trip.

Two other sites can be used to calculate the time for biking and taxi cabs. For biking, Ride the City provides a route calculator, similar to Google Maps, that allows users to plan their route. Ride the City uses map software in combination with bike lanes and trails to help users plan the safest route or the most direct route. Additionally, Ride the City provides a drop-down menu option that allows users to map safer routes (tradeoff with time) that may be useful for late night or early morning situations. Ride the City is currently available in five other cities: Chicago, Austin, Louisville, San Diego, and Seattle. Other similar websites exist and graduates interested in biking are encouraged to look for such resources in their city.

For taxi cabs, various sites provide cost and time estimates for potential customers. For this analysis, Yellow Cab NYC was chosen for its ease of use and functionality. In order to determine accuracy, this website was cross-referenced with other, similar sites; the results seemed relatively uniform. For cities outside of NYC, graduates can contact local taxi companies in order to get quotes for time and cost.
Financial Cost

The calculations for financial cost differ for each mode of transportation. For taxi cost estimates, the Yellow Cab NYC website mentioned to calculate time also provides estimated fares. This website is especially nice because it includes surcharges for peak hours and a range of costs based upon desired tip percentage.

The financial cost of a single trip in a personally owned motor vehicle depends on several factors: insurance, parking, fuel cost and any tolls associated with the routes taken. The piecemeal calculation shown first in the tables does not include the cost of depreciation, nor the initial capital investment of purchasing the vehicle. Insurance rates for 2008 in the state of New York are available through the New York State Insurance Department. For the purpose of the example trips, the average from several major insurance providers for male and female drivers, age 20 and living in Manhattan, was used. This average came to $2096.17, from the following providers: Amica Mutual, Esurance, Geico, Nationwide, Progressive Direct, and State Farm (New York State Insurance Department, n.d.). This average was then divided by 365, to calculate a “daily cost” of insurance. Parking costs for the two commuter trips were calculated by averaging the prices of monthly permits in local parking garages, then dividing by 30 to get an average daily cost. In the case of a one-time trip, parking was calculated using an average of hourly rates at local garages. Fuel cost was calculated by using the average local fuel price of the origin and destination points, as provided by MapQuest, and multiplying by the number of gallons used. (Gallons used = distance traveled / miles per gallon). The value using the federal reimbursement rate ($0.55/mile) will be given as well for comparison, and to give an idea of “hidden costs” such as depreciation of the vehicle. The final value for the piecemeal calculation includes: any tolls incurred along the Google Maps route, cost of gasoline (gasoline used * route length), insurance daily cost, and parking daily cost (or hourly, as called for). The value of the federal calculation is simply the reimbursement rate multiplied by the route length.

- Fuel Pricing: [http://gasprices.mapquest.com](http://gasprices.mapquest.com)
Safety

Safety is an important concern when considering the trade-offs between different transportation modes. For instance, biking or walking may save money and provide very little environmental impact, but it is important to understand the additional risks assumed by urban cycling or being a pedestrian. This type of safety information should remain constant for all three scenarios in the New York Case Study. Therefore, this information will be discussed in the detailed analysis section for each mode of transportation.

Energy Intensity

Accounting for energy intensity requires a bit more calculation. However, it is important to note that basic math skills are all that is needed to perform this calculation.

For the taxi and motor vehicle calculation, the only inputs that the graduate must provide are the vehicle’s miles per gallon as estimated by the U.S. Environmental Protection Agency and the distance they would like to travel. Estimated fuel economy information can be found online at the government’s Fuel Economy website (http://www.fueleconomy.gov) and Google Maps can be used to calculate distance. Using a conversion factor for the energy in one gallon of gas, a graduate can use the following equation

\[ \text{Energy [MJ]} = \frac{\text{distance in miles}}{\text{miles per gallon}} \times 134 \text{ MJ} \]

Taxi cabs in NYC use a variety of different vehicles, with different energy and emissions performance. To account for this in the NYC scenarios, two numbers are given for both energy intensity and carbon dioxide emissions. The larger number represents the values for a Ford Crown Victoria taxi cab—the traditional yellow, New York cab. The second number is an estimate for the increasing number of hybrid vehicles being used as cabs. As an estimate of fuel efficiency, we used the average mpg of all the hybrid vehicles being used as cabs, about 30 miles per gallon (NYC Taxi and Limousine Commission 2008).

The energy use figures for various methods of public transportation were calculated using published figures that estimate energy used per passenger kilometer traveled, which provides a way of gauging an individual’s impact while using a mode of transport, such as a bus or train, which has many other passengers. Since our scenarios are meant to simulate commuting, buses were assuming to be operating near peak capacity. An average of light-rail figures was used to estimate the energy use of the New York Subway system, and the reports figures were used directly for commuter trains. The figures used were 0.6 Mega-Joules Per Passenger Kilometer Traveled (MJ/PKT) for peak hour diesel bus, 2.5 MJ/PKT for Subways, and 2.4 MJ/PKT for Commuter trains. Once the distance (in Kilometers) has been calculated, using Google maps or other methods, that distance can be multiplied by these figures to determine the energy used for the trip.
Energy intensity for biking and walking are measured in terms of calories burned. Thus, for these two modes of transportation, the energy intensity figured is actually beneficial, with a higher number being better. Because calories burned per mile depend on weight, the figures displayed in the tables are displayed as a range from a low weight of 110 pounds to a high weight of 180 pounds. The actual calories per pound per mile figures will be provided for users to calculate their specific calories burned, while the figures in the table will provide a general reference. The figures used were .53 calories burned per pound per mile for walking at a pace of three to four miles per hour and .24 calories burned per pound per mile for biking at a pace of eight miles per hour (the average for urban biking). These figures can be multiplied by the distance of the commute and the individuals’ weight in pounds to determine his/her calories burned.

- Calories Burned per pound per mile walking: [http://www.runnersworld.com/article/0,7120,s6-242-304-311-8402-0,00.html](http://www.runnersworld.com/article/0,7120,s6-242-304-311-8402-0,00.html)

**Carbon Dioxide Emissions**

In order to examine greenhouse gas emissions, we focused on carbon dioxide emissions (CO$_2$). As with energy intensity, approximating CO$_2$ emissions requires relatively simple calculations.

For motor vehicles and taxi cabs, a conversion factor must be used to translate fuel usage to CO$_2$ emissions. The United States Environmental Protection Agency uses a conversion factor of 8.8 kg of CO$_2$ for each gallon of gas burned. Therefore, the following equation can be used to calculate carbon dioxide emissions based on trip distance and vehicle fuel economy

$$\text{Mass CO}_2 \ [\text{kg}] = \frac{\text{distance in miles}}{\text{miles per gallon}} \times 8.8 \ \text{kg}$$

The emissions calculations for CO$_2$ emitted by public transportation are similar to those used to determine energy use. In this case, instead of counting Mega-Joules per Passenger Kilometer Traveled, grams of CO$_2$ per Passenger Kilometer Traveled (gCO$_2$/PKT) are used. The figures used were 50 gCO$_2$/PKT for peak hour buses, 125 gCO$_2$/PKT for Subways, and 95 gCO$_2$/PKT for commuter trains.

5.5 Results

The following tables present the metric evaluations for each scenario. These tables provide an example of the type of output a graduate should expect from using these analysis techniques. These values can then be used to compare each form of transportation and make an informed decision based on individual priorities.

**SCENARIO 1 - COMMUTING TO MANHATTAN FROM ALPHABET CITY**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Vehicle</strong>**</td>
<td>11/15</td>
<td>$33.23, $3.30</td>
<td>30.92 MJ</td>
<td>2.0 kg</td>
</tr>
<tr>
<td><strong>Bus</strong></td>
<td>30</td>
<td>$3.00 - $4.50</td>
<td>4.4 MJ</td>
<td>0.368 kg</td>
</tr>
<tr>
<td><strong>Subway</strong></td>
<td>27</td>
<td>$3.00 - $4.50</td>
<td>12.52 MJ</td>
<td>0.920 kg</td>
</tr>
<tr>
<td><strong>Walk</strong></td>
<td>45</td>
<td>Free</td>
<td>152.64 – 228.96 cal</td>
<td>None</td>
</tr>
<tr>
<td><strong>Bike</strong></td>
<td>20/15</td>
<td>Free</td>
<td>72.0 – 108.0 cal</td>
<td>None</td>
</tr>
<tr>
<td><strong>Taxi Cab</strong></td>
<td>8</td>
<td>$22.40</td>
<td>24.54 – 46.94 MJ</td>
<td>1.8 – 3.4 kg</td>
</tr>
</tbody>
</table>

**Second value is from IRS reimbursement value**

Table 7. Results for Scenario 1

Table 7 is an example of what graduates can create for their own travel decisions by following our suggested methods. A table such as this is useful for making relative comparison between modes of transportation and then choosing a preferred method based upon individual priorities.

In this particular scenario, taking a taxi is expected to be the fastest means of travel. However, if a graduate is concerned about financial cost or the environment, biking is a viable alternative.
**SCENARIO 2 - COMMUTING TO MANHATTAN FROM HOBOKEN, NJ**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Vehicle</strong>**</td>
<td>20 / 16</td>
<td>$26.43*, $5.06</td>
<td>51.5 MJ</td>
<td>3.4 kg</td>
</tr>
<tr>
<td><strong>Train + Bus</strong></td>
<td>36</td>
<td>$3.45</td>
<td>15.38 MJ</td>
<td>1.12 kg</td>
</tr>
<tr>
<td><strong>Train</strong></td>
<td>46</td>
<td>$1.80</td>
<td>13.44 MJ</td>
<td>0.960 kg</td>
</tr>
<tr>
<td><strong>Walk</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Bike</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Taxi Cab</strong></td>
<td>14</td>
<td>$43*</td>
<td>39.6 – 75.7 MJ</td>
<td>2.9 – 5.5 kg</td>
</tr>
</tbody>
</table>

*Includes an $8 toll going into the city, which is not reduced for EZ-Pass due to peak hour traffic.

** Second value is from IRS reimbursement value.

**Table 8. Results for Scenario 2**

Table 8 shows results for our second scenario, which are very similar to Table XX. Note that the transportation alternatives for public transit have changed slightly. For commuting the best combination of public transit options is different compared to traveling within the city. In this case, the commuter train is now a viable option and the subway is not. Another aspect of this scenario worth mentioning is the absence of walking and biking data. This is because traveling from New Jersey to New York City involves tunnels that prohibit cyclists and pedestrians. Finally, NYC Yellow Cab reports the fare as negotiable because their website only calculates fares within New York City.
**SCENARIO 3- LIVING IN WILLIAMSBURG AND GOING OUT FOR A NIGHT IN TIMES SQUARE**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Vehicle**</td>
<td>$36.47, $7.04</td>
<td>68.7 MJ</td>
<td>4.6 kg</td>
</tr>
<tr>
<td>Subway</td>
<td>$3.00 - $4.50</td>
<td>30.72 MJ</td>
<td>2.4 kg</td>
</tr>
<tr>
<td>Walk</td>
<td>Free</td>
<td>324.36 – 486.54 cal</td>
<td>None</td>
</tr>
<tr>
<td>Bike</td>
<td>Free</td>
<td>146.88 – 220.32 cal</td>
<td>None</td>
</tr>
<tr>
<td>Taxi Cab</td>
<td>$42.96</td>
<td>60.2 – 115.1 MJ</td>
<td>4.4 – 8.4 kg</td>
</tr>
</tbody>
</table>

**Second value is from IRS reimbursement value

Table 9. Results for Scenario 3

Finally, Table 9 provides results for our third scenario. Again, the public transit options are slightly different based upon available options. In this case, only the subway is shown as being an option because of the late-night return trip.

5.6 Detailed Analysis of Options

**Personal Motor Vehicle**

When choosing whether to purchase a car in New York City, recent graduates are likely to consider the following: the price of the vehicle, the cost of owning and maintaining the vehicle, the time it may save them to have the car available, and the convenience of owning a car. The monetary cost of owning a car can be broken down into several subcategories: maintenance (oil changes, checkups), automotive insurance, parking, and fuel, as well as any tolls incurred on regular driving routes. The federal government estimates the cost of owning a vehicle at $0.55 per mile, but for the purposes of giving an easily understandable comparison of a graduate’s options in a way that breaks down the cost into comparable sections, that figure will be given in addition to a breakdown based solely on fuel, parking, tolls and insurance, which are more visible costs. Fuel prices in Manhattan can be up to $0.20 per gallon higher than the New
England average of $2.542 per gallon (Department of Energy [DOE], 2009). As fuel prices have risen in recent years, drivers have been given a financial impetus to drive more low-emission cars. Further, there are tax rebates associated with the purchase of cars that meet certain EPA standards, in addition to some other incentives, such as use of the HOV lane regardless of the number of passengers or free parking in certain commuter lots. These incentives can help ease some of the financial burden of owning a car, and can affect the relative rankings of various methods of transportation. For example, a graduate buying a car who chooses to buy a hybrid can receive up to $4000 in tax credit, effectively reducing the purchase price of the vehicle by that amount. If that vehicle has a 45 MPG rating or higher, the graduate may be able to use HOV lanes or park free at town meters or commuter lots, thereby reducing the time and financial cost of day to day travel. More information regarding transportation tax credits can be found in Section VI.b, discussing finance.

