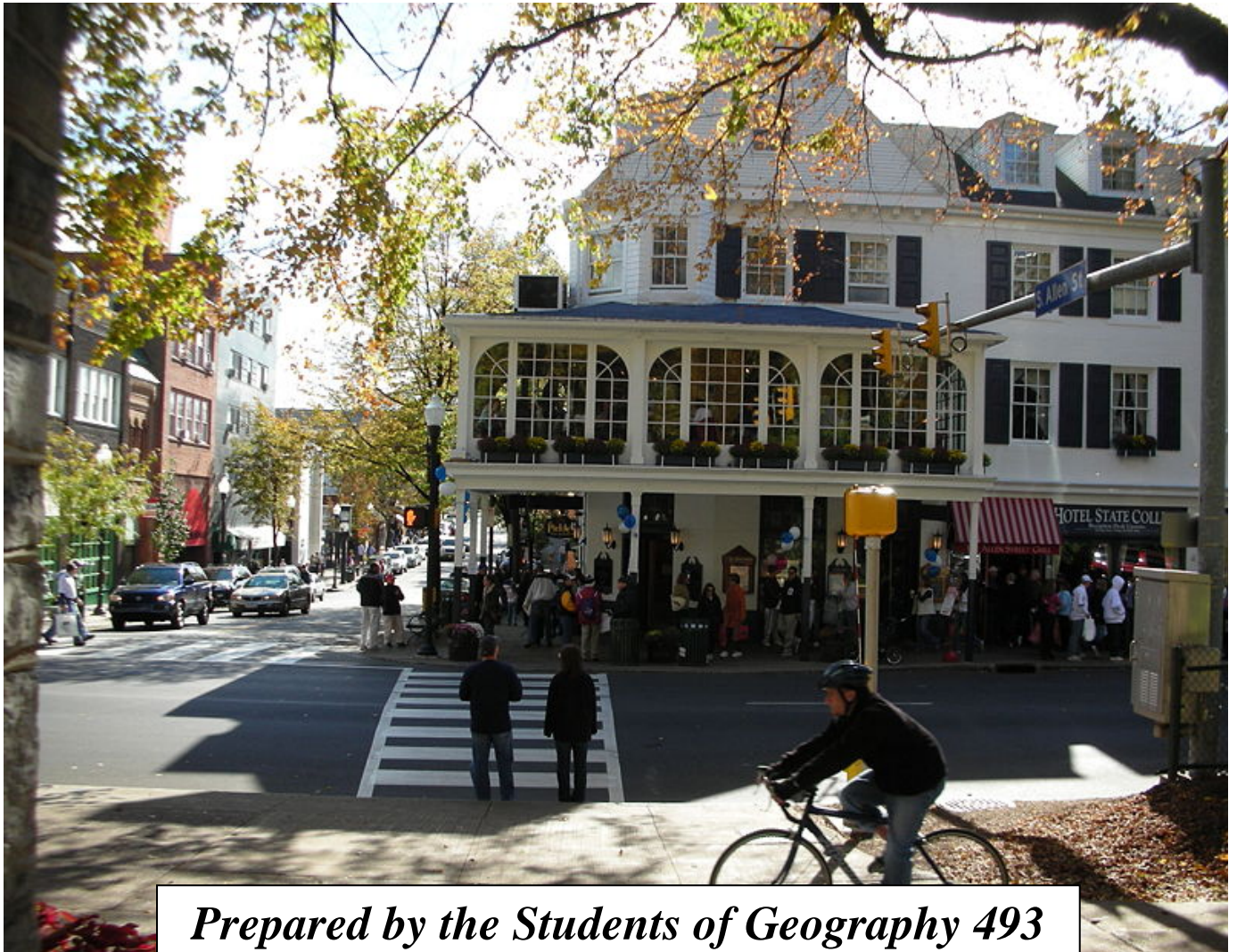


An Action Plan for Greenhouse Gas Mitigation for State College Borough Greenhouse Gas Emissions Reduction Strategies



*Prepared by the Students of Geography 493
Penn State University, December 2007*

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TABLE OF CONTENTS

Foreword	7
Introduction.....	8
Methods.....	9
Transportation Sector	10
Significance.....	10
Driving Forces	10
Action T1: Employ measures to make the Borough more conducive to bicycle use	11
Potential Borough Government Options.....	12
Option T1.1: Increase bike path maintenance on peripheral paths	12
Option T1.2: Create more bike lanes along Waupelani Drive, College Avenue, and Allen Street.....	14
Option T1.3: Keep bike lanes separate from roads.....	16
Option T1.4: Provide more bike racks downtown	18
Option T1.5: Shelter bike racks downtown	20
Potential Borough Community Options.....	22
Option T1.6: Encourage businesses to provide bike racks for customers	22
Option T1.7: Encourage businesses to shelter bike racks from the weather	24
Action T2: Encourage the use of public transportation	26
Potential CATA Options.....	27
Option T2.1: Increase the area served by CATA buses.....	27
Option T2.2: Increase bus frequency to the periphery	28
Option T2.3: Use smaller buses to serve less populated areas	29
Potential Borough Government Options.....	30
Option T2.4: Create transit lanes to ease travel for buses.....	30
Option T2.5: Develop a traffic light system with transit priority	31
Option T2.6: Eliminate car traffic on College Avenue and Beaver Avenue	32
Option T2.7: Begin a trolley service for the downtown area.....	33
Option T2.8: Make bus passes more affordable to the public	34
Option T2.9: Create tax incentives to encourage hybrid taxis.....	35
Action T3: Develop a better system for freight traffic management	36
Potential Borough Government Options.....	37
Option T3.1: Limit delivery vehicles to Calder Way	37
Option T3.2: Restrict deliveries to certain hours	39
Potential Borough Community Options.....	41
Option T3.3: Encourage businesses to use the smallest delivery vehicles possible	41
Option T3.4: Work with the local businesses to create a remote drop off and pick up location for deliveries	42
Action T4: Create parking options that favor carpools, fuel-efficient vehicles, and low emission vehicles	43
Potential Borough Government Options.....	44
Option T4.1: Increase parking for motorcycles and mopeds and/or provide such parking for free.....	44

Option T4.2: Provide free parking for carpool and hybrid cars.....	45
Option T4.3: Change zoning to reduce parking spaces for apartment buildings.....	46
Action T5: Alter traffic dynamics to decrease traffic generated emissions.....	47
Potential Borough Government Options.....	48
Option T5.1: Replace traffic lights with roundabouts	48
Option T5.2: Create a “no motor vehicle zone” downtown during certain times or days.....	49
Option T5.3: Develop a plan to replace some Borough municipal vehicles with hybrids each year.....	50
Potential Borough Community Options.....	51
Option T5.4: Work with other townships to synchronize traffic lights to decrease car idling	51
Energy Sector	52
Significance.....	52
Driving Forces	52
Action E1: Promote energy efficiency and climate change awareness through education and possible behavioral changes	53
Potential Borough Government Options.....	54
Option E1.1: Create an energy and climate change awareness Website that focuses on greenhouse gas reduction	54
Option E1.2: Try to obtain a grant from the Pennsylvania Public Benefit Fund.....	56
Option E1.3: Create a coalition of concerned citizens to discuss energy issues	58
Option E1.4: Propose the introduction of general education “energy” classes within local schools to gain a larger audience for the energy reduction programs	59
Action E2: Promote local government leadership in aiding with energy use reduction.....	60
Potential Borough Government Options.....	61
Option E2.1: Introduce new building codes and regulations to promote and or enforce more efficient lighting	61
Option E2.2: Buy Green Power to run Borough facilities to set a good example for the community	63
Option E2.3: Encourage businesses to increase their use of natural and energy efficient lighting and energy efficient systems	64
Option E2.4: Use energy efficient lighting in public areas and municipality buildings to set a good example.....	66
Action E3: Take steps to solve the landlord-renter property efficiency Conundrum	67
Potential Borough Government Options.....	68
Option E3.1: Require landlords to disclose typical energy use statistics to potential renters.....	68
Option E3.2: Provide subsidies for low or no cost energy saving measures, such as window film and water heater blankets.....	70