In addition to the monetary costs associated with owning a car, there is a time cost or savings as a result of using the car as a method of transportation. In New York City, traffic patterns and sheer population density cause the travel time per mile via car to vary between 2 minutes and 10 minutes, increasing especially when approaching main arteries and access points onto the island. In particular, vehicle access onto Manhattan is limited to 19 bridges and tunnels, some of which charge tolls for entrance onto the island. Tolls in New York City exist primarily on entrance routes onto Manhattan, and some vary with time. Peak hour tolls are higher than off-peak tolls, and most peak tolls do not see the same toll discount that other tolls see with EZ-Pass, the electronic toll collection method available in New York (Metropolitan Transportation Authority [MTA], 2009). Despite this, using an EZ-Pass or other method of electronic toll collection allows the driver to slow down, rather than stop, saving both fuel and time. There is also an opportunity cost associated with driving, when compared to taking a bus or subway, because the driver cannot complete other tasks while commuting.

The best known metric for judging the friendliness of a car relative to the environment is fuel efficiency, with higher mileage cars regarded as being more low-emission cars. As a note, motorcycles are more fuel efficient and typically cost less to park, but may have higher insurance costs.

The personal safety risk associated with using a motorcycle in a congested traffic situation is also something to be considered. "Though motorcycles account for less than 3% of all registered vehicles in the United States, motorcyclists accounted for 13% of all traffic fatalities in 2007." (Workman, 2009). Other safety considerations, for both cars/trucks and motorcycles, include the risks of driving late at night or while intoxicated. The risk of car theft and carjacking is also increased in urban areas: approximately 93% of all carjacking occurs in cities or suburbs. Very rarely, however, does carjacking result in injury to the victim (U.S. Department of Justice [DOJ],
Regarding traffic fatalities, in 2008, there were 34,017 motor vehicle deaths, 19,200 of which were drivers, or 12.27 fatalities per 100,000 population (Fatality Analysis Reporting System Encyclopedia [FARS], n.d.).

**Buses and Subways**

The first factor that is considered by most people who intend to use buses and subways is location, or more specifically, whether there are bus stops or subway stations close to both their point of origin and their destination. In Manhattan, it is very likely that there are Subway and bus lines located nearby, and many people in New York, especially in the outer boroughs, choose their residence with the subway in mind. One crucial point is that buses in New York use the same fare cards as the subway system, so that journeys can involve transfers between the two at no additional cost. In terms of cost, public transport is likely to be the most affordable option, since unlimited-ride Metrocards are $89 for 30 days, or less than $3 per day, and there are no additional financial costs. Though bus and subway journeys can be long, especially to the outer boroughs, time spent on public transport can be used productively by working, reading, listening to music, or even watching movies or television shows while on buses or trains. Finally, public transport is a much greener option than cars and taxis, with far lower CO\textsubscript{2} emissions and energy consumption. Subways consume only half the power and emit less than half the emissions of a normal car per mile. Peak hour buses use only a quarter of the energy and emit less than a quarter of the emissions of a normal car, and that is likely to fall further as New York brings in a new fleet of hybrid-electric buses.

- Metropolitan Transport Authority (www.mta.info)

**Commuter Trains**

There is an extensive network of commuter trains that connects New York City to Upstate New York, Connecticut, and New Jersey. These are often used for commuting because they terminate in either Grand Central or Penn Station, which are conveniently located in midtown and connect to many subway lines. Monthly passes for specific routes generally cost around $200 per month, depending on the point of origin. As in Subways, the passenger has the opportunity to spend the time onboard productively, and trains are generally faster than traffic through the bridges and tunnels into Manhattan at peak hours. Energy use and Emissions per mile are generally comparable to those of subways, making this option much greener than a car. However, living in most of the suburban areas served by these trains usually requires owning a car to run errands and possibly to get to the train station itself.
Biking

In an urban setting such as Manhattan, one can expect to bike at an average speed of 8 MPH. This means that, in order to limit commute time to 30 minutes, the distance between home and work would need to be no greater than four miles and in Manhattan 20 blocks North-South is roughly one mile. Navigation by bike is fairly easy considering the grid-style street layout, but Manhattan starts to lose this grid format south of 14th street. New York City has over 620 miles of bike lanes and bike paths including both on-street lanes and protected lanes, and the city is only becoming more bike-friendly as 49 acres of public space (public plazas, bike lanes, etc.) have been added since 2008. The city also boasts more than 5,000 bike racks, and bike shelters are also available. However, it is also one of the only major US cities that does not have buses equipped with front or side bike racks. Bikes are allowed on the subway though.

Costs to consider when deciding whether to use a bike as the primary mode of work-related commuting include cost to purchase a bike, maintenance costs, and equipment/accessory cost (especially a quality lock which is essential in New York City). The emissions, energy usage, and life cycle energy consumption of biking are essentially negligible, making it one of the most low-emission commuter options. Additionally, there are health benefits that result from a bike commute, primarily in terms of calories burned, which are also important for a graduate to consider when making a commuting decision. Information on how to determine the calories burned per pound per mile while biking can be found under the ‘Energy Intensity” subheading of this section.

Bike safety in New York City is an especially large concern, when considering using it as the means of transportation for commuting to and from work, when the streets are the most crowded with vehicle and pedestrian traffic. The bicycle fatality rate in New York City was 2.8 per million residents over the period of 1996 through 2005 compared to a national fatality rate of 2.7. Although it is slightly above the average, New York City boasts a much higher percentage of residents biking for transportation than do other major cities (11% versus 3% national average). The greatest danger for bicyclists is motor vehicles, as 92% of fatalities occurred in accidents with motor vehicles. Finally, only one fatal crash over the past ten years has occurred in a marked bike lane, out of the 225 fatal bike crashes; in 97% of fatalities, the bicyclist was wearing a helmet (New York City Department of Transportation, n.d.). While, as mentioned above, there are many bike lanes available throughout the city, almost all routes will require the use of regular
traffic lanes at some point in the trip. To ensure they are aware of the bicycle laws and rules in New York City, as well as some useful safety tips, we point the users to the New York City Department of Transportation website containing their new bicycle safety poster that has been posted throughout the city (http://www.nyc.gov/html/dot/downloads/pdf/bikeposter.pdf).

Additionally, the issues of weather and seasonality arise with a bicycle commute in New York City. For information on weather patterns in New York City that may affect the pleasantness and safety of bicycle travel, we refer them to the information detailed in the ‘Walking’ section of the New York City guide.

- Ride the City (http://www.ridethecity.com)

Walking

Much like biking, distance is probably the single most important factor when determining whether walking is the best choice for commuting to work. Average walking speed is 3 MPH (normal pace) to 4 MPH (brisk pace). At this speed, and assuming one would want to limit their commute to no more than 30 minutes, the proximity of home and work should be no greater than 1.5 miles to 2 miles. If living and working north of 14th street, navigation would be easier for a potential commuter given the grid-system of streets. More sidewalks are frequently being added throughout the city and its pedestrian friendliness is being enhanced by converting traffic lanes into public plazas (Madison Square, Broadway Boulevard, Meat Market Plaza, Gansevoort Plaza, and two plazas in Brooklyn).

The costs associated with walking as a primary means of commute are minimal, with increased shoe wear being the only potential monetary cost. Much like biking, there is an added health benefit, both in terms of calories burned and exercise time saved, associated with a walking commute. The environmental impact of commuting to work by foot is non-existent both in terms of greenhouse gas emissions per passenger mile and energy intensity per passenger mile. Much like biking, the health benefit of burning calories is a key factor to be considered by graduates when making their decision. More detail on how to determine the calories burned for a walking commute can be found under the ‘Energy Intensity’ subheading of this section.

Safety is a large concern for people considering walking as a means of transportation in New York City. In terms of traffic safety, the same laws, rules, and customs apply as in other cities and states. In 2008, 317 pedestrians were killed in traffic accidents in New York City, accounting for 31% of traffic fatalities in the city – the highest such percentage in the nation.
However, 6% of the New York City population walks to work, more than any other area in the nation, so the figure is not all that alarming (Namako, 2009). Information regarding pedestrian fatalities and injuries broken down by borough will also be provided through a link provided within the decision aid (Tolmage, Peskin, Harris & Falick, 2009). In terms of crime safety, the main tip we will provide to graduates is to be aware of their surroundings. We provide them with useful links regarding street-smart safety and will highlight what we believe to be some of the best and most helpful advice that we have found.

Finally, if considering walking as their primary means of transportation to and from work in New York City, graduates must take weather into consideration. The average temperature in Manhattan during the winter months is 32 degrees Fahrenheit, while in the summer months it is 78 degrees. This could make for an uncomfortable walk for at least half of the year with temperatures at one extreme or the other. Additionally, during the winter, sidewalks and streets in New York City frequently become a messy and hazardous place to walk with all of the accumulated precipitation (often a mix of rain and snow).

Two useful websites that have a 'walking' option for mapping the shortest route (distance or time) from one location to another are:

- HopStop (http://www.hopstop.com/?city=newyork)

Taxi Cabs

Taxi cabs are prevalent in New York City and therefore are a very viable means of transportation within the city. According to the NYC Taxi and Limousine Commission’s 2008 annual report there are 13,237 medallion taxi cabs licensed in the city (Taxi and Limousine Commission 2008). While the costs and environmental effects of running a taxi are similar to a privately owned motor vehicle, taxis have the advantage of having their capital cost split over many users. This also means that while the per-trip environmental impacts are the same as a private motor vehicle, the life-cycle environmental impacts are distributed amongst each user thus decreasing the impact over the life of the vehicle.

The environmental impact of NYC cabs varies. In NYC cab owners are required to purchase new vehicles every three years. Additionally, the city has recently passed laws that require all new vehicles purchased after October 2009 to attain a minimum of 25 mpg or be low emissions vehicles (hybrids). While this law is currently on hold, the trend in registered cabs in NYC suggests that low emission vehicles will in fact become the status quo. Additionally, new leasing
regulations encourage longer leases for low-emission taxi cabs while requiring shorter term vehicle leases for traditional vehicles (Taxi and Limousine Commission 2008).

As mentioned, it is important to consider safety when evaluating transportation choices. A 2004 study of taxi cab accidents in NYC concludes that crash rates for taxi cabs are one-third lower than for other motor vehicles (Schaller 2004). However, when accidents do occur the injuries for passengers in taxi cabs are usually more severe. This is due to the low rates of restraint usage for taxi passengers and the requisite barricade that separates the back seat from the driver (Schaller 2004). While taxi cabs and motor vehicles are pretty comparable across many attributes this analysis examines, this particular result suggests that taking a cab would be safer than driving a personal vehicle, as long as a safety belt is used.

One new concern regarding safety has surfaced as a result of the switch from traditional taxi vehicles to newer hybrids. The concern is that these hybrid vehicles were never intended for the constant passenger usage that taxis experience, and are often retrofitted with passenger barriers which are required in all cabs. As a result, the clearance between the passengers and the barriers is not optimal and some argue this poses more of a risk for serious injury, as mentioned above. This issue is the subject of on-going investigation by the taxi cab commission and one of the reasons for the delay in adopting the low emissions requirement for new cabs (Motor Trend 2009).

The time consideration of a taxi cab is very similar to a motor vehicle because the same traffic patterns are used, but taxi passengers have the benefit of not having to park the cab. There is a caveat of having to hail a cab which may be difficult or time consuming depending on the time of day and location. This issue was neglected when completing this analysis, however a graduate may want to note this additional time based upon their own experience.

Finally, the monetary cost is variable depending on the distance, time and amount of people traveling. The graduate can determine this cost by summing the set fares and additional fees caused by such variables as peak-traffic and multiple passengers. These rates are set for the every licensed cab so it should be possible for graduates to easily estimate their travel costs.
5.7 Critical Review

Although the general Transportation analysis breaks down the decision into the four main factors detailed earlier, our individual case study of New York City loses this structure. In terms of the New York City case study, rather than analyzing each transportation option using the same process and formatting the results in the same manner, each has its own focal issues. While something is lost in terms of clarity and ease of use, this flexibility allows the analysis to fit the problem. Each example was organized to focus on the same attributes, while presenting key information in the most effective way for the user. Although the layout differs across modes of transportation with city, it will be the same across cities within modes of transportation.

The Transportation aid could be improved by moving beyond the focus on “work commute.” Most of the assumptions, information, and recommendations are based on travel to and from work. While this type of travel accounts for a significant portion of recent graduates’ transportation needs (*second greatest trip purpose by miles traveled*), expanding the aid to cover recreational and errand travel would allow the aid to account for an even greater portion of the transportation of recent graduates (Hu and Reuscher, 2004). A separate part of the product focuses on the impact of vacation travel, another major source of transportation use, so including recreation and errands would be the next logical step in making the overall aid more comprehensive. To do this, more information would be needed on the decision process of choosing which mode of transportation to use for recreational use and errands because the same factors that we used for work commutes definitely do not apply/have the same weight.

It is rather obvious that the aid could be improved by expanding its application to cities other than New York. With the initial target audience of the decision aid being Carnegie Mellon graduates, it would be rather easy to determine their most common destinations and then do a case study for each of the top five or ten following the same format as the New York guide. While the general information and decision aid applicable to all graduates, the degree of depth of the New York case study, which could be fairly easily replicated for other cities, makes the product truly unique and especially helpful in a manner not readily available from other sources. Therefore, offering this benefit to a larger portion of our target audience, not just those that will be living in New York City after graduation, would give the product greater impact. We hope that the Career and Professional Development Center will take this next step.

Finally, any added customizability would only serve to benefit users. The aid is moving towards that with the concept of city-specific case studies, allowing users to focus their research on the area they will be living. This could be refined by allowing choice of neighborhood (for both work and home), personal preferences, and a login system to track and save past use of the website.
5.8 Policy

Two kinds of policy option were considered when developing the aid: policies that make better information available to graduates and policies that will make the “greener,” more environmentally friendly choices more available.

We identified no major information needs, as information transportation options is fairly readily available, particularly since the increase in fuel prices has increased interest in transportation costs. Rather, the challenge is to make effective use of all the information that is already available. The aid addresses that challenge.

Work on the aid did, however, identify policies that could help graduates make “green” choices. As mentioned in Section 5.6 (Motor Vehicles Section), there have been tax incentives and federal programs instituted to incentivize the purchase of more fuel efficient vehicles. However, public transportation is much more energy efficient per passenger mile than even the most fuel-efficient car on the market. A recent study done in the UK (Barnard, et al, 2007), found that lack of accessibility and safety were particular concerns to young people when choosing not to take public transportation. Accessibility can be relatively expensive to address, requiring either additional buses or setting a minimum number of transportation stops per capita would improve the situation. With regards to safety concerns, some cities, such as the Dallas/Fort Worth metroplex in Texas, have formed separate police forces whose sole purpose is to maintain security on DART (Dallas Area Rapid Transit) buses and light rail (Dallas Area Rapid Transit, n.d.). The MTA (Metropolitan Transportation Authority) also has a police force whose responsibilities include security and counterterrorism on MTA transit lines (Dallas Area Rapid Transit, n.d.). Other cities with safety concerns or cities having public transit crossing city lines could consider a similar solution.
SECTION VI.a) LIFESTYLE – UTILITIES

6.1a Decision Process

One of the decisions that graduates have to face is selecting the company and plan by which their home will be supplied with electricity, gas, and water utilities. Different utility arrangements can vary not only in their cost to subscribers, but also in their environmental impact and convenience of payments. The goal of this section is to provide options to help graduates make informed utility decisions. These decisions affect the environment by both influencing the amount of electricity, gas, and water resources that graduates consume, and by influencing whether the supply of these utility resources come from "green" suppliers. The structured information presented below will help graduates be more aware of these aspects of their utility choices.

Graduates encounter a range of decisions in choosing their utility mix. Figure 8 provides an example of a typical sequence of utility decisions. Each decision has consequences for utility costs, billing convenience, and environmental impact.

Figure 8. Typical decision sequence for selecting utilities
The first consideration for graduates regarding electricity and gas is knowing whether they will live in a state in which utility markets are deregulated like New York or regulated energy markets. Although graduates are unlikely to consider this issue when deciding where to live, that choice effectively makes this one. Graduates living in regulated markets typically face monopoly suppliers and do not have choices for selecting their electricity or gas companies. Graduates living in states with deregulated utility markets can often choose their supplying companies. For example, it may be possible to choose whether electricity comes from non-renewable energy sources. It is like electricity from coal versus electricity from wind, hydropower, or solar.

The next choice affecting graduates’ electricity and gas options is whether they are renting or buying (Shelton, 1968). For example, graduates will have limited options for selecting their energy source if they are renting a house, where the landlord makes that choice. If the utilities are included in their rent, then they will not have financial incentives for energy conservation.

The third step is only applicable for graduates who live in deregulated areas. They need to choose among the various electricity and gas suppliers that are competing for their business. In many deregulated states, electricity and gas companies are divided into two types. Distribution companies own the wires or pipelines that deliver the electricity or gas to the home. These companies are usually regulated monopolies. They are supplied with electricity and gas by generation companies which compete with each other for customers. Once a customer chooses a particular generation company, in a competitive electricity market, many states require that the delivery company do the billing for the generation company, so that customers receive only one electricity or gas bill, listing separate charges for both generation and distribution. In deregulated markets, consumers can select among generation companies that vary considerably in price and the environmental impact of their portfolio of electricity generators or gas supplies.

6.2a Key Environmental Issues

People affect the environment through the choices they make for their electricity and gas options. Each of the choices described above has complex environmental effects. One measure of the environmental impact of different type of heating systems and type of energy sources for electric and gas is their CO2 emissions. However, comparing the environmental effects of renting and buying is a complicated issue because there are various situations facing graduates. For example, graduates might be renting a house with the electricity or gas bill included in their rents. This might lead to graduates increasing their energy consumption and greenhouse gas emissions.

Most space heating in urban areas is performed by natural gas, although some regions of the country use cheap electric power for heating. Different heating systems vary in their energy efficiency, cost, and environmental impact such as emissions of greenhouse gases. To compare the amount of greenhouse gas emission, the decision aid contrasts CO2 emissions for electricity and gas heating systems. Also, the amount of usage directly influences the greenhouse gas emission. For this purpose, the average amount of utility cost graduates face depending on whether they use electricity or gas heating systems has been studied. With the potential difficulties and challenges to find the information, a survey was done among NYU students that
revealed how the cost of utility usage varied between electricity and gas heating system. The survey result is indicated in Table 10. Additionally, this survey compared how the electricity and gas usage varied between renting and buying. Furthermore, according to a research conducted by SMR Research Corporation when one has one roommate, it saves 18.4 percent more energy per capita and three roommates save 52.8 percent more energy per capita (SMR Research Corporation, 2009). This was studied among apartments. For example, if one graduate has average electricity and gas bill of $120 and one has a roommate, the average cost will be reduce by 18.4 percent per person. However, this situation of having roommates might increase the environmental cost when more anonymity tends to increase the energy consumption.

<table>
<thead>
<tr>
<th>Who pays utilities</th>
<th>Type of Heating</th>
<th>Heating Cost</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renter</td>
<td>Gas</td>
<td>$65 - $90</td>
<td>$1800 - $2300</td>
</tr>
<tr>
<td></td>
<td>Electricity</td>
<td>$130 - $300</td>
<td>$2000 - $2500</td>
</tr>
<tr>
<td>Landlord</td>
<td>Gas</td>
<td>$70 - $100</td>
<td>$2000 - $3500</td>
</tr>
</tbody>
</table>

Table 10. Results of survey of NYU students showing monthly utility costs as a function of who pays the bill and the type of space heating.

There are different types of electricity source that energy suppliers use for their competitiveness. This might limit options for regulated energy market. Some energy suppliers use renewable energy sources such as wind, solar, hydro, and biomass. These renewable energy sources tend to have less carbon dioxide emission, but the supplying energy companies tend to mix renewable energy with other energy sources such as fuel or gas. To see the environmental impact of the choice of electricity supplier, the amount of carbon dioxide emission was compared among different supplying companies. Since recent graduates are cost sensitive, the cost of different suppliers was also compared.

By comparing the greenhouse gas emissions and the energy usage among different types of heating system, renting or buying, and type of energy sources for electricity and gas, the aid provides meaningful prediction of the environmental impact of recent graduates’ decisions regarding electricity and gas usage. This environmental information will help graduates to recognize the importance of these choices they make.

---

1 This survey was done among 40 NYU undergrads, seniors who all live in one bedroom apartment. The sampling method was convenient sampling.
6.3a Proposed Aid

After electricity and gas related information is provided, graduates need to make decisions based on their preferences. There are three attributes that seem to influence graduates’ decision the most, and these are listed below.

- Economic cost
- Environmental cost
- Convenience

In terms of cost, graduates who live in regulated market have the same cost per unit of electricity use, while graduates in deregulated market could have a different cost depending on their selection of supplying company. This economic cost or financial cost comparison is relatively straightforward. For example, New York, the cost of using 250 KWH per month varied from $15.28 to $34.81 as shown below. Once graduates choose where they are living, they are locked into a particular company because the service areas do not overlap. This delivery company choices are not depend on the choice of the supply company and also graduates could not make these choices.

<table>
<thead>
<tr>
<th>Delivery company</th>
<th>250 KWH</th>
<th>750 KWH</th>
<th>3000 KWH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Hudson Gas &amp; Electricity Corporation</td>
<td>$26.93</td>
<td>$48.14</td>
<td>$143.58</td>
</tr>
<tr>
<td>Consolidated Edison Company</td>
<td>$34.81</td>
<td>$73.91</td>
<td>$349.86</td>
</tr>
<tr>
<td>New York State Electricity &amp; Gas Corporation</td>
<td>$22.47</td>
<td>$38.56</td>
<td>$110.93</td>
</tr>
<tr>
<td>Niagara Mohawk Power Corporation</td>
<td>$15.28</td>
<td>$45.84</td>
<td>$183.37</td>
</tr>
<tr>
<td>Orange and Rockland Utilities</td>
<td>$25.87</td>
<td>$43.80</td>
<td>$149.30</td>
</tr>
</tbody>
</table>

*Table 11. Different delivery energy companies in New York City with different price*

Carbon dioxide emissions are one key component of the long term environmental consequences associated with the energy purchased from a given utility company. It was compared between renewable energy supplying companies and fuel or gas energy companies. A sample calculation is provided for New York. The matrix below allows graduates to see the different costs depending on their selection of supplying company and also the cost difference between having a dual bill or one bill. The meaning of one bill and dual bill correspond to no choice of supply company versus choice of Supply Company. If graduates chose to have a one bill, graduate do not need to decide which energy company that one will select.
Convenience could also be another important attributes for graduates. For example, when graduates rent their house, it is less time consuming and easier to just follow what landlords use for their electricity and gas supplying company. However, there is a one bill option still available. Convenience is measured by time consuming to install the service. For example, while one bill needs to contact one company for the installation, dual bill requires searching and contacting two different companies.

<table>
<thead>
<tr>
<th></th>
<th>One bill</th>
<th>Dual Bill</th>
<th>Supplying company A</th>
<th>Supplying company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Cost (CO2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 12. Matrix of attributes for selecting electricity and gas supplier in a deregulated energy market*

This matrix will shows the options and important attributes for the decision makers in their electricity and gas selections. It answers questions such as: Is it better to have a single bill or a dual bill? Which company is cheaper? Is it also cheap and environmentally helpful by making this decision? Is this also easy and less time consuming to do this decision? After these questions are answered, graduates can make informed decisions depending on what is most important to them and decide how and what will they do for their electricity and gas.

6.4a Critical Review of Aid

With the current electricity and gas analysis, there are some critical issues. The comparison of electricity and gas cost, depending who pays the bill, in Table 1 might be include skewed information. With a sample size of only 40, this implies imprecision. This estimate cannot be applied universally, because New York’s rent and electricity and gas costs are much higher than those for most of the U.S. For decision aid, most of the recent graduates would do renting so there is more of the decision that needs to be made between having roommates or not. The current decision aid does not include these options. Also, utility options strongly influence by the housing decision so that this decision aid might need to be linked to the housing decision aid to have more general view.