Option E3.3: Set renewable energy portfolio standards for rental properties.....	72
Option E3.4: Require energy efficiency standards for rental properties	74
Potential Borough Community Options.....	76
Option E3.5: Work with Penn State Fraternities to develop best practice energy efficiency standards.....	76
Option E3.6: Work with local rental agencies and landlords to establish a board to handle concerns and complaints about rental property energy issues	78
Option E3.7: Encourage realtors with properties located in the periphery to include bus passes in the cost of rent	79
Option E3.8: Encourage landlords to make renters responsible for utility bills	80
Action E4: Recognize local businesses and landlords using green business practices	81
Potential Borough Government Options.....	82
Option E4.1: Create a coalition of green businesses who adhere to fixed environmental standards in their business practices	82
Option E4.2: Provide free advertising to green coalition members on the previously proposed Website.....	84
Option E4.3: Recognize and promote green coalition members with unique window stickers and other identifiers	86
Waste Sector	87
Significance.....	87
Driving Forces	87
Action W1: Reduce State College Borough’s current waste generation	88
Potential Borough Government Options.....	89
Option W1.1: Develop a program to collect and compost organic materials from residential and commercial areas, documenting GHG reductions ..	89
Option W1.2: Replace synthetic chemical fertilizers with organic compost on Borough properties.....	91
Option W1.3: Increase the number of recycling bins on Borough streets and encourage recycling through distinctive signage, thus increasing downtown recycling awareness	93
Option W1.4: Implement a single-string waste pick-up process	95
Option W1.5: Support the implementation of a can and bottle redemption policy at the state level.....	97
Option W1.6: Recycle waste products of Borough building and development projects	99
Option W1.7: Develop a plan to decrease landfill waste from the current level of 48% to near 0%	101
Option W1.8: Enact a fee-schedule charging residents and businesses only for garbage that is picked up.....	103
Option W1.9: Require large event promoters to submit recycling plans and to attend periodic events recycling workshops	105
Potential Borough Community Options.....	107

Option W1.10: Encourage businesses and citizens to separate organic materials from other wastes through a green business recognition program	107
Option W1.11: Discourage the use of garbage disposals	109
Option W1.12: Encourage businesses to reuse woodchips and/or pallets generated as waste for fuel or heat.....	110
Option W1.13: Develop a grant program whereby businesses can obtain consulting to improve waste management practices.....	111
Option W1.14: Encourage county landfill to use aluminum to oxidize waste and sequester hydrogen.....	112
Option W1.15: Develop a program for the recycling and reuse of electronics	113
Option W1.16: Encourage businesses to minimize packing materials used with their products	114
Option W1.17: Develop a program where residents can choose to reduce the amount of junk mail they receive.....	115
Option W1.18: Encourage businesses and residents to buy locally grown foods.....	117
Option W1.19: Encourage businesses to reduce paper use.....	118
Action W2: Purchase and use goods that reduce the populations environmental impact.....	120
Potential Borough Government Options.....	121
Option W2.1: Set all Borough government printers to duplex printing	121
Option W2.2: Require the purchase of office products made from recyclable materials for Borough government operations	123
Option W2.3: Enact a producer responsibility law whereby local businesses are financially responsible for the environmental impact of their products or sales.....	125
Potential Borough Community Options.....	126
Option W2.4: Work with Borough government and local businesses to promote and make available brown paper bags or compostable plastic bags for waste disposal	126
Option W2.5: Discourage the use of plastic bags at grocery and other retail stores	128
Option W2.6: Encourage residents to buy reusable products and reuse them.....	130
Option W2.7: Encourage local businesses to use packing materials for their products that have minimal impact on the environment.....	131
Action W3: Employ liquid waste practices that minimize GHG emissions	132
Potential Borough Government Options.....	133
Option W3.1: Develop a program to promote residential use of high efficiency shower heads, faucet aerators, toilets, or washing machines	133
Option W3.2: Develop a program to promote business use of high efficiency kitchen pre-rinse sprayers, toilets, urinals, washing machines, and power washers.....	135
Option W3.3: Create a Website with information about water conservation	136
Potential Borough Community Options.....	137

Option W3.4: Encourage local businesses and households to install EPA approved WaterSense or automatic faucets	137
Option W3.5: Collaborate with Penn State to enlist student help in educating residents to lower water consumption.	139
Option W3.6: Provide free water conservation consultations for residential homes and commercial businesses.....	140
Option W3.7: Encourage the use of rain collection barrels to irrigate residential lawn and gardens.....	141
Conclusions.....	142

FOREWORD

This report represents a collaborative effort between a course at Penn State and the government and community of the Borough of State College, Pennsylvania. *Geography 493, Service Learning: The Centre County Community Energy Project* is an ongoing course devoted to encouraging residents of Centre County, Pennsylvania to use their energy resources more wisely.

For the last three semesters, the course has focused its efforts on helping the Borough of State College develop a greenhouse gas mitigation plan. In fall 2006, students compiled a greenhouse gas emissions inventory for the Borough, thereby determining the human activities responsible for those emissions and setting a baseline with which to compare future emissions. Spring 2007 saw another group of students conduct focus groups with Borough stakeholders to identify several dozen potential greenhouse gas reduction options. In fall 2007, yet another group of students took the options identified the previous spring and fleshed them out. Their work resulted in this report.

Spring 2008 will see the conclusion of the student work with the Borough. At that time, students will conduct more focus groups at which Borough stakeholders will evaluate the options presented in this report and develop a formal greenhouse gas mitigation plan. The goal of this four-semester sequence is not for the course to dictate and manage the plan, but instead for the students to encourage and facilitate Borough construction and adoption of such a plan.

The course was at least partly successful because the State College Borough Council passed a formal declaration as a climate protection community in August 2007. We hope that this report will complement the declaration and will further the work of the Borough government and residents towards a more sustainable future.

*Brent Yarnal and Howard Greenburg
January 2007*

INTRODUCTION

In August 2007, the State College Borough Council pledged to reduce the emissions of carbon dioxide and other greenhouse gases to 10% below 1990 levels by 2012. The Borough Council also pledged to help the community meet several greenhouse gas and energy efficiency targets by that date. This report details options available to the municipal government and community for reducing emissions from the three activity sectors responsible for most of the Borough's greenhouse gases: transportation, energy, and wastes.

The report follows a set pattern to help readers compare and contrast the many options by sector. Each sector presents a goal aimed at reducing GHG emissions. This goal is followed by several broad actions that could be taken to reach the goal. Under each action is a list of potential options the Borough government and the community could use to implement change. Here is a list of each sector, its goals, and broad actions to meet the goals. Detailed options appear later and make up the bulk of this report.