6.5a Policy

Current proposed policies in New York could be improved if this information like supplier company carbon dioxide emission amount or average electricity and gas usage of our targeted audiences could be more transparent and could be easily accessible for our targeted audiences. Even though these policies are being made, graduates often face hardship to have access to these
information and many times graduates do not have the control over these renewable energy uses. This was evidenced by a recent study, which observed that when information about usage and receiving source of electricity were made clear together with the amount of carbon dioxide that one emits, individuals who saw this information were more aware and tended to alter their behavior better than others who didn’t (Grevet and Mankoff, 2008). If the federal or state government could officially publish complete set of data on companies’ rates and their environmental performance such including their greenhouse gas emissions, graduates would have more access to knowledge to sources their electricity and gas from renewable energy suppliers. Also, by requiring every building to equip with unit-specific meters to measure utilities use by individuals, each individual would be responsible for their separate utility bill. If different units had their own separate thermostat, then they would also have better control of their energy use. In addition, a policy that requires utilities to include average neighborhood use on each bill would make consumer more aware of their usage of energy for heating and electricity.

6.6a Annotated List of Resources

- www.energystar.gov
- http://assembly.state.ny.us/member_files/044/20070913/
- www.epa.gov
- http://www.dps.state.ny.us/
- http://www.nyseg.com/
- http://www.eia.doe.gov/fuelelectric.html
SECTION VI.b) LIFESTYLE - FINANCIAL LITERACY

6.1b Decision Process

The decision aid will provide recommendations on four types of financial decision. In keeping with the project’s goals, we focus on financial decisions that can affect the environment, without attempting to change users’ spending goals. With this in mind, the guide considers six major financial areas:

- Credit Cards
- Checking / Savings Accounts
- Tax
- Governmental Policies
- Investment
- Retirement
- Recommendations

6.2b Overview

The guide provides users a variety of resources and recommendations based on their spending habits. Given today’s wide variety of financial product options, a major decision for a recent graduate, like signing up for a credit card, will have long-term repercussions for their financial status, including their ability to invest in environmentally friendly utilities, furnishings, housing, or transportation. Along with these recommendations, the guide will also provide a list of questions that will help graduates take their first step as financially independent adults. Most of this advice applies to graduates wherever they live. However, the guide considers issues specific to New York City.
One of the most important parts of the guide will be to explain why the specific services are being recommended, so the users can know where to look for further detail. A general perspective is needed because financial services in today’s world change constantly. For example, credit card promotion being offered this year might not be offered again next year. Because of the variety of financial services, the guide focuses on ones most relevant to users’ spending habits and income level. We ask users to consider themselves as either *spenders*, *moderate* or *savers*, using the definitions in the table below.

<table>
<thead>
<tr>
<th>Percentage of Monthly Income Saved</th>
<th>Spender</th>
<th>Moderate</th>
<th>Saver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 20%</td>
<td>Varies with Expenses, but is Less than 10% on Average</td>
<td>Less than 20%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Retirement Saving Priority</th>
<th>Low</th>
<th>Low</th>
<th>Moderate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Awareness of Financial Services</th>
<th>Low</th>
<th>Moderate</th>
<th>Moderate / High</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Primary Motivating Factor in Choosing Financial Service</th>
<th>Convenience</th>
<th>Ease of Use</th>
<th>Risk / Return</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Primary Method for Financing Purchases</th>
<th>Credit / Loans</th>
<th>Credit / Loans with some Downpayment from Savings</th>
<th>Savings</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Primary Financial Services Used</th>
<th>Credit Cards / Checking Account</th>
<th>Credit Cards / Checking Account</th>
<th>Debit Card / Savings Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Strategy</td>
<td>Maximize Return on Stocks</td>
<td>Place Income Leftover from Expenses into Savings</td>
<td>Minimize Risk with CDs and Long Term Investments</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Consumption Patterns</td>
<td>Maximize consumption in the Present</td>
<td>Focus on Present Consumption with some Future Savings</td>
<td>Accumulate Savings for Large Future Purchases</td>
</tr>
</tbody>
</table>

**Table 13. Characteristics of Spenders versus Savers**

6.3b Credit Cards

Credit cards give users borrowing power. However, used without knowledge and self-control, credit cards carry the risk of carrying unpaid balance over to the next months and years, giving the user a heavy debt and interest payments much larger than the original purchase amount. We do this by walking the graduate through a $100 purchase on a typical credit card with an. In order to make this principle clear, the guide provides simple recommendations based on educating college graduates on credit cards. We have compiled information from financial literacy websites so that the graduates are able to make fully informed decisions. This includes information that college graduates are typically unaware of, such as how credit score affects insurance rates and down payments necessary (Pritchard, n.d.). Thus, we have tied section into other parts of the aid such as housing and transportation. We also help the graduates pick the best card for their situation. For example, a spender with a good credit score moving to begin work may be able to take advantage of a no interest offer to purchase items for their new home and avoid paying interest by paying off the balance before the end of the promotional period. However, this is dependent on the graduate qualifying for such a card. This is because in light of the current financial crisis, credit card providers have been limiting their exposure by cutting credit limits and reducing perks (Dratch, n.d.). For those who do not qualify, the guide recommends building credit by obtaining a low limit credit card with no annual fee and paying it off monthly. Alternatively, the guide recommends obtaining a secured credit card if the graduate has enough finds available. Besides these basic recommendations, the guide will also provide a list of questions that can help college graduates with questions about credit cards such as making student credit cards.

With regard to environmental impact, we inform graduates about cards that have the additional benefit of encouraging environmental protection. We have compiled information from sites like creditcards.com (Munns and Gerson, n.d.). Cards such as the Nature Conservancy Visa card and the Brighter Planet Visa act like other credit cards, but with the benefit of helping the environment. These cards help the environment by planting trees when users make purchases and offering rewards programs that offer eco-friendly merchandise (The Nature Conservancy, n.d.). We recommend that the graduates take advantage of them to reduce their environmental impact without drastic lifestyle modifications.
6.4b Checking and Savings Accounts.

Most graduates will have experience with these services. However, they may not take advantage of the best bank rate available to them. For example, graduates may not be aware of banks that offer much higher interest on savings. In the guide, we will inform the graduates of sites like bankrate.com that enable the user to quickly have up to date information on different banks. The guide explains the different types of bank accounts and trade offs in accessibility, return, and risk among the account types. Generally, savers will tend to use a variety of means to grow their wealth. The decision aid offers guidance as to the various trade-offs between risk, return, liquidity and other attributes between different savings vehicles. When it comes to liquid savings, savers would want to choose a bank based on higher interest return on their principal in a checking or savings account. This is because banks tend to offer higher interest rates above a minimum balance (ING Direct, n.d.). However, spenders will need to have easy access to their money, as they will be spending it soon after it is earned. Many bank account services are promoted by emphasizing numbers such as the annual percentage yield that is earned in interest on the account. Much of this terminology is unfamiliar to recent college graduates. The Q&A section is largely devoted to providing information on these types of issues.

One environmental issue regarding banking is opening checking or savings accounts with internet banks. The guide provides a list of such banks that are FDIC insured and offer good interest rates. Because these banks do not have the overhead and environmental impact of physical bank branches, the savings in operating costs are given back to customers in the form of increased interest rates (Consumer Search, 2009). Here, the guide points out monetary benefits that arise from an environmentally friendly action. Customers receive a credit/debit card that can be used to make purchases, as well as withdraw money at ATMs. This gives customers greater flexibility in that banks, such as eTrade, offer the ability to withdraw money at any ATM nationwide, with the ATM transaction fee reimbursed (eTrade, 2009). However, online banking customers may have the disadvantage of not being able to directly contact a customer service employee to resolve issues. One drawback of this is that the graduates can be faced with large penalties for overdraft (Lieber, 2009). However, the guide also includes advice on how to avoid these fees, such as opting out of overdraft protection and how to keep track of purchases, which will make the graduate more financially savvy in general. Checks are written electronically, so customers save money and time by simply entering the details of the check that they wish to be written and the bank will send out the check in the mail (ING Direct, n.d.). College graduates who are comfortable using the internet to make transactions should readily adapt to internet banking. Therefore, college graduates can benefit themselves as well as the environment by choosing a non-traditional bank.

In addition, the selection of a financial institution affects environmental impact. Responding to consumer desires, banks that focus on environmental investment, such as Green Bank have been founded (Green Bank, 2009). These banks offer FDIC insurance like conventional banks, but invest primarily in companies that develop environmentally friendly products, as well as operate in a way that minimizes environmental impact.
One practice that can be followed with most banks is to receive statements electronically. Currently, 687,000 tons of paper in the US alone are used for regular bank statements to 276 million bank customers (AtoZCleanTech, 2008). In addition to reduced environmental impact, it offers benefits to consumers like eliminating the need to keep track of a particular document, easy access, and archival capability.

6.5b Tax

Next, tax is also a very new financial responsibility that graduates will worry about, because most of them never had to worry about paying taxes before. In New York City, there are many online resources available that can provide useful information about city and state taxes. The IRS website is available for use throughout all the states as it contains useful information about federal taxes. For this specific section of the guide, there will not be a recommendation because all the graduates will already have the goal of trying to save as much as they can within the boundaries of legality. At the same time, we inform readers of the large impact that taxes have in the amount of spendable income they have (Gunnison, 2003). This may result in the graduate’s lifestyle having to be modified due to the gap between their pay and the amount they can actually spend. The guide provides very useful links to paying their bills and taxes online and a Q&A section of questions that college graduates will find useful. For example, The NYC Department of Finance jointly with the NYC Environmental Control Board offers various tax credits and tax relief to encourage greener business practices as well as personal lifestyle. These kinds of information are not widely disseminated, and recent college graduates as well as general public usually are not aware of these financial incentives. We inform the graduates of tax deductions for environmentally friendly decisions such as purchasing energy saving appliances, making energy saving home renovations, installing alternative energy equipment, purchasing hybrids and using fuel cells for power (Database of State Incentives for Renewables and Efficiency, 2009). We go beyond this for more general tax deductions for mortgage interest, student loan interest and employer-maintained medical savings account (Internal Revenue Service, 2009). Employer maintained savings accounts benefit the graduate not only by helping to budget, but income saved in those accounts is not taxed, enabling the graduate to do more with their income. The guide provides various links organized under simple structure, making it easy for any college graduate with internet access to do better financially and decrease their carbon footprint, which is the ultimate goal of the finance section of the guide.
**Figure 10.** Screenshot of the EPA's Website on Hybrid Tax Credits

**Figure 11.** Screenshot of the IRS Website
6.6b Governmental Policies

The economic stimulus package has targeted environmental improvement in the allocation of its funds (Environmental Working Group, 2009). Thus, recent college graduates could take advantage of these offers to improve their financial wellbeing by having part of the choice to be environmentally friendly subsidized by the government.

A way that the benefits of governmental programs can be taken advantage of by college graduates applies to the area of housing. In the process of doing so, the graduate can have a more comfortable place to live, such as by eliminating drafts, and not bare the full cost of the improvement. These incentives will help enable the more widespread incorporation of energy saving measures in buildings, which benefits everyone through a lower environmental impact. This is generally accomplished through tax credits are available to the owner of the residence to make increasing energy efficiency more cost effective (Energy Star, n.d.). In addition, renters can receive up to a $200 rebate from the federal government to replace existing appliances with more energy efficient ones (Boyle, 2009). The extent of these changes range from relatively simple, such as the addition of insulation to more extensive changes to generate energy in an environmentally friendly manner, such as the installation of solar panels.

In terms of their financial impact on the individual, decisions regarding transportation are second only to those regarding housing. Thus, it is important for graduates to understand the financial ramifications of their transportation decisions. For example, although a college graduate living in New York City would likely take public transportation or a cab for transportation, they may need a personal vehicle. In doing so, the graduate needs to weigh the costs and benefits of various forms of transit, such as: walking, biking, public transit, cab, and car. In terms of car ownership to help the graduate become aware of the outcomes, they should look into the total cost of ownership using a tool such as that on Edmunds.com as well as tax credits available for purchasing hybrid and alternative fuel vehicles (Reed, n.d.). This affects the environment not only through the impact of the marginal use of the form of transportation, but also by the environmental impact of its initial creation.