Transportation Sector

Goal: *To increase public transportation and parking options, as well as policies that discourage emissions from cars, to help State College Borough mitigate greenhouse gas emissions.*

Actions:

1. Employ measures to make the Borough more conducive to bicycle use
2. Encourage the use of public transportation
3. Develop a better system for freight traffic management
4. Create parking options that favor carpools, fuel efficient vehicles, and low emission vehicles
5. Alter traffic dynamics to decrease traffic-generated emissions

Energy Sector

Goal: *To reduce energy use by local government, businesses, and residents and adopt cleaner energy options to help the State College Borough mitigate greenhouse gas emissions.*

Actions:

1. Promote energy efficiency and climate change awareness through education and local government leadership
2. Take steps to solve the landlord-renter property efficiency conundrum
3. Recognize local businesses and landlords using green business practices

Solid and Liquid Waste Sector

Goal: *To reduce community-generated wastes and adopt cleaner ways of managing these wastes to help State College Borough mitigate greenhouse gas emissions.*

Actions:

1. Reduce State College Borough's current waste generation
2. Purchase and use goods that reduce the population's environmental impact
3. Employ liquid waste practices that minimize GHG emissions

Within each of the above actions, several options are possible. The description of each option addresses several topics, including:

Description	An in-depth explanation of the option
Stakeholders	Who would be affected by or concerned with implemented changes
Measures of Success	Ways to measure the success of the implemented change
Pros	Positive attributes of the option
Cons	Negative attributes of the option
Existing Programs	Similar programs or ideas currently in place
Funding	Ways an option could be financed
For More Information	Sources of reference or more information

Through this report, the Borough Council, municipal employees, and community members will have the opportunity to explore a variety of greenhouse gas mitigation options. The report gives all stakeholders an idea of what ideas might work and who might be affected. The ultimate aim of the report is to make it possible for Borough government and the community to develop enlightened mitigation policies.

Methods

To gather the information highlighted in this report, the research team:

- Conducted primary research
- Read documents, journal articles, and reports
- Used the Internet
- Met with local municipal employees
- Emailed local businesses and interest groups
- Presented to community members at open public events to inform Borough residents of this work and to use them as a source of information

TRANSPORTATION SECTOR

Significance

GHG emissions from the transportation sector are estimated to be the largest contributor to overall GHG emissions in the Borough of State College. Reducing emissions from this sector is critical to achieving success in overall GHG emissions reductions. Major ancillary benefits from some of the options presented here are healthier lifestyles and a State College Borough that is a safer and better place for pedestrians and bicyclists. Many of these options are also relatively low cost, having a short payback period or low initial investment towards reducing GHG emissions.

Driving Forces

A negative sign (-) indicates forces that are most likely to reduce GHG emissions either by reducing sector GHG emissions or enhancing GHG sequestration. A plus sign (+) indicates forces that increase GHG emissions, whereas a positive and negative sign (+/-) indicates forces with unknown outcomes.

- (-) Increasing hybrid car ownership
- (+) Decreased pedestrian commuting
- (+) Decreased carpooling
- (+) Increased sports utility vehicle use
- (+/-) Public transit use
- (-) Increased alternate fuel use
- (-) Increased bicycle commuting
- (-) Bicycle rack usage
- (-) Increased motorcycle/moped usage
- (-) Decreased car/truck traffic
- (-) Increased tree plantings

ACTION T1: EMPLOY MEASURES TO MAKE THE BOROUGH MORE CONDUCTIVE TO BICYCLE USE

For State College to see a noticeable reduction in greenhouse gases, it is vital to promote alternative means of transportation. Bicycle use is one of the most environmental friendly ways of transportation because zero greenhouse gas emissions come from riding a bike. This action describes seven options that promote bicycle use in the Borough of State College: five potential Borough government options and two potential Borough community options.

Potential Borough Government Options:

- 1) Increase bike path maintenance
- 2) Create more bike lanes along Waupelani Drive, College Avenue, and Allen Street
- 3) Keep bike lanes separate from roads
- 4) Provide more bike racks downtown
- 5) Shelter bike racks downtown

Potential Borough Community Options:

- 6) Encourage businesses to provide bike racks for customers
- 7) Encourage businesses to shelter bike racks from the weather

Potential Borough Government Options

Option T1.1: Increase bike path maintenance on peripheral paths

Description: Increasing bicycle path maintenance is a key aspect in advancing bicycle use within the State College Borough, which would reduce greenhouse gas emissions from transportation. With increased maintenance on the bicycle paths, not only would this option keep current bike riders satisfied, but more importantly it would also attract those potential bike riders that currently do not travel around town via bicycle. Presently, the Borough does a good job keeping up with the maintenance on the bike paths. All Borough bike paths are swept once during the fall and spring in addition to the winter maintenance (i.e., the paths are plowed after snowfall), which allows the bike rider to travel via the bike paths even during the winter months. However, there is a dilemma because these Borough bike paths also run through the surrounding townships, but do not receive winter maintenance once they are out of the Borough's jurisdiction. Therefore, this strongly prevents numerous people from commuting via bike during the winter months.

Although most of the bike paths are well maintained, there is a need to sweep the paths more often, especially during the fall. Leaves, acorns, and branches on the bike paths create unsafe conditions.

Therefore, this option advocates:

- More frequent sweeping along all bike paths in the Borough during fall months; adopt weekly, biweekly, or monthly sweeping.
- Working with, or put pressure on surrounding townships to adapt winter maintenance along bike paths.

Stakeholders: State College Borough, State College Planning Department, surrounding townships, Centre Region Bicycle Coalition, local bicycle shops, current bike riders, and potential bike riders

Measures of Success: Compare bicycle use on bike paths before increased maintenance with bicycle use along paths after increased maintenance. Calculate the number of bicycle accidents pre-increased maintenance with the number of bicycle accidents post-increased maintenance.

Pros: There would be more bike riders around town and less car traffic. Townships would adopt winter maintenance along bike paths.

Cons: This option would require more time and money spent on bike paths. Residents and businesses along bike paths may view increased bike path maintenance as an annoyance.

Existing Programs: State College bike paths are swept once in the fall and in the spring. Borough bike paths are plowed after snowstorms.

Funding: The Borough could apply for a grant from the Bikes Belong Coalition:
<http://www.bikesbelong.org/grants>

The Borough could apply for a grant from the United States Department of Transportation:
<http://www.fhwa.dot.gov/environment/bikeped/bp-broch.htm#funding>

The Borough could apply for a grant from the League of American Bicyclists:
<http://www.bikeleague.org/programs/bikemonth/grants.php>

For More Information:

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Centre Region Bicycle Coalition: <http://www.centrebike.org/>

Option T1.2: Create more bike lanes along Waupelani Drive, College Avenue, and Allen Street

Description: Waupelani Drive, College Avenue, and Allen are heavily traveled and therefore important sources of greenhouse gases; reducing traffic there and encouraging bicycle use would reduce the Borough's greenhouse gas emissions. College Avenue and Allen Street are two primary streets in the downtown area of the Borough that serve as routes into and out of town. Creating bike lanes along these two streets would help to mitigate the heavy motorized vehicle traffic. Not only would traffic congestion be reduced along these streets, but drivers would be conscious of the bicyclists so slower motorized vehicle speeds would be expected; helping to reduce the number of accidents along these two streets. Along with fewer accidents, would come awareness by drivers that bicycles are vehicles too and they have just as much right to be on the road as cars/trucks do. Constructing a bike lane along Waupelani Drive, which has numerous apartment buildings in the vicinity, would certainly help to attract those potential bike riders that currently feel unsafe riding along non-bike lane roads, and would also give those residents in the area an alternative to riding the bus. With bike lanes along Waupelani Drive and Allen Street, that would provide a direct bike route into and from the heart of downtown State College for residents who live in the Waupelani Drive area of the Borough.

It is very dangerous to ride a bike along College Avenue, which has high traffic levels. Very few bike riders are seen along College Avenue. Allen Street and Waupelani Drive are along bike routes, but they do not have their own bike lanes like Garner Street. The relatively high speed of motorized vehicles along Waupelani discourages potential bike riders.