6.7b Investment

College graduates also have to make decisions regarding long-term investments. Non-FDIC insured investments such as stock, bonds, mutual funds have the potential to grow substantially, as well as lose all of the graduate’s investment. Thus, the graduate needs to determine to what extent they wish to risk their principal when investing. FDIC insured investments protect principal, but at the expense of the potentially larger gains from non-insured investments. The guide helps inform the graduate of all these options, as well as how they play into various life stages. College graduates can choose to invest in mutual funds that take the work out of individually managing stock investments. Investing in green technologies doesn’t mean that college graduates have to sacrifice returns as recent trends in mutual funds show. With the emerging trends focusing on green technology, mutual funds that focus on green technology-oriented companies have been created. In recent years, these funds demonstrated their ability to be a competitive investment. For example, in the first seven months of 2009 two environmentally
focused funds have outperformed indices such as the S&P 500 by up to 300% (Scott, 2009). Thus, in addition to helping to fund the creation of technologies that will reduce environmental impact, college graduates can also realize a healthy return, unless a decrease in demand occurs. This was evidenced when high gas prices dramatically increased demand for hybrids and other fuel efficient cars, which subsequently vanished as gas prices returned to normal (Besinger, 2009). Minimizing impact on the environment is an aspect of socially responsible investing that is covered on websites that are incorporated into the guide (Rocco, 2009). In addition, current governmental policies and incentives help to ensure that these companies are projected to grow, as subsidies are provided for development (Business.gov, n.d.). There is the risk that environmental protection may not be favored in future governmental policies (Thiel, 2009). However, changing market conditions that create risk are an element of all non-insured investments.

6.8b Retirement

Retirement is usually something that college graduates do not consider, because it is so far down the road for them (Weston, n.d.). However, it remains significant to college graduates as a small increase in the amount saved, or starting savings a few years earlier can have a dramatic effect on the amount of money the graduate accumulates for retirement. Graduates are informed in the guide as to what various retirement plans are and rules of thumb to achieve savings goals for their desired retirement. The guide also talks about the implication of choosing the default options in workplace retirement plans and the importance of understanding aspects of IRAs (Kwak, 2009). In addition, there are environmental implications in that money saved away today prevents present consumption, which impacts the environment. Additionally, consumption in the future may have less of an environmental impact due to advances in technology. Also government mandates such as the phase out of incandescent lamps and more fuel efficient cars that take effect in the future help to reduce the environmental impact of future consumption (Europa, 2008).

6.8b Policy

First, the marketing committee of the project will need to put large efforts in making sure the guide is easily available to the student body and market it aggressively. One of the greatest advantages of the guide taking a digital form on the internet is that graduates will have much easier access to the guide, and this objective should be completed relatively easily. Second, the finance section of the guide can be much more effective if it is promoted to the correct segment of the student body. For example, the Carnegie Mellon Business Association (cmBA) or Undergraduate Finance Association student groups interested in the area of finance. They can help us to create better materials and also provide a learning experience for them. This will result in a guide that is more appealing to the graduate of Carnegie Mellon. Learning about personal finance should also be encouraged by the school, because it is one of the skills that not many graduates have but all graduates will need in near future. Therefore, if the school can host events for students to learn about personal financing and simply provide a link to this finance guide, the guide can become very well known. Students who are interested will visit the guide and take the
information they are interested in, and they will possibly educate their peers about this existing guide.

The policies that would strengthen this guide are divided into two categories: promoting financial literacy and planning and green investment. For example, green investment could be promoted through a policy to offer coupons for New York City’s healthy dining locations or subsidize green energy plants. Any aid the city can provide for the citizens and incoming population to adopt a green style of living can be considered a green investment that promotes the usage of this guide. In terms of promoting financial literacy, if there was a policy that defaulted all billing settings to internet e-mail unless indicated otherwise, many more people will choose to not change it and therefore avoid the paper waste that is generated by the billing process. In addition, the Credit Card Accountability Responsibility and Disclosure Act has created reforms that help prevent college grads from having access to large amounts of credit, which invites massive debt accumulation (Irby, n.d.). All in all, however, there needs to be a more in-depth discussion and research of many more available policies that will strengthen this guide and green lifestyle for the graduates of colleges. This can be done through policies that work hand in hand with our guidelines to promote financial literacy. They could include providing credit card information in a standardized format so that offers from several companies could easily be directly compared. In addition, banks could be required to report information on rates and other aspects of their account to the government. That way, an official comprehensive governmental website could list information in an easily comparable format, compared to the incomplete information available on sites such as bank rate.
SECTION VI.c) LIFESTYLE – FURNISHINGS

6.1c Decision Process

Moving often requires getting some furnishings for the new digs. Broadly speaking, these can include furniture, linens, blinds and drapes, carpeting, dishes, lamps, and appliances. Factors that seem important to people in choosing furnishings include cost, the time investment needed to select them, aesthetic and performance characteristics of the item, and perhaps the environmental cost associated with the item’s production, use, and eventual disposal. There is a vast array of options that graduates will face regarding their furniture and other items in their home and this guide will assist in steering them to make environmentally friendly decisions. As with other environmentally responsible decisions that graduates can make in all aspects of their lifestyle, so too can they mitigate their environmental impact while saving money and achieving other ends. There are two main areas of focus when considering the furnishings and household products graduates will purchase and use in their homes. The first area are non-durable goods that graduates will purchase on a regular basis such as light bulbs and cleaning products, while the second area will consider durable goods such as furniture and décor.

6.2c Proposed Aid

Non-Durable Goods: Household Products

Graduates will most likely make purchasing decisions on a multitude of non-durable goods, and may not fully understand the impact of those decisions. Making positive environmental decisions about fast moving consumer goods (FMCG, which are often defined as products having a life-span of less than three years), such as cleaning products, can have a positive impact on the health and well being of the graduate as well as the environment. Graduates who pay attention to cleaning product ingredients will be more able to avoid harmful, often toxic, chemicals. An average American household has chemical levels, which can be as much as 70 times higher than just outside their homes\(^1\). Likewise, as a large portion of the average consumer’s budget goes towards FMCGs, it is important for graduates to know the information provided in the decision guide to save money\(^1\).

Today, various companies are expanding their corporate responsibility when it comes to the environment. Notably, Johnson and Johnson has set environmental goals to curtail energy use (reducing carbon dioxide emissions), water use, paper and packaging, and environmental literacy, among others. Ensuring the companies that graduates buy their products from are aware of their environmental impact, and are making changes to improve that impact, is important in reducing the graduates’ environmental impact as well. The waste produced by using various FMCGs is reduced by the reduction of the inputs used to create those products\(^1\).

As companies such as Johnson and Johnson or Proctor and Gamble continue to lessen their environmental impact so too does the environmental impact of the consumer diminish. However, it is important to note that most large FCMG producers have adopted environmentally responsible policies that do not necessarily translate into action. Wal-Mart, for example, has
listed three primary goals: 1) to be supplied 100 percent by renewable energy, 2) to create zero waste, 3) to sell products that sustain our resources and environment. However, many environmental organizations such as The Sierra Club are critical of these steps because it is not thought that Wal-Mart will be able to meet these lofty goals, and are merely portraying themselves as environmentally enlightened; however whether or not The Sierra Club’s claims are true are left to be seen.

There are multiple sources, especially websites that are focused on providing ‘recipes’ for environmentally friendly household cleaners. These website provide a clear alternative for graduates to make their own cleaning solutions to save money and be more environmentally friendly. Many of these recipes include easy-to-find household items such as baking soda and vinegar. These products are generally easy to make and use, as well as costing less than most common household cleaners bought in stores. Furthermore, the environmental impact is significant due to the reduction of harmful chemicals used in the home as well as a significant reduction in the amount of waste produced.

The last of FMCGs that will be discussed are compact fluorescent light bulbs, which are also known as CFLs. A CFL, on average, uses 2/3 less energy than a comparable incandescent bulb. Especially if a graduate is paying their own electric bill, this can have tremendous savings in the long run. On average, a CFL will have a savings of $30 over the life of the bulb. This is possible even with a generally higher purchase price because CFLs tend to outlive their incandescent counterparts tending to last 10 times longer. The guide will highlight the savings graduates would generate by switching their light bulbs to CFLs as well as the positive environmental impact that would result from using less energy and also creating less waste (since a CFL lasts longer, they are replaced less often, resulting in less waste). Calculators will also be present in the decision guide so that a graduate may input the number of light bulbs that could be changed in their home, giving graduates the big picture of how impactful their switching to CFLs could be on both their budget and the environment.

There is a multitude of other FMCGs that are important to setting up and maintaining a new home for a graduate that range from paper products to linens, which are all grouped as non-durable goods. One approach to significantly lower environmental impact little impact on a graduate’s budget is to buy bamboo linens. Without the harsh chemicals used in dying and producing traditional linens, the decision guide will explain how bamboo provides a comparable alternative that is much better for the environment. Furthermore, bamboo linens are thought to be superior in quality to their non-organic counterparts in terms of durability and comfort. Secondly, buying paper products that are made from recycled paper are an easy alternative for graduates that do not require them to go far out of their way. Making this information easy for graduates to obtain will make them more likely to consider their environmental impact with these purchases. Not only would a graduate be making environmentally conscious decisions, but in using organic products, may be improving their well-being along the way.
Durable Goods: Furniture and Décor

Some of the most expensive parts of a graduate moving out of the dorms and into their own apartment are the durable goods they will buy to fill their home. This can range anywhere from couches and chairs to kitchen appliances and décor. The guide will give general tips on how to save money and help the environment on some of these heftier priced items.

A general rule of thumb when trying to save money and have less impact on the environment is to buy used items at thrift shops and online through websites like housworks.com or craigslist. For example, when a graduate is searching for a table the price of a new one will generally be higher than the price for a comparable used table. Furthermore, the table’s previous owner or owners have already incurred the environmental cost of producing and transporting it from when it was first purchased, even if it was from a far flung country half-way across the planet. The environmental impact made by the graduate would only be due to transporting it from a store to their home, which is a similar environmental cost that would have been incurred with a new table as well. However, the materials and transportation costs of a new table (especially if from overseas) is completely avoided in this case.

There are many incentives for graduates to buy used furniture. On top of the obvious lower cost of buying a used piece, a graduate would also be able to more freely customize their furniture. To help match the new piece to their current or desired décor, a used table, for instance, could be sanded down and repainted with eco-friendly water-based paints. The graduate would be saving money while creating a custom piece of furniture for their home that they can also be proud of. The guide will direct graduates to website with tips about refurbishing old furniture to ensure they look for the right pieces and deal with them accordingly (such as pointing out the hazards of furniture with lead-paint)

Of course, graduates will not only be concerned with how much their furniture costs but also if it fits their décor or style. Especially when living in New York City, space in a graduate’s home will be at a premium. Therefore, the decision guide will highlight the usefulness of multi-function furniture. Multi-purpose furniture may have a higher up-front cost, but when considering purchasing all of the pieces separately it becomes significantly more budget friendly. From an environmental perspective, multi-purpose furniture will generally be less costly to the environment as well because what instead of incurring pollution from transporting multiple pieces through multiple overseas trips, there would only be one overseas trip carrying the single piece

The logic presented with the example of the table is just one of hundreds of decisions a recent graduate faces when buying durable goods for their home. Furthermore, buying used furniture also presents a unique opportunity for graduates to customize their furniture through painting or other decorations that they may have forgone had they bought their furniture new. The guide will explain this potential cost savings and environmental advantage that would result from buying used furniture. It will also provide information on where to find local New York thrift stores that sell items that are in a good condition, as well as advice on what to look for when buying these items. Some examples of the advice that will be given is to make accurate
measurements of both the space the furniture will go in and the furniture itself, since the majority of thrift stores do not accept returns. Other major purchases that can be made inexpensively at second-hand/thrift stores are pots and pans, dishware, silverware, mirrors, dressers, beds, bookshelves, and much more which will be included in the decision aid.

6.3c Policy

Since graduates will be spending a significant amount of their budget on furnishings and household goods, it is important for public policies to assist in making environmentally responsible decisions. Standards should be set for FMCGs to improve the efficiency of their transportation from production to the market.

One example of improving efficiency is the use of a more concentrated solution such as in Tide 2x, which provides consumers with as much cleaning power as its predecessor but in almost half the size and weight, resulting in lowered waste after the product is used and lower transportation costs and pollution. Other possibilities for policy changes could be tax incentives for non-toxic materials such as paints and household cleaners. One way this policy already exists is with homemade household cleaners, which generally used foodstuffs that are not usually taxed by the state (such as baking soda and vinegar).