Therefore, this option advocates:

- Reserving part of the road surface along Waupelani Drive and Allen Street for bicycles only, perhaps by painting an actual dividing line and clearly marking the bike lane
- Creating an actual bike/bus lane along College Ave. (a lane reserved for bikes and buses only; this would reduce car/truck traffic by increasing bicycle use and keeping the CATA buses off the two lanes intended for car/truck traffic)
- Taking away parking spaces along Allen St. to create bike lanes on both sides of the road
- Clearly labeling the bike lanes with fluorescent colors along with necessary warning signs so drivers would be aware of the bicyclists (to preserve the safety of bike riders and properly alert the drivers)

Stakeholders: State College Borough, State College Planning Department, Centre Region Bicycle Coalition, CATA, local bike shops, current bike riders, potential bike riders, downtown businesses

Measures of Success: Compare bicycle use pre-bike lane implementation with bicycle use post-bike lane implementation. The Borough saves money and time because of the reduction in motorized vehicle accidents. The Borough would not have to invest as much money in parking (parking lots, on-street spaces, and parking garages) because increased bicycle use would decrease the need for more parking.

Pros: State College would become a healthier city because of the cutback in greenhouse gas emissions. Downtown businesses see a boost in sales because bike lanes give those with a bicycle as the only means of transportation a safe way into town. Smoother traffic flow through town would reduce driver tensions or road rage.

Cons: More funding would be required to construct the bike lanes. A reduction in parking spaces may upset some State College residents. It may take some time for the drivers to get used to the newly implemented bike lanes.

Existing Programs: The bike lane along Foster Street provides an east-west bike route around town. The bike lanes along Gill and Garner Street provide a north-south bike route into and out of downtown. The idea of a center refuge island for bicyclists at the intersection of Foster and Atherton Street is a possibility for the future.

Funding: The Borough could apply for a grant from the United States Department of Transportation: <http://www.fhwa.dot.gov/environment/bikeped/bp-broch.htm#funding>

The Borough could apply for a grant from the League of American Bicyclists:
<http://www.bikeleague.org/programs/bikemonth/grants.php>

For More Information:

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Centre Region Bicycle Coalition: <http://www.centrebike.org/>

Option T1.3: Keep bike lanes separate from roads

Description: Encouraging bicycle use by providing more bike lanes could decrease the greenhouse gas emissions from the Borough. Although State College on-road bike lanes do provide a path for bikes, they are currently not the most appealing and safest paths for bicyclists. The current off-road bike lanes in State College provide a smoother surface with less debris than the on-road bike lanes; creating a bike lane that is much more appealing to current and potential bike riders. The safety issue is one of the most important factors determining whether bicyclists would commute via bike or some other means of transportation. Obstacles that are harmful, such as dangerous drain grates, debris (sticks, rocks, and moist leaves that get pushed to the side of the road), cans and bottles, and other various objects that find their way to the side of a road, have proven to be a hazard for bicyclists. Therefore if bicyclists determine that an on-road bike lane is not safe, they would most likely not travel along that lane. The problems that riders face along these on-road bike lanes, including safety issues and high-vehicle traffic, create a need for more off-road bike lanes in State College.

Most on-road bike lanes around State College are not as safe as the off-road bike lanes. Numerous drain gates, along with leaves, sticks, acorns, and bottles and cans are seen along the Garner Street on-road bike lane. Although the off-road bike lanes have debris on them (leaves, acorns, and some sticks), the debris is not built up into piles like it is along the on-road bike lanes.

This option advocates:

- Creating more off-road bike lanes wherever space permits
- When constructing new roads in the Borough, preserving enough off-street space for possible off-road bike lanes in the future
- If the two solutions above are not feasible, then increasing maintenance along these on-road bike lanes
 - Clearing the debris that piles up along these paths more frequently
 - Fixing the dangerous drain gates that create a safety hazard for the bicyclists
 - Implementing alternative snow plowing techniques so snow is not accumulated along these on-road bike lanes during winter months

Stakeholders: State College Borough, State College Planning Department, Centre Region Bicycle Coalition, local bike shops, current bike riders, potential bike riders, downtown businesses

Measures of Success: Borough officials could compare bicycle usage before off-road bike lane implementation with bicycle usage after off-road bike lane implementation. Cost savings resulting from fewer accidents or even lawsuits that were caused by dangerous drain gates located along on-road bike lanes. Stronger economic growth downtown due to the greater number of off-road bike lanes.

Pros: More bicyclists would be seen riding around town and less car/truck traffic would be observed. State College Borough would be viewed as a leader in bicycle friendliness in the region, further enhancing the perception of State College as a “green” community. With more

people riding bikes instead of using motorized vehicles, State College would become a healthier community.

Cons: This option would require more funds to construct these off-road bike lanes. The State College Borough government may run into space constraints or zoning laws that prevent bike path construction. Residents or businesses may become upset if an off-road bike lane is constructed on their property or near their property (eminent domain may be necessary, which usually does not sit well with the residents or businesses affected).

Existing Programs: No existing programs were found.

Funding: The Borough could apply for a grant from the Bikes Belong Coalition:
<http://www.bikesbelong.org/grants>

The Borough could apply for a grant from the United States Department of Transportation:
<http://www.fhwa.dot.gov/environment/bikeped/BP-Broch.htm#funding>

The Borough could apply for a grant from the League of American Bicyclists:
<http://www.bikeleague.org/programs/bikemonth/grants.php>

For More Information:

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Centre Region Bicycle Coalition: <http://www.centrebike.org/>

Option T1.4: Provide more bike racks downtown

Description: Making the downtown area of State College more conducive to bike riders would reduce transportation sector greenhouse gas emissions. By providing more bike racks in the downtown area, more bike riders would be inclined to ride their bike instead of using personal automobiles. Action 18 in the Borough's declaration as a climate protection community states "By 2012, as a community, increase the percentage of residents walking, **biking**, or using transit to commute to work by 10% over 2007 levels." Providing more bike racks in the downtown area is one way that the State College Borough government could help the community achieve this goal.

Currently, there are sixty-six bike racks in the downtown area (the area constrained by the roads of Atherton Street, College Avenue, High Street, and Beaver Avenue). Most of the sixty-six bike racks in this area of town were located along the 100 blocks of College and Beaver, and along Allen Street and Pugh Street. This small area of the town alone was home to over half of the bike racks, thirty-nine to be precise. Outside of this core area of town, there were considerably lower amounts of bike racks. To make up for this lack of bike racks, numerous bikes were parked by telephone poles, light poles, piping, and other metal poles. The overwhelmingly majority of bike racks observed were the "post and ring" or hitch-style racks, while there were only two "coat-hanger" style racks. Although the hitch-style racks cost considerably less than the "coat-hanger" style racks, \$100 vs. \$620, the "coat-hanger" racks can park at least six bikes compared to a maximum of two with the hitch-style racks. In addition to accommodating more bikes, the "coat-hanger" style racks from CORA, the Borough's current bike rack provider, are much more solid and heavier than the hitch style; providing the bike rider with greater insurance that his/her bike would not be stolen. It is much easier and attractive to the thief to damage the hitch style racks (leading to stolen bikes) than it is to damage the more massive "coat-hanger" style racks.

When providing bike racks, careful selection of the type and location of bike rack needs to be taken into consideration. Two problems observed were inadequate location and type of bike rack.

This option therefore advocates:

- Providing more bike racks along the 200, 300, and 400 blocks of College and Beaver (20 more along the 200 blocks, 15 more along the 300 blocks, and 10 more along the 400 blocks)
- Providing more bike racks along the side streets other than Allen and Pugh
- Providing bike racks along Calder Way, currently there are no bike racks along this street
- Providing more "coat-hanger" style racks instead of the "post and ring"/hitch style racks, because the "coat-hanger" style racks can hold more bikes and deter potential bike thieves.