Another possibility is to create incentives for consumers to purchase domestically manufactured goods which carry may carry a smaller environmental impact because of the reduction in distances to be transported.

6.4c Conclusion

Graduates will have a very extensive list of purchases that need to be made while settling into their new homes. From couches to paper-towels, it is important for graduates to be aware of the environmental and budgetary consequences experienced from making many of these decisions. The decision guide will attempt to assist graduates in making better decisions for the environment and for them. Not only is the guide focused on making positive impacts on the environment but also the well being of the graduate. Although not all the decisions a graduate will face regarding furnishings will be feasible to put in the decision guide, most major decisions (especially on big-ticket items like furniture) along with types of products (such as cleaning products) will be included. The guide may also include various websites that can assist those graduates that wish to delve deeper into the environmental impact of their decisions regarding furnishings.
SECTION VI.d) LIFESTYLE – DIET

6.1d Decision Process

People’s decision processes are dependent on their habits and the familiarity of alternatives. Habits are built on the consideration of attributes and their weight of importance to the person. The five most important attributes for diet decisions are cost, taste, convenience, health and environment. These attributes contributed by graduates are not constantly being re-evaluated for each decision, but are evaluated based on their previous decisions. The cost of a good—especially for younger people—is a major influence on whether it is consumed. Taste obviously plays an important role in influencing graduates’ consumption choice (Glantz et al., 1998), but there can be other factors that play into a person’s consumption behavior. The decision choices for diet of a graduate may easily be influenced by the emotions he or she is feeling. Depending on mood—depressed or stressed—some people are more inclined to consume more food without consciously knowing how much they are eating (Garg N. et al, 2007). Another attribute that affects a person consumption habits is convenience (Cullen, 1994). Because there are opportunity costs associated with eating, young graduates tend to choose food options that are the most convenient to their schedule. Policy analyses from Sweden—the most energy-efficient country—suggest that providing information on health and environmental factors allow people to make the most informed decisions; better choices lead to a reduction of 20-50% of energy consumption (Degrees, 2009). The following guidelines show how information on these attributes can be incorporated in a decision aid facilitating a graduate’s decision process about diet.

The topics that the diet guide includes are decisions on eating in or eating out, buying organic or non-organic produce, buying processed or non-processed foods, and consuming meat or no meat. Dietary decisions graduates make will affect different aspects of their life—cost, taste, convenience, health and environment. First, the aid includes the cost and benefits for the alternatives of eating in and eating out. Second, there are many health and environmental implications of buying organic or non-organic produce. Providing an effective way of communicating the tradeoffs for both decisions could influence graduates’ consumption patterns. Third, processed and non-processed foods maintain a large disparity in the use of energy inputs for production. It would be of the best interest of graduates to purchase food that is not just healthy, but also food that was created through low emission process. Fourth, the production and over-consumption of meat and fish products has the greatest impact on the environment and is associated with many health issues. The guide explores different strategies for reducing meat consumption by presenting equally attractive alternatives for meals. These four topics are studied in the case of a graduate living in New York City.

6.2d Key Environmental Issues

The diet guide touches on a few key environmental issues. First, transportation of food to supermarkets and restaurants is a large contributor of greenhouse gas emissions, which inevitably has an impact on the earth’s climate. Second, the use of pesticides and chemical plant protection solutions are harmful not only to the consumers’ health, but also the atmosphere.
Third, biodiversity of animal and plant life are affected by how much one species or type of food is consumed. The overconsumption of one type of species could create an imbalance in an ecosystem and lead to the extinction or overpopulation of other species. The over production of one type of crop could lead to the loss of nutrients in soil, and make the land unable to support any sort of plant life.

**6.3d Proposed Aid**

**General Information**

Information on various foods provided by the diet guide is separated into six different categories, similar to the Swedish National Food Administration’s environmental guide (National Food Administration, 2009). The information contains general information about the following topics:

- Meat
- Fish and shellfish
- Fruits and berries, vegetables and leguminous plants
- Potatoes, cereal products and rice
- Cooking fat
- Water

![Figure 12. Example of Food Guide: Meat Consumption](image-url)

**Meat - Health**

- Most important source of iron and good source of protein – 140 g
- On average people consume more protein than needed in meals today
- Reduction of meat consumption may reduce the risk of certain types of cancer

**Meat - Environment**

- Replace one or a few meals with vegetarian meals, or reduce meat portion sizes – Reduced Climate Impact
- Locally produced meat, natural grasslands – Varied Agricultural Landscape, Rich Diversity, Non-toxic Environment, Reduced Climate Impact
- Organic alternatives – Non-toxic Environment
The information provided to users includes tips on how to choose goods that are the healthiest and most environmentally sound decision. It includes alternatives to foods with higher environmental impacts so that the user can make a conscious decision on how much he or she will reduce costs and environmental impacts. Below is what the guide looks like for the topic, environmental impact of meat:

<table>
<thead>
<tr>
<th>Reduced Climate Impact</th>
<th>Non-toxic Environment</th>
<th>Rich Diversity of Plant and Animal Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Livestock production is responsible for 1/5 of world’s GHG emissions</td>
<td>• Grain cultivation uses more plant protection than coarse fodder</td>
<td>• Outdoor grazing contributes to a rich diversity</td>
</tr>
<tr>
<td>• Production of cattle and sheep have highest emissions</td>
<td>• Soya fodder requires large amounts of plant protection</td>
<td>•Areas of rainforest are cut down:</td>
</tr>
<tr>
<td>• Production of pigs and chicken have lower emissions</td>
<td>• Chemical plant protection destroys biodiversity</td>
<td>• Space for livestock</td>
</tr>
<tr>
<td>• Mineral and manure fertilizers contribute to GHG emissions</td>
<td>• Organic production does not use chemical plant protection</td>
<td>• Growing of fodder</td>
</tr>
<tr>
<td>• Transport of meat produce large emissions</td>
<td></td>
<td>• Felling of rainforests produces a lot of GHG emissions</td>
</tr>
</tbody>
</table>

Figure 13. Example of Food Guide: Environmental Impact – Meat Consumption

Eating in or Eating out

One decision a graduate must consider is the option of eating in or eating out. The dining options for graduates living in the New York City area are numerous, and could even be considered overwhelming. Because there are so many different choices, graduates might have a harder time choosing the best alternative. The attributes for diet—cost, taste, convenience, health and environment—applies to this decision process; some attributes are weighed more than others, depending on the situation.

Environment

The environmental impacts of eating out are higher than eating in. Eating out tends to have higher impacts on the environment for a few reasons. First, restaurants account for 33% of energy consumption in the retail sector—the highest electricity consumption per square foot compared to any other US industry. However, the amount of energy consumption is also contingent on whether the restaurant is using energy efficient technology, such as Energy Star appliances, or using renewable energy sources for power. In addition to greenhouse gas emissions, restaurants generate large amounts of waste that end up in landfills. The waste generated by restaurants include packaging and left over food. Eating out tends to have higher
energy inputs in the lifecycle process because restaurants not only use larger appliances, but also more often than average households. Below is a graph that compares energy requirements for eating in and out:

![Graph comparing energy requirements for eating in and out](image)

*Figure 14. (Hirst, 1974)*

The graph above displays energy requirements only up to 1970. Subsequent research shows that the percentage change in the number of meals eating outside the home from the 1970s to the 1990s is 36.1%. The current trend of eating out is increasing, while the current trend of eating in is decreasing (Cullen, 1994). This ultimately results in higher carbon emissions into the atmosphere and a larger carbon footprint associated with eating out. Although there might be technological improvements in the efficiency of transportation, it would not be enough to offset the increases in eating out. Eating in also has lower environmental impacts because technological improvements—higher energy efficiency—of household appliances.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunch</td>
<td>1.81</td>
<td>1.77</td>
<td>1.89</td>
<td>1.93</td>
<td>4.4</td>
<td>9.0</td>
</tr>
<tr>
<td>Other meals</td>
<td>1.39</td>
<td>1.45</td>
<td>1.95</td>
<td>1.83</td>
<td>40.3</td>
<td>25.3</td>
</tr>
<tr>
<td>Total</td>
<td>3.20</td>
<td>3.23</td>
<td>3.84</td>
<td>3.76</td>
<td>20.0</td>
<td>16.1</td>
</tr>
</tbody>
</table>

*Source: Euromonitor*[2]

*Figure 15. Meals Eaten outside the Home (per person per week) (Cullen, 1994)*
Attributes

The decision to eat in allows graduates to have more control over other variables of eating. Graduates can choose where to buy groceries, what produce to buy, what meal he or she eats, how the food is prepared, and how large the portions are made. Eating in requires many decisions, which graduates can reduce by choosing to eat out and avoid making these decisions. Graduates also take into consideration the inconvenience of preparing the meal and learning how to cook different types of meals. It has been shown that single person households eat out more than others. The current market trends have been focused on individualizing eating habits, allowing more varieties of food to be served at a cheaper price (Cullen, 1994).

Costs

There is variability in the costs of choosing between eating in and eating out. The aid provides graduates with a visual representation of information on the differences between the costs of eating in and out. Diet is closely related to finance (Section X.X). The total costs of eating can go unnoticed because it is hard for people to visualize the accumulation of small costs over time. Many eating choices could be done in ways that reduced costs for graduates as well as benefit the environment. By closely tying the diet and finance section, graduates can closely monitor their spending habits on their eating behavior.

Taste

Information on food taste can be organized in a way to help people to recognize what types of food they want, including healthier options. Stressing the good taste of healthful foods would work as a way of informing graduates of viable alternatives to their current behavior (Cullen, 1994). Local organic food is generally fresher than food shipped from non-local locations; therefore, local organic food has the benefit of tasting better. Given the increase in income, graduates would search for consumption possibilities that yield greater satisfaction (Cullen, 1994). This means that graduates might prefer meals with little regard to cost and the environmental impacts eating out. Information that stresses the importance of nutrition could provide insight for graduates who are concerned with improving their health environmental conservation.

Convenience

Convenience is an important attribute that determines whether graduates eat in or eat out. The guide includes links to resources to locate farmers markets within the New York City region. This section ties closely with the transportation section to improve convenience of eating in. Providing a complete set of tools to plan a trip gives graduates incentive to eat in. Providing a seasonal food chart could help graduates pick the different types of food to buy during any given season; it adds environmental costs into graduates’ decision choice. To complement this chart, the diet guide provides recipes for preparing different types of dishes. By suggesting healthy and environmentally friendly ‘eating in’ options, it allows the consumer to save time by improving the convenience attribute for the consumer. The omission of the need to search for alternatives
eases the decision process of choosing a meal, and could essentially deter graduates from defaulting to eating out. Since our target audience consists of a younger demographic, suggesting new options could be effective because they are more likely to alter their behavior in the status quo and change their habits (Cullen, 1994).

**Organic or Non-organic**

With the decision to eat in or eat out, graduates have the option of choosing a meal consisted of organic or non-organic foods. The popularity of organic produce in the New York City area is on the rise as seen through the steadily increasing availability of this option in grocery stores as well as restaurants. The main attributes that the diet guide will focus on for this decision is taste, health, and the environment.

Locally grown organic produce are the most fresh relative to food originating from conventional farms. Time in transport for conventional food tend to be, resulting in lower quality and less fresh produce. Most good chefs always prefer local organic produce to ensure the highest quality for the meals they prepare.

There are many health issues associated with being exposed to conventionally grown produce. The exposure of chemical fertilizers and pesticides has many health repercussions such as:

- Immune system suppression
- Nervous and hormonal system disorders
- Reproductive system damage
- And various cancers, including breast cancer

There are many environmental impacts of conventional farming, ranging from the use of chemical pesticides to the loss of biodiversity. The continual use of conventional farming holds potential impacts of reducing the ability to grow crops on the same fields and destroying the richness of species in certain areas (Hole D.G. et al., 2005). There are some controversies and criticisms directed at the processes of organic farming. Some sources claim that some organic food produces more carbon emissions than conventional food because it is usually transported further to meet demand. Also, some claim that organic farming leads to the destruction of more land to yield fewer crops (www.greenyour.com).

The diet guide provides links that directs graduates to local farmers markets. The resources provided not only informs graduates on why local organic food is better for their health, but also offers alternatives for preparing healthy meals. The guide also provides links to restaurants using organic produce in the ingredients of their dishes.
Although there are many criticisms towards organically grown systems, they are addressed by the diet guide through the promotion to buy local organic produce. Supporting the local farmers not only reduces emissions from transportation, but also creates an opportunity to test and implement better systems for the production of organic food (Hole D.G. et al., 2005).