Stakeholders: State College Borough, State College Planning Department, Centre Region Bicycle Coalition, local bike shops, current bike riders, potential bike riders, downtown businesses

Measures of Success: Borough officials could compare bicycle use pre-bike rack implementation with post-bike rack implementation bicycle use. Also, Borough officials could

calculate motorized-vehicle use before bike rack implementation with motorized-vehicle use after bike rack implementation. Fewer meter maids need to be employed due to increased bicycle use and decreased motorized vehicle use (cost savings for the Borough). Fewer motorized vehicle accidents would also save the Borough time and money. Fewer bikes are tied to telephone poles, light poles, piping, and other structures that are not bike racks

Pros: The Borough realizes a decrease in traffic build-up; less cars in the downtown area, resulting in a reduction of greenhouse gas emissions. More businesses and apartments in the downtown area stress the importance of bicycle use.

Cons: Would require more funding to provide more bike racks. The larger “coat-hanger” style racks cost considerably more than the “post and ring”/hitch style bike racks. Businesses may disagree with more bike racks in front of their store. Takes away sidewalk space; less room for pedestrians.

Existing Programs: Not applicable

Funding: The Borough could apply for a grant from the Bikes Belong Coalition:
<http://www.bikesbelong.org/grants>

The Borough could apply for a grant from the League of American Bicyclists:
<http://www.bikeleague.org/programs/bikemonth/grants.php>

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Centre Region Bicycle Coalition: <http://www.centrebike.org/>, Cora Bike Rack Company. (2007).
Accessed 10/21/07: <http://www.cora.com/>

Option T1.5: Shelter bike racks downtown

Description: As noted in option T1.4 (providing more bike racks), sheltering bike racks would also help make downtown State College more bike friendly and ultimately reduce greenhouse gas emissions. Providing more bike racks would give bicyclists more places to park their bikes; similarly, sheltering these bike racks would give these bike riders a sense of security that their bike is safe from the weather. Not only do bike riders need more places to park their bike, they need a roof over their vehicle to protect it from inclement weather conditions. As cars and trucks have roofs over their seats that protect them from these adverse weather conditions, unfortunately, bikes do not have the same luxury. This reason alone creates a strong need for sheltered bike racks. The Dero bike rack company offers three styles of bike shelters, the Pocket Shelter which parks 6 bikes, the Aero Shelter which parks 6-12 bikes, and the Kolo Shelter which parks 9-14 bikes. The State College Borough officials could go through and determine which bike rack best suits their needs.

Presently, the only bike racks in the downtown area that are sheltered are located in parking garages. There are no sheltered bike racks along any downtown street in the Borough.

This option advocates:

- Providing at least one sheltered bike rack for every block of College and Beaver Avenue between Atherton Street and High Street
- Providing at least one sheltered bike rack along every side street between Atherton Street and High Street

Stakeholders: State College Borough, State College Planning Department, Centre Region Bicycle Coalition, local bike shops, current bike riders, potential bike riders, downtown businesses

Measures of Success: Borough officials could compare bicycle use between pre-sheltered bike rack implementation and post-sheltered bike rack implementation. Cost savings derived from less bike rack maintenance and damage because of protection from shelters. Downtown businesses see greater profits since implementation of bike shelters.

Pros: Increased bicycle use and decreased motorized vehicle use around town. Smoother traffic flow around town would be expected. There would be less hostility towards the Borough about lack of bicycle accommodations.

Cons: More funding would be required to buy these bike shelters. The shelters would take up considerable room on the sidewalk; there would be less room for pedestrians. May obstruct view and advertisements of businesses and create opposition from business owners.

Existing Programs: The only town found with sheltered bike racks was Ashland, Oregon. There was no description as to how or what they have done to implement their bike shelters.

Funding: The Borough could apply for a grant from the Bikes Belong Coalition:
<http://www.bikesbelong.org/grants>

The Borough could apply for a grant from the League of American Bicyclists:
<http://www.bikeleague.org/programs/bikemonth/grants.php>

For More Information:

Mark A. Whitfield – Public Works Director

State College Borough

Phone: 814-234-7140, mwhitfield@statecollegepa.us

Centre Region Bicycle Coalition: <http://www.centrebike.org/>, Dero Bike Company. (2007).
Accessed 10/21/07: http://www.dero.com/bike_shelters.html

Potential Borough Community Options

Option T1.6: Encourage businesses to provide bike racks for customers

Description: The State College community could get involved with enhancing bicycle use and reducing greenhouse gas emissions by encouraging businesses downtown to provide bike racks for customers. Currently the Borough provides bike racks along the streets of downtown State College, but there are few, if any businesses that provide bike racks. Bike racks provided by the businesses would certainly be helpful because Borough bike racks are frequently occupied. With businesses providing bike racks, it lets the community know that they do care about alternative means of transportation and are taking a proactive step in the fight against global warming.

The community could provide incentives for businesses that do provide bike racks. Such incentives would be recognition as a “green” business on a community run Website and volunteer work by the community for certain “green” businesses. Community members could volunteer their time to do simple tasks for a business because of their effort to reduce greenhouse gas emissions.

Stakeholders: State College community, State College Borough, Centre Region Bicycle Coalition, downtown businesses, local bike shops, bike riders, potential bike riders

Measures of Success: Bicycle use before bike rack implementation could be compared with bicycle use after bike rack implementation. Fewer parking spaces near stores would be occupied by motorized vehicles because of the greater bicycle use. Businesses see an increase in sales because of their “green” actions.

Pros: Less traffic is observed in the downtown area resulting in fewer greenhouse gas emissions. State College would become a healthier community because of increased bicycle use and cleaner air.

Cons: Some businesses may have trouble finding a location for a bike rack near their store. Bike racks may take up sidewalk space, which would irritate pedestrians.

Existing Programs: In Seattle, Washington, the Bicycle Spot Improvement Program (community run) installs bicycle racks in neighborhood business districts to encourage bicycling for short trips and errands.

Funding: The Centre Region Bicycle Coalition could apply for a grant from the Bikes Belong Coalition: <http://www.bikesbelong.org/grants>

The State College community could apply for a grant from the Centre County Community Foundation: http://www.centrecountycf.org/grant_making.htm

For More Information: Seattle Department of Transportation. (2007). Accessed 12/11/07: <http://www.seattle.gov/transportation/bikeracks.htm>, Centre Region Bicycle Coalition: <http://www.centrebike.org/>, Cora Bike Rack Company. (2007). Accessed 10/21/07: <http://www.cora.com/>

Option T1.7: Encourage businesses to shelter bike racks from the weather

Description: While providing bike racks is one step in the right direction towards reducing greenhouse gas emissions, sheltering those bike racks would be another step in the right direction. The State College community could enhance bike use even further by sheltering bike racks. Weather plays an important role on what type of transportation an individual decides to use. With inclement weather conditions, the number of bicycle users almost certainly declines because their bike is not protected. However, this problem could be resolved simply by sheltering bike racks. The community could achieve this goal by encouraging businesses to shelter their bike racks so the customer would feel safe that his bike is protected from unfavorable weather conditions.

Borough government could provide incentives for the businesses to shelter their bike racks. Such incentives would be recognition for promoting bicycle use on a community “green” awareness Website, and community volunteer work for businesses that shelter their bike racks. For example, community members could volunteer their time by constructing the bike shelter.

Stakeholders: State College community, State College Borough, Centre Region Bicycle Coalition, local bike shops, current bike riders, potential bike riders, downtown businesses

Measures of Success: Compare bicycle use pre-bike shelter implementation with post-bike shelter implementation. A reduction in traffic downtown and fewer occupied parking spaces near business would also be two indicators of success. Another would be an increase in sales because of “green” recognition from community. For the community, by achieving this option it may lead to more community involvement and rallies that focus on reducing greenhouse gas emissions

Pros: Less traffic downtown and an increase in bicycle use would reduce State College’s traffic congestion problems and improve the air quality. This option may reduce the number of parking spaces downtown so more room would be provided to satisfy increased bike use, mainly more room for bike shelters. Fewer parking spaces would give the car/truck driver less incentive to drive downtown. Community bicycle users would most likely want to get involved with this, forming a solid base of citizens that care about such issues.

Cons: Bike shelters can take up considerable room that the businesses may not have or room that they may not want to create. Sidewalk space may be taken away making State College a less pedestrian friendly town. Community members who do not use bicycles, and who are the majority of State College residents, would most likely have no interest in achieving this option.

Existing Programs: No existing programs were found.

Funding: The Centre Region Bicycle Coalition could apply for a grant from the Bikes Belong Coalition: <http://www.bikesbelong.org/grants>

The State College community could apply for a grant from the Centre County Community Foundation: http://www.centrecountycf.org/grant_making.htm

For More Information: Centre Region Bicycle Coalition: <http://www.centrebike.org/>, Dero Bike Company. (2007). Accessed 10/21/07: http://www.dero.com/bike_shelters.html

ACTION T2: ENCOURAGE THE USE OF PUBLIC TRANSPORTATION

This action addresses options that increase the efficiency of public transportation. These options are divided into two categories: potential CATA options and potential Borough government options.

Potential CATA Options

- 1) Increase the area served by CATA buses
- 2) Increase bus frequency to the periphery
- 3) Use smaller buses to serve less populated areas

Potential Borough Government Options

- 4) Create transit lanes to ease travel for buses
- 5) Develop a traffic light system with transit priority
- 6) Eliminate car traffic on College Avenue and Beaver Avenue
- 7) Begin a trolley service for the downtown area
- 8) Make bus passes more affordable to the public
- 9) Create tax incentives to encourage hybrid taxis

Potential CATA Options

Option T2.1: Increase the area served by CATA buses

Description: This option advocates creating bus routes that serve additional areas in State College. Additional bus routes would increase the use of public transportation and decrease the number of people who drive cars. Additional routes would give commuters the choice to use public transportation as opposed to driving to work. Additional routes could extend CATA's service area beyond the present State College service area because not everyone that works in State College also lives in there.

Stakeholders: CATA, people who drive cars, downtown business owners, downtown business employees, and Penn State employees

Measures of Success: Success for this option would occur if the new services resulted in sufficient additional revenue to offset costs and led to decreased car use in the Borough.

Pros: Additional service would increase bus use and decrease car use. Penn State and downtown employees and owners would be able to save money on gas and parking by using the bus. Expanded service would provide commuters with more options for riding the bus instead of driving themselves.

Cons: Insufficient ridership may mean new routes or additional offerings on old routes are not cost efficient.

Funding: Funding would have to come from CATA to increase their service.

For More Information:

CATA Bus Line. (2007). Accessed 11/5/07:

<http://www.catabus.com/>

This reference shows CATA's Website

Option T2.2: Increase bus frequency to the periphery

Description: Suggest additional times for bus picks that serve periphery areas. Additional bus frequency may increase the usage of public transportation in areas near the border of State College Borough. Commuters that live farther from downtown may have not considered public transportation due to inconvenient schedule times and lack of service in these areas. Additional schedule times and service would give these commuters more options to take. This option could add more convenience to the public when riding the bus depending on where they live. The steps required to carry out this option are:

- Find additional areas that may use utilize public transportation
- Find where most Penn State employees live
- Identify and analyze the periphery of State College
- Evaluate CATA's current route network
- Evaluate CATA's current bus schedule to these areas.
- Evaluate the cost of additional bus visits.

Other possibilities that could be included in this option would be creating a program that determines the demand of bus service in all areas of State College.

Stakeholders: CATA, people who drive cars, downtown business owners, downtown business employees, and Penn State employees

Measures of success: Success for this option could be determined by measuring if the increased service to additional areas results in additional, revenue for CATA. Also it could be determined if this service would also lead to an increase in bus usage among commuters and a decrease in car usage. In order to be efficient CATA would also have to determine if these extra buses are being completely or partially filled.

Pros: More bus frequency could lead to increase in bus usage and decrease in car traffic. This increased bus usage would also cause increased revenues for CATA. Bus riders would be able to save money on gas. These extra times would provide commuters with more options to take the bus, instead of driving their own car.

Cons: Additional routes and service would increase cost to CATA and use more fuel than normal. Buses need to meet a certain number of passengers to maintain marginal costs in operating additional times. The public must be aware of bus schedules and times especially if changes are being made often.

Existing Programs: Currently CATA employs workers that mainly deal with the benefit of additional routes and service demand. These employees may have already evaluated this option or already decided this option is viable or not.

Funding: Funding would have to come from CATA to increase their service.

For More Information:

CATA Bus Line. (2007). Accessed 11/5/07:

<http://www.catabus.com/>

This reference shows CATA's Website

Option T2.3: Use smaller buses to serve less populated areas

Description: Use smaller buses to transport passengers in less populated areas or in areas where CATA has less business. Determine high and low populated areas by using maps or Borough consensus data. Also evaluate areas that may only have a few customers as oppose to areas that have many using CATA passenger records. These smaller buses may also be used during times of less demand during the year such as holidays or breaks when students are not around. Having smaller buses makes CATA more versatile to the demand of the public transportation market. The steps required to carry out this option are:

- Find cost of current large buses and smaller buses used.
- Find the current amount of smaller buses used by CATA
- Determine if natural gas technology could be used in smaller sized buses.
- Analyze if smaller buses that use petroleum save more money or emit less carbon then larger natural gas buses.

Other possibilities that could be included in this option would be to purchase smaller hybrid buses or smaller natural gas buses.

Stakeholders: CATA, people who drive cars, downtown business owners, downtown business employees, and Penn State employees

Measures of success: Success of this option could be determined if using if cost of smaller buses is less than the cost of using larger buses. CATA would have to determine if smaller buses create less GHG as well. The cost of smaller buses and their fuel consumption would have to be compared to the cost of larger buses and their fuel consumption.

Pros: CATA could save money on fuel, by using smaller lighter transportation. Lighter vehicles may emit less GHG and cost less to CATA. Smaller buses may also be used during times of the year in which less public transportation is needed.

Cons: Using smaller buses may mean using petroleum-fueled vehicles. Currently CATA's larger buses use natural gas and petroleum produces more Carbon dioxide per unit then natural gas. Using more petroleum buses may also decrease CATA's image as a green company. Large capital investments may be needed to add more buses to CATA's fleet. If revenue does not increase, or money is not saved then payback periods on these buses may be significantly longer.

Existing Programs: Currently CATA employs workers that mainly deal with the cost analysis of buses and fuel use. These employees may have already evaluated this option.

Funding: Funding for this option could come from CATA to improve their fleet.

For More Information:

CATA Bus Line. (2007). Accessed 11/5/07:

<http://www.catabus.com/>

This reference shows CATA's Website

Potential Borough Government Options

Option T2.4: Create transit lanes to ease travel for buses

Description: Create additional transit lanes for public transportation and buses in order to increase the flow of traffic. These transit lanes would decrease the amount of traffic build up around the downtown area and any other congested areas in State College Borough. Having transit lanes at most bus stops would function as additional space for buses to load and unload passengers. Multiple buses could wait or use these transit lanes. This would increase traffic flow because buses would spend less time blocking cars behind them. The steps required to carry out this option are:

- Find heavily congested areas of traffic around State college Borough
- Investigate if buses in these areas are loading and unloading using space on the road for traffic
- Find the amount of time these buses spend blocking the road of other vehicles
- Judge if there is sufficient space and right of way to create a transit lane
- Analyze the cost and need to construct a transit lane in that area

Other possibilities that could be included in this option would be the creation of bus lanes commonly found in other cities.