Processed or Non-processed

The focus of the diet guide is to distinguish the attributes of taste, convenience, and health for processed and non-processed foods. There are different types of processed foods ranging from sugary breakfast cereals to packaged snacks, such as chips and candy. Many of the packaging and transportation techniques require high energy inputs and result in a larger carbon footprint. The environmental implications of packaging and transportation are higher use of electricity. Renewable energy sources could dampen the effect of higher energy usage; however, those alternatives are costly so processing plants have less incentive to use renewable sources. Fortunately, the manufacturer must comply with certain policies and regulations to reduce waste by improving techniques used in the status quo. The graph below indicates that sweets, snacks, and sauces—all processed foods—is second to meat production in energy inputs:

Figure 16. (Carlsson-Kanyama et al, 2003)
Depending on the preferences of graduates, the taste of a certain type of food could determine whether or not it is consumed. Some processed foods include excessive amounts of ingredients—to improve the taste of the food—that are detrimental to health.

Convenience plays an important role in the consumption of processed foods. For example, people might buy candy bars from vending machines at their work to satiate their hunger. However, there are healthy alternatives that are as convenient. The guide provides a list of alternatives that are equally or more convenient than conventional options.

Graduates might be inclined to consume unhealthy alternatives because they are unaware of the impacts on their health. The guide provides some healthy alternatives to conventional snacks that do not alter their perception of convenience. The guide provides a graphical display of a list of processed foods and their health implications.

The reduction in consumption of processed foods ultimately reduces graduates’ carbon footprint. Fewer purchases of processed food reduce the amount of food that are processed and transported. Providing insight on the topic of processed foods could serve as a stepping stone for graduates to make more conscious decisions on what types of food to purchase.

Meat or No Meat

For every meal, graduates have the option of choosing a meal that contains meat or no meat. If graduates have been raised to eat meat for every meal, the choice of eating a meatless meal might not be an apparent alternative. The attributes associated with making this decision include taste, convenience, health and environment.

The lifecycle of producing meat and making it available has the highest impact on the environment. Dining requires the use of many resources, some being more harmful than others; the environmental impacts associated with a meal begin with the type of food being consumed. The production of meats (and dairy products)—beef, pork, and poultry—requires the highest amounts of energy inputs relative to other types of food. Over-consumption of meat is one explanation for the inefficient allocation of resources, and negative impacts on the environment. The accumulation of instances where meat is over-consumed places an enormous weight on the emission of greenhouse gases because of the high inputs of livestock feed, methane into the atmosphere, and fossil fuel used in transportation. The production of livestock alone is responsible for 14 to 22% of greenhouse gas emissions (Scientific American, 2009).

It is undeniable that people choose to eat meat because of the way it tastes, but there are many tasty alternatives that provide the same protein requirement of a healthy diet. The diet guide provides resources that specialize in presenting meatless alternatives. Stressing the good taste of a meatless alternative can serve as an incentive to use a meat substitution.

Convenience plays a crucial role in graduates’ decision to consume a meal. Most restaurants in the New York City area have meat as their main focus with a few meatless alternatives. However, there are certain restaurants that specialize in meatless meals. The guide provides
resources that enable graduates to search for specific restaurants as stated in the ‘eat in or eat out’ section. The guide will also present information on how over-consuming meat could have negative health implications. Although it may be more convenient to purchase a burger from a fast food chain, displaying the trade-offs the overconsumption of meat has on health could give graduates an opportunity to make informed decisions about their current habits.

The guide is not going to advocate switching to a vegetarian diet; however, the guide provides insights on how reducing the intake of meat for one meal benefits health, and in turn benefits the environment. The diet guide will provide information on the health and environmental benefits of reducing meat consumption. This information will include alternative options that have graduates rely on vegetable and grain products while maintaining a healthy balanced diet. Healthy diets require consumption limitation on certain food groups. Also, limiting the consumption of certain food groups is beneficial to the environment. The production and consumption of meat is an inefficient way of feeding a population (Hirst, 1974).

6.4d Critical Review

Although the diet guide will include information on the four decisions: eating in or eating out, organic or non-organic, processed or non-processed, and meat or no meat, the guide can be improved in a few ways. First, the guide can be improved by presenting numerical data of greenhouse gas emissions for different processes of the lifecycle of various kinds of food. This data might include emissions caused by transportation, emissions caused by packaging, and emission levels of specific brands. Second, the guide can be improved by having data on the difference in energy consumption between restaurant and home cooking appliances. Third, the guide can be improved by having data on the environmental consequences for consuming various types of meals over different timelines (weeks, months, and year). The environmental consequences are those mentioned in section 6.2c, Key Environmental Issues.

6.5d Policy

Graduates could reduce their carbon footprint by using the diet guide and choose various alternatives to their current diet choices. First, one policy recommendation is to make it mandatory for companies to report the carbon footprint their daily and monthly processes to have accurately measure an industry’s carbon emission. Having access to this information not only allows companies to have a better understanding of their emission patterns, but also allows the guide to display more detailed information on the carbon footprint of graduates’ decisions. Second, it should also be mandatory for grocery stores to provide information on health for the nutritional facts of different types of food. This would enable the guide to display accurate information and facilitate comparisons between conventional food and their healthier counterparts. Third, another policy recommendation is to require restaurants to participate in a “green” certification examination. Not only would customers be able to see how “green” a particular restaurant is, but also provide the restaurant with detailed information on which areas of their restaurant can be more efficient.
6.6d Annotated List of Resources

<table>
<thead>
<tr>
<th>Eating Out in NYC</th>
<th>Search Option</th>
<th>Eating Plan</th>
<th>Restaurant Profile</th>
<th>Free Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dine Green!</strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>NY Search</strong></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Clean Plates</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Figure 17. Eating Out Review*

Eating In Review: [CENYC - Greenmarket](#)

- Market Locator: Search for markets near your area
- Map of markets with dates and locations of available markets
- Information on greenmarket projects in the NYC area
- Community Garden [locator](#)

Review: [Meals Matter](#)

- Free Account
- Nutrition and Fitness Planners
- Meal Planner/Shopping List/Cookbook
- Recepies/Healthy Food ideas
SECTION VI.e) LIFESTYLE - VACATIONS

As the CMU graduates step into the shoes of young professionals, we would like to give some advice on less costly and more environment friendly ways of spending on their weekend trips. Getting comfortable with the idea of monthly paychecks, these new professionals might be tempted to zip away on long drives in their new cars or fly down to meet college buddies in other cities.

However, students must realize that for every 400 miles that they drive, they burn 200 pounds of carbon dioxide, besides adding carbon monoxide and nitrogen oxide to the environment. In addition to the direct impact of driving or renting a car, the cost of maintaining automobile plants, car dealerships, roads, highways and junkyards also add to the social costs of driving\(^1\). The other preferred mode of transport is flying, which has all the more drastic impact on the environment. An airplane doubles the green house gas emissions per mile per passenger than other forms of intercity travel. Besides the direct impact of the plane, in-flight services and airport maintenance etc. also increase the financial and environmental on the individual as well as the society.

Bearing in mind the excessive costs of travel, we would like to inform the students about weekend spots in nearby areas, upcoming weekend activities within the city and the available public transport options available for intercity travel.

Off Manhattan is a website that promotes car-less tourism by introducing New Yorkers to some of the lesser known nearby regions such as Three Long Island Vineyards in North Fork, Cape Elizabeth in Portland, Maine, Beacon Open Studios in Beacon, New York or parks in New Hope, Pennsylvania. Their website also carries a Google interactive map for such locations in and around New York State. Given below is a map of nearby weekend options from Off Manhattan:

![Figure 18. Green vacation locations near New York City](image-url)
In addition, New York City often has some interesting environment-friendly activities such as Earth Fair and Urban Go Green Expo. We suggest CMU graduates browse through magazines such as New York Timeout and Greenopia to know of the upcoming events if they are interested in such activities.

Finally, New Yorkers typically travel to other major cities like Washington DC, Boston, Philadelphia and Baltimore. Taking the case of travel from New York City to Washington DC, there are two main types of public transportation services available: Bus lines and Amtrak. The major bus lines are DC2NY, Bolt Buses, Greyhound, 2000 New Century Buses, Washington Deluxe Buses and MVP Buses. In deciding between these choices, the graduate would consider attributes such as cost, duration, routes, frequency, booking system, website etc. For instance, if an individual opts for Bolt Bus, it would help to know that the bus journey would cost 19 to 24 dollars, departing from 33rd Ave & 7th St and reaching DC in 4.5 hours, arriving at 1-th & H St NW. Moreover, Bolt buses leave every hour and provide free Wi-Fi and Power Outlets. Further information such as on ticket booking is available on www.boltbus.com
SECTION VII.a) DECISION AID - STRATEGY

7.1a Project Framing

The goal of our project is to create an information resource and decision aid that would enable new and recent college graduates to transition from college life to working life while making environmentally-conscientious decisions.

Our approach was influenced by a number of factors which we derived from our initial research. First, and perhaps most important, we felt that an environmentally-conscious guide for graduates is an as-yet undeveloped market niche. While a lot of information is available on both graduate transition and environmental friendliness, graduates do not seem to act on either in a structured way, but instead tend to muddle into their transitions. A fully-realized decision aid, as we’ve envisioned and properly marketed, would be a direct solution to this problem, as well as, as far as we know, a unique midpoint between existing green living guides and graduate transition guides.

Second, we felt that a new graduate is very sensitive to cost while making housing and living decisions. This concern tends to override others, especially environmental concerns. Focusing on issues in terms of costs and savings provides new vectors for environmental information that might otherwise be dismissed.

Third, while there are a number of environmentally-positive choices which are in fact financially beneficial to make, there is a significant portion of the population that is immediately turned away by a discussion of the environment that is perceived to be pushing an environmental agenda. Therefore, presenting environmental information clearly yet without specific direction to graduates would expand the potentially receptive audience and thereby the environmental impact.

Fourth, we felt that habits learned early would be habits held for life. If a graduate’s first major decisions in the world outside college took environmental factors into account, he or she would be much more likely to continue to make decisions while being conscious of the environmental impact thereof.

Fifth, we felt that having an information base addressing a broader set of concerns, beyond the environment alone, would attract students who were looking (or only knew to look) for specific non-environmental information or advice. The more comprehensive content would thus serve as a “hook” to get more graduates reading the product of our research and exposing them to the underlying, environmentally-conscious decision possibilities.
SECTIO\nN VII.b) DECISION AID – DESIGN

7.1b Decision Aid Positioning and Design

In order to maximize both the dissemination and uptake rates of our information (i.e. how many people see it and how many people use it), we decided that the decision aid would have to be, above all, 1) easy to comprehend from a wide variety of backgrounds, 2) credible, and 3) convenient, familiar and accessible.

As such, we decided that our decision aid would have to be accessible on the Internet, and that a website would be the most natural and flexible format to work with both from our perspective and from an end-user perspective. The website would have two main methods of navigation through the decision aid. First, an interactive navigation would walk graduates through the decision aid based on information they entered for a custom experience, and second, an alternative narrative navigation would present information sequentially for a broader, unfiltered overview.

Additionally, these two navigations, interactive and narrative, could and should be adapted to different media. The interactive navigation, for example, can be paired with worksheets or more specific information on selected topics in a mobile application. This would be useful as a “travel version” of the guide for use when, say, looking at apartments or purchasing an air conditioner. The narrative navigation could be easily adapted into a short book, which could be printed either traditionally or on-demand and serve as a more-tangible version of the decision aid. Additionally, elements could be re-used for marketing and publicity purposes. For example, excerpts can be placed on Facebook or other social networking sites to increase traffic to the main website (as mentioned in 2.5).

7.2b Immediate Goals

Since a fully-developed website with dual navigation is a significant undertaking (never mind a mobile app or book version), we decided to attempt only one of these final products: a narrative-navigation website, organized around the paradigm of a chapter-based question-and-answer book. Each topic of the decision aid would be introduced with a short prose essay framing the decisions involved. This would be followed by a series of questions and answers designed to invoke additional information and context, as well as stimulate reflection and analysis by the reader.

Additionally, we found that even this reduced task was very complex to generalize on first approximation, because a lot of the specific decision-aiding information is location and context specific. Therefore, we decided to reframe our first draft decision aid as a case study of New York City. We felt that working through an existing city and its living, work and physical environments would aid us in clearly defining the issues and challenges of transition and how to help graduates address them.
As this decision aid’s actual implementation (an activity distinct from developing its content) is outside our collective expertise, we solicited the services of an experienced student designer.