Stakeholders: CATA, people who drive cars, downtown business owners, downtown business employees, and Penn State employees

Measures of success: Traffic at intersections and travel-time decreases resulting from fewer buses blocking the road could be measures of success. Comparing the before and after flow statuses would most likely show a decrease in time waiting on the road. These decreases in time of vehicles on the road to determine the amount of GHGs decreased.

Pros: These transit lanes would result in fewer buses blocking the road allowing more traffic flow. These lanes make it easier for passengers to load and unload buses also making it safer. Lanes are low maintenance and onetime cost.

Cons: Cost of constructing the transit lane may be expensive depending on location and space. Right of way issues in construction area may affect business or be in areas the Borough cannot construct a transit lane. There is no real financial pay back for this option.

Existing Programs: Recently Penn State has constructed two new transits lanes for buses in high traffic areas. Currently most of the bus stops on Beaver Ave have transit lanes. Using information about how Penn State constructed their transit lanes and the efficiency of their transit lanes may help the Borough.

Funding: PENNDOT may fund or support infrastructure improvements.

For More Information:

Penn State Office of Physical Plant (2007) 12/15/07:

<http://www.opp.psu.edu/construction/projects/curtin.cfm>

This reference shows the creation of transit lanes on Penn State's campus

Option T2.5: Develop a traffic light system with transit priority

Description: Use traffic lights to give priority to public transportation to decrease bus travel time. This gives the public incentive to use buses more frequently if they know buses have priority at intersections and travel time is faster than driving. Traffic lights would have to be programmed to know when a bus is coming and give a green light when they are approaching. They would also have to give red lights to other vehicles coming in other directions at those intersections. The traffic lights would also have to recognize buses from other vehicles with transmitters. The steps required to carry out this option are:

- Find out existing traffic light configuration
- Judge if traffic light equipment is sufficient to be programmed for this option
- Analyze the cost and need to replace traffic lights downtown that are not programmable
- Determine if this is enough incentive for passengers to ride the bus

Other possibilities that could be included in this option would be to give priority to emergency vehicles such as ambulance, fire trucks or police vehicles. Also programmable traffic lights could have adjusted sequences for busier times and better traffic flow.

Stakeholders: CATA, people who drive cars, downtown business owners, downtown business employees, and Penn State employees

Measures of Success: Success for this option could be determined if travel time for buses decrease when buses have priority. Also it would be necessary to determine if more passengers ride the bus due to this decrease in travel time.

Pros: People may be more willing to ride the bus if travel time is dramatically reduced. These lights could also give priority to other vehicles that State College would also like to have priority. Buses spend less time on the road, and slightly decrease fuel consumption and GHG emissions.

Cons: Programming traffic lights would take time to get the most efficient traffic light sequence. Priority to buses may make cars wait longer and spend more time on the road. Even if buses have priority they would still have to wait in congested traffic areas before they reach the intersection. Replacing traffic lights maybe be expensive and the Borough would see no financial pay back for this option.

Existing Programs: Currently in State College, some traffic lights are programmable but configuring efficient traffic light sequences takes time and planning. Many traffic lights need to be upgraded to programmable traffic lights in order to carry out this option and the Borough is waiting to phase out currently traffic lights slowly.

Funding: State College could create PENNDOT proposals to update their traffic light technology and programming.

For More Information:

Infotron (2007) Accessed 12/15/07:

<http://www.infotron.com.pl/english/prior.html>

This reference shows currently technology needed for this option

Dailey Collegian (2001) Accessed 12/15/07:

<http://www.collegian.psu.edu/archive/2001/11/11-26-01tdc/11-26-01dnews-8.asp>

This reference shows existing programs similar to this option.

Option T2.6: Eliminate car traffic on College and Beaver Avenue

Description: Eliminate downtown traffic on College and Beaver Avenue in order to encourage the use of public transportation and reduce commuter car traffic. Eliminating downtown traffic may reduce the amount of people who travel and park downtown. If commuters cannot park or travel to the downtown area they may have to use public transportation to get to these places. This could be done as a permanent or hourly policy at the busiest traffic congested times when emissions are the worst. The steps required to carry out this option are:

- Find the effects on local business of eliminating downtown traffic
- Find the feasibility of re-routing traffic outside the downtown area
- What exceptions would have to be made for services or freight vehicles
- Find public opinion of this option

Other possibilities that could be included in this option would be an extension of no traffic to other areas and exceptions to public transportation vehicles.

Stakeholders: Downtown business owners, downtown business employees, municipal employees, planners, and community members

Measures of success: Success of this option could be measured by determining if eliminating downtown traffic causes an increase in public transportation. It would have to be determined if this benefit would outweigh the disadvantages and inconvenience the public would have to endure.

Pros: There may be an increase in public transportation usage. Less cars and traffic in the downtown area causing emissions. With no cars, it would be safer for people to travel in the downtown area. May also increase bicycle transportation. State College could use the areas unused for cars for more businesses or other projects.

Cons: The public may be upset that they are unable to travel directly downtown. This may hurt downtown business and cause inconvenience to consumers. Consumers may travel to other businesses not located in this area. This option may also be too complicated to eliminate traffic for all vehicles. If public transportation does not increase then traffic would be re-routed to other areas and cause increased traffic in those areas around the downtown area.

Existing Programs: Penn State has good examples of eliminating traffic on certain roads and increasing public transportation. Currently Penn State is trying to move all traffic to the outer boundaries of campus. Shortlidge Road is an example of this.

Funding: This is a policy-based option and no funding is needed.

For More Information:

Daily Collegian (2003) Accessed 12/15/07:

<http://www.collegian.psu.edu/archive/2003/01/01-28-03tdc/01-28-03dnews-06.asp>

This reference shows an article on removing traffic from Penn State Campus

Penn State Office of Physical Plant (2007) 12/15/07:

<http://www.opp.psu.edu/construction/viewproj.cfm?project=shortlidge>

This shows the construction of Shortlidge mall after traffic was removed from this road

Option T2.7: Begin a trolley service for the downtown area

Description: Create a trolley service or light rail system that substitutes the use of car travel in the downtown area. If commuters are unable to drive downtown or park in the downtown area, they may have to use public transportation to get there. Creating a trolley system would generate fewer GHGs and could be centrally controlled. This would take cars out of the downtown area and could be safer for pedestrians. This trolley is comparable to larger city transit systems, such as subways or railways. The steps required to carry out this option are:

- Find the effects of eliminating downtown traffic
- Analyze the effect on business downtown
- Find the cost of creating, maintaining and energy need for trolley system
- Analyze the logistics of constructing a trolley system
- Determine public opinion of this option

Other possibilities for this option could be the creation of a trolley system that extends beyond the downtown area or the creation of a subway system.

Stakeholders: Downtown business owners, downtown business employees, municipal employees, planners, and community members

Measures of Success: Success for this option could be measured by determining if eliminating traffic downtown increases public transportation. Determine if the trolley system is useful business owners and people use it often.

Pros: This option would cause a decrease or elimination of traffic around the downtown area. This trolley would provide an easier method for people to travel around or to the downtown area. Fewer cars on the road would decrease emissions and offer a safer environment for pedestrians. State College could charge a fee to use this trolley system and eventually pay back their investment.

Cons: Public may be upset that they are unable to travel directly downtown, and this may hurt downtown business. A sophisticated trolley system may be capital intensive and the public may be upset to pay a trolley fee. This type of transportation system may be more suitable for larger towns and cities. Depending on the energy sources of this trolley system, attempts of reducing green house gases may be nullified by the use of electricity.

Existing Programs: Other cities and towns use transportation systems that have proven to be successful, such as subways and rail systems. Typically these cities have a higher population than State College.

Funding: Funding for this option would have to come from State College Borough or a private transportation company with permission from State College.