SECTION VII.c) DECISION AID – CRITICAL REVIEW

In its current form, the decision aid is not a usable resource for the average graduating and transitioning college student. While as-is it represents an enormous amount of research and synthesis, overall it lacks the narrative context and ease-of-use required to make it a usable general resource.

7.1c Key Issues We Faced Constructing the Decision Aid

Once we made the decision to perform a case study of New York City, we progressed rapidly. However, before that point, analyzing, synthesizing and contextualizing the myriad information available on the many dimensions of transition took an enormous amount of time. Given the fixed timeframe of this semester-long project, it was not possible to make up for lost time sufficiently to complete the New York City decision aid.

Even as a single case study, living in New York City is a very complex topic to break down, reconstruct, and contextualize. Packed into a small area, New York City has a population, government, and infrastructure larger and more complicated than that of many states. In particular, this makes the final step of our decision aid construction – putting raw information and analysis into an easy-to-read context – an extremely time-consuming task.

Additionally, we were constrained by the realities of the design and implementation process as communicated by our designer. Specifically, our material would have had to be in advanced stages in order for the designer to have done any meaningful work, and yet the process of turning a design into a functional website would take her and her team from a week to three months, depending on the complexity of the navigation and features involved. Together with the complexity of the material, the design and implementation requirements meant that no end-user design work was possible in the semester we had. Because of this, a final decision aid was unattainable.

7.2c The Decision Aid As-Is and Its Potential

As it exists now, the decision aid is primarily information-dense raw material for a contextualized, easily-digested end product. Its internal structure is based on our analysis of graduate and situational decision-making and thus is highly non-linear, branching, and interdependent. It is much more like the interactive-navigation website option we temporarily dismissed than the narrative-navigation website we were attempting to create. This implies both challenges and opportunities for future work on the decision aid.

The first challenge is the task of adding context and a written narrative to the decision aid itself. Putting research and analysis into context is not a simple task. Making that context easy to read and comprehend without a background in the material is also difficult. Doing both on as
large a scale as a graduate transition decision aid is a significant writing challenge. Further, these tasks cannot be accomplished without a strong understanding of the material.

Continued work on the decision aid, especially to generalize it or expand it to other locations, will require acquiring significant expertise in the subject material of these decisions. Without this expertise, time will have to be invested in learning this material, as well as in “catching up” on the basic framework that we have outlined in this report.

Interface design and the actual implementation of the decision aid, which we ourselves did not get to, remain necessary tasks.

Despite these challenges, the raw-material nature of the material lends it to a particular advantage: it is flexible. Because the decision aid is not yet developed into one discrete end product, the material can be shaped into any form which fits the strengths and needs of any individual or group who continues its development. Our decision aid is a valuable collection of information which may yet become a popular and useful guide for graduating college seniors.
SECTION VIII) POLICY

8.1 Decision Process

The process of creating the decision aid revealed a number of gaps in the information needed to make informed choices, as well as some gaps between graduates’ preferences and the options available to them for making “green” decisions. Both kinds of gap might be closed with public policies. These gaps and the proposed policies are summarized below. We also present recommendations for improving and implementing the decision aid itself. Finally, we address additional issues that arose during the project’s work, but were outside its scope.

8.2 Policy Summaries

8.2.a Transportation Policy

Information on transportation, the methods available, and associated costs is abundant. As fuel prices and awareness of global climate change have increased, there has been a growing interest in more cost effective methods of transportation, more fuel-efficient cars and other “greener” options. As a result, there is a wide array of information, from government websites, such as FuelEconomy.gov. Because the necessary information is available and relatively simple to acquire, the focus of transportation policy arising from work on this aid is creating better transportation options. There have been various tax incentives and federal programs to incentivize the purchase of more fuel-efficient vehicles, but in terms of the environmental metrics, public transportation is the superior option per passenger mile. A recent study found that accessibility, cost and safety were the primary concerns of young adults choosing not to take public transit, but health and the environment were not really considered (Barnard, White, and Lewis, 2009). Cost could be addressed by lowering the price of public transportation, or with reimbursement from the IRS, similar to that for motor vehicles. A minimum required number of transit hubs based on population density could alleviate the accessibility issues. With regards to personal safety concerns, some cities have formed separate police forces whose sole purpose is to maintain security on buses and light rail (Dallas Area Rapid Transit, n.d.). Other cities with safety concerns or cities having public transit crossing city lines could consider a similar solution.

Policy Conclusions:

- Information on transportation is readily available
- Public transportation still more efficient in terms of environmental metrics
- Primary concerns for young adults choosing not to take public transit (Barnard, White, and Lewis, 2009).
  - Cost
  - Accessibility
  - Safety
- Health and environment not significant factors in transportation choice (Barnard, White, and Lewis, 2009).
Policy Proposals

- Tax incentives and federal programs to incentivize purchase of more fuel-efficient vehicles and use of public transportation. Set a minimum number of transit hubs by population density.
- Create separate police forces whose sole responsibility is security on the local public transit lines.
  - Dallas, Texas (Dallas Area Rapid Transit, n.d.).
  - New York City, New York (Metropolitan Transportation Authority [MTA], 2009).

8.2.b Housing Policy

In the process of conducting research on housing availability (renting vs. buying), there were many (sometimes too many) resources available. Information provided by the Government has proven to be some of the most reliable information. Although there are websites that provide information update information on available renting units and prices, they are not consistent. Information from the State of New York Affordable Housing Directory and Department of Housing and Urban Development (HUD) provide consistent and cost-friendly housing options for recent graduates. Many, however, seem to be missing the environmental component, as when agencies make cost their sole concern. Although there is information that is available regarding environmental factors and considerations in different States, the information is inconsistent and sparse. This lack of environmental facts and valuable figures (like total emissions in a particular city) will continue to create a wider gap between the preferences of graduates and the green decision.

Policy Conclusions:

- Many reputable Government websites, like the State of New York Affordable Housing Directory and Department of Housing and Urban Development (HUD) fall short of providing information regarding green living options.
- The lack of such information may affect the desire for graduates to incorporate green decisions into their other life choices that they make after college.

Policy Proposals:

- Provide more centralized and consistent information regarding the environment conditions of each city in the United States.
- Encourage more States to create websites like New York's Department of Energy Conservation. Ensure that the information is comprehensive.
8.2.c Lifestyle Policies

Utilities

Graduates rarely control over the type of utilities used in their living space, if they are renting. Effective policy would be a top down approach that requires energy suppliers to provide more transparent information regarding their environmental performance, more specifically information regarding their CO₂ and pollutant emissions, in addition to the average usage of the graduates’ neighborhood and the rates of other providers in the area. With this information, graduates’ could make better informed energy choices.

Policy Conclusions:

- Need more transparent information regarding supplier performance
  - CO₂ emission/environmental performance
  - Average usage by neighborhood

Policy Proposals:

- Require utilities to provide information on:
  - Environmental performance
  - Rates
  - Average neighborhood usage

Finance

Finance is a key part of a graduate’s decision-making process. Since money is necessary for housing and transportation, as well as general day-to-day purchases, decisions in this area have far-reaching implications. Many graduates are under educated about personal finance, but a study done in 2004 showed that 91% of final year undergraduates have at least one credit card, and 56% have four or more (Nellie Mae, 2005). The result of this is that many students and recent graduates live with credit card debt. Possible policy solutions include requiring credit card companies to print their terms in clear language, in standard size print on the front of their billing statements. Additionally, the state or federal legislature could pass a bill requiring borrowers to take a course to acquire a “borrower’s license” before signing up for a credit card.

Policy Conclusions:

- Many graduates are uneducated about finance, need clearer information
  - Simple, standard credit card terms

- Green investment is often overlooked

Policy Proposals:

- Require important credit card terms to be written in clear, concise language in standard size print on the billing statement

- Legislation requiring a “borrower’s license”
Diet
Graduates make uninformed diet choices because information on food choices is not readily available. They are also uneducated about the health implications of their dietary choices. This issue could be resolved by requiring companies to report the carbon footprint of their food products, and by local governments identifying restaurants that use green business practices, like using local produce and environmentally friendly products.

Policy Conclusions:
- Information is not readily available about many food choices

Policy Proposals
- Require companies to report the carbon footprint of their food products
- Identify restaurants that practice green business such as using local materials and environmentally friendly products

Water
Graduates have little to no control over their water supply, apart from how much they use. As a result, though the government could enact policy to regulate consumer usage, policies encouraging the development and production of water-saving appliances would likely be more effective. Additionally, local or federal government could mandate the implementation of water-saving building practices, such as storm water diversion.

Policy Conclusions:
- Usage is the only variable under graduates’ control
- Policy directed toward consumers may be less effective than policy encouraging production of water-saving appliances
- Housing and building regulations must be undertaken by the entire municipality for greatest effect
  - Storm-water diversion
  - Water input/output monitoring

Policy Proposals
- Consider making current standards mandatory, and introduce higher standards for future tax credits
8.3 Policies Related to Improving and Implementing the Decision Aid

Carnegie Mellon University is already one of the most active universities in promoting environment-friendly habits on campus. Events such as Recyclemania, an inter-university competition across the nation, and Best Dorm Competition are frequently organized to make students become aware of how their day-to-day activities can be made more environment-friendly and cost effective. In order to implement the decision aid at Carnegie Mellon, the Career Center would have to not only make it available, but heavily publicize it among students. Mass mailings are largely ignored. One possibility is to create a 3-unit mini in the senior spring semester that introduces students to the decision aid and how to use it to their benefit after graduation. Additionally, the decision aid should be mentioned as something to consider while job searching, negotiating a job offer, or preparing to move. The Career Center offers a large number of workshops throughout the year, on topics ranging from how to write a resume to handling job interviews. Adding a rotation of workshops on life after graduation would likely be informative and well-attended, in addition to getting students to think about what decisions will be important to them long before they graduate. Getting students to utilize the decision aid comes down to two primary objectives: make the students aware that it exists, and convince them that they need it.

8.4 Conclusion

Recent graduates belong to a demographic that relies on the worldwide web as its source for information on decisions ranging from the latest movies to life-threatening diseases. When making decisions regarding their next steps, recent graduates face an overload of information. Often, this information does not come from a reputable source and may mislead users. The research undertaken in this project found the need for centralized information from a trustworthy source. That information must also be presented in a user-friendly way. Our aid seeks to meet these needs. Its success depends on how well it is implemented, as well as what information and options are available to graduates. Policies like those proposed here could reduce these information and market failures.
Appendix

Table 1 - Attributes that influence graduates’ decision-making process  
Table 2 - Demographic between male and female by their ethnicity 
Table 3 - Demographic between male and female by their majors 
Table 4 - Anova test by gender 
Table 5 - Ranking attributes of importance 
Figure 1 - Preferred transportation based on destination 
Figure 2 - Facebook users 
Figure 3 - Total Facebook User trend 
Figure 4 - Likely Decision Tree 
Figure 5 - Increase in persons per household 
Figure 6 - Archetypes 
Figure 7 - Brooklyn Aid 
Table 6 - List of origins and destinations for the three transportation scenarios 
Table 7 - Results for Scenario 1 
Table 8 - Results for Scenario 2 
Table 9 - Results for Scenario 3 
Figure 8 - Typical decision sequence for selecting utilities 
Table 10 - Monthly utility costs based on who pays the bill/ type of space heating 
Table 11 - Different delivery energy companies in New York City 
Table 12 - Matrix of attributes for selecting electricity/gas supplier 
Figure 9 - Example of Guide Section on Credit Cards 
Table 13 - Characteristics of spenders versus savers 
Figure 10 - Screenshot of the EPA’s Website on Hybrid Tax Credits 
Figure 11 - Screenshot of the IRS Website 
Figure 12 - Example of Food Guide: Meat Consumption 
Figure 13 - Example of Food Guide: Environmental Impact – Meat Consumption 
Figure 14 - Energy requirements for eating in and out 
Figure 15 - Meals Eaten outside the Home (per person per week) 
Figure 16 - Energy input by food product type 
Figure 17 - Eating out review 
Figure 18 - Green vacation locations near New York City
References


Munns, D., & Gerson, E. S. (n.d.). 'Green' credit cards reward the environment. Credit


quickfacts.census.gov/qfd/states/


http://www.dft.gov.uk/pgr/scienceresearch/social/youngaspirations?page=1


for-us-college-students/


address., & purpose., e. w. (n.d.). Nature Conservancy Visa credit card. *The Nature*