For More Information: Not Applicable

Option T2.8: Make bus passes more affordable to the public

Description: Find ways to make bus passes cheaper and more affordable to the public. Cheaper prices may encourage more people to buy bus passes. This would increase the amount of people using public transportation and reduce the number of cars on the road. State College could target areas or groups of people that drive to work every day in either the downtown area or to Penn State. If these commuters are going to be driving to work and leaving work at the same time everyday they may benefit from using the bus. State College could subsidize bus passes using tax money or CATA could reduce its prices from additional revenue generated from increased bus usage. A combination of these two funding options may be best for this option. The steps required to carry out this option are:

- Find areas that may use public transportation more than others
- Determine the process of bus pass pricing
- Examine cost CATA has to cover in order to operate
- Examine the maximum discount affordable
- Use experimental areas and experimental rates

Other possibilities that could be included in this option would be free bus passes provided by the borough, free bus passed provided by business to their employee or bus passes included in the cost of living in residential housing to students far from campus.

Stakeholders: Downtown business owners, downtown business employees, municipality of State College Borough, community, Penn State employees, Penn State students

Measures of Success: The success of this option would be determined by finding if cheaper passes lead to increased public Transportation. CATA would also have to determine if additional revenue from these bus passes could results in reduced bus pass prices. Additional cuts in price may lead to additional increases in bus usage. If bus passes are offered to employees, then success could also be measured by the reduced number of employees driving to work.

Pros: There would be an increase in use of public transportation and fewer cars on the road. CATA would be able to increase its operating budget if more funds are coming in. CATA would also be able to make more profit if this program attracts more customers. Commuters would save money from less gasoline. If more employees take the bus, there would be less of a need for parking spaces in the downtown area and on campus. Commuters would not have to purchase permits for parking on campus or in the downtown area.

Cons: The possibility that people do not purchase enough passes to cover the cost of offering the buses pass would hurt CATA revenue. There would be large cost to the Borough associated with funding the cheaper passes. The Borough would never get this cost back to them.

Existing Programs: Currently there are programs that discount bus passes for Penn State employees if they do not buy a parking pass or drive to work. Public works of State College is working on an experimental plan to give discounted bus passes to target areas in State College to determine if cheaper bus passes lead to more use of public transportation.

Funding: Funding for this options could come from PENNDOT proposals for experimental programs, from Penn State for passes to employees, from State College Borough and from CATA.

For More Information:

Penn State Discounts (2007) Accessed 12/15/07:

www.ohr.psu.edu/discounts/categories/transportation.htm

This reference shows a current program that discounts bus passes for full time penn state employees.

Option T2.9: Create tax incentives to encourage hybrid taxis

Description: Encourage the use of hybrid taxi cab services downtown using tax incentives. Whenever a taxi company purchases a new car, State College could offer a tax incentive or subsidy of some kind to reduce the cost of hybrid vehicles. Using a taxi is an alternative to those who would rather not wait for a bus or need door-to-door transportation. Taxi companies could lead the way by providing a good example of using Hybrid vehicles and receive tax incentives from the borough to cover extra cost of using hybrid cars. Currently if all taxis were hybrid the amount of emissions produced by them would be decreased by about half the amount. The amount of the tax incentive would depend on the difference in cost. If this program is successful it could an experimental step towards offering this tax incentive to current State College Borough residents. The steps required to carry out this option are:

- Find the cost of current hybrid taxis versus non hybrid taxis in State College
- Determine the amount of taxi cabs in State College
- Determine the amount of time needed to phase out all taxi cabs in State College
- Meet with taxi cab companies to gage their responses
- Find the amount, that the Borough would be able to provide in a tax incentive
- Encourage passengers to use Hybrid taxi services as opposed to non-hybrid taxi services

Other possibilities that could be included in this option would be the creation of a law to require hybrid vehicles of all taxi cab companies or a low interest loan for the purchase of any hybrid vehicle in State College.

Stakeholders: CATA, Taxi companies

Measures of Success: if this incentive were offered to companies, the number of hybrid vehicles would determine success. State College could also try to determine if this decreases regular car usage and measure by how much. As a secondary effect also determine if the total amount of hybrid cars in State College is increasing and if hybrid sales are increasing.

Pros: Hybrid cars produce less emissions then petroleum-fueled cars by about half. Taxi companies would also spend less money on gasoline, increasing their profit and reducing their cost. Cost of gasoline has being rising consistently every year and this is cutting into profits. Taxi companies would be able to charge more or less than regular rates as oppose to increasing rates due to higher gas prices. Taxi cars would also be able to drive twice as much as they usually would and could double their revenue. The effect of more hybrid taxi cars may also encourage other consumers to buy and use hybrid cars. This would give a positive green image to the Borough and again decrease more emissions. Also reference other hybrid options in this report for more Pros, such as specialized parking.

Cons: Using hybrid cars may have longer pay back periods and require larger capital investments. The Borough may not be able fund tax incentives because they may be too costly and not within the budget. Also if the Borough funding this tax incentive, they would not see money in return for this costs. If gasoline priced stop increasing or decided to decrease then the profit and benefits of higher gas prices would diminish accordingly. Hybrid vehicles cost more

and maintenance may be harder to find or may be more expensive than normal petroleum vehicles. The hybrid industry is still new and is not as sophisticated as gasoline cars yet.

Existing Programs: Currently the Borough and Penn State are heading towards using more hybrid vehicles but this is a slow process, due to the phasing out of older non-hybrid vehicles that are still in good conditions. Within 5 to 10 years, all taxis in New York City will be hybrid vehicles. New York is considered to have one of the largest taxi markets in the world.

Funding: Funding for this option could come from Penn State for their own use of hybrid cars or State College Borough and other possible government establishments that would involve the use of hybrid car tax incentives.

For More Information:

The auto channel (2006) Accessed 12/15/07:

www.theautochannel.com/news/2006/04/20/004462.html

This reference shows current information on hybrid technology

ACTION T3: DEVELOP A BETTER SYSTEM FOR FREIGHT TRAFFIC MANAGEMENT

Freight traffic is a common problem in downtown areas of cities, and State College is no exception. Freight vehicles could cause significant congestion leading to car idling, which results in more greenhouse gas emissions. This action item addresses the numerous delivery vehicles that cause this congestion in State College. The action describes four options that promote alternative methods of managing delivery vehicle traffic—two aimed at the Borough government and two at the community.

Potential Borough Government Options:

- 1) Limit delivery vehicles to Calder Way
- 2) Restrict deliveries to certain hours

Potential Borough Community Options:

- 3) Encourage businesses to use the smallest delivery vehicles possible
- 4) Work with the local businesses to create a remote drop off and pick up location for deliveries

Potential Borough Government Options

Option T3.1: Limit delivery vehicles to Calder Way

Description: Freight vehicles around any downtown can certainly be obstacles that slow traffic, but with State College's heavily occupied, narrow streets this issue is sometimes acute. With more traffic come more carbon dioxide emissions and a decrease in the overall quality of State College's environment. Aside from the traffic issues that arise from poor freight vehicle management around town, these bulky vehicles have a low fuel economy, which makes fuel use and greenhouse gas emissions relatively high per vehicle and per vehicle mile traveled. While the low fuel economy of freight vehicles is an important issue, the objective of this option is to direct all delivery vehicles to Calder Way. Although the loading zones on College and Beaver Avenue seem to work well, there are few loading zones on the side streets and none along the busy Atherton Street. Parked delivery vehicles along these side streets and most notably Atherton Street can cause heavy traffic build-up, which is the main reason why these delivery vehicles need to be directed to Calder Way, an alley that receives very low levels of traffic.

The loading zones seem to be working well, so keep the existing loading zones. Although not the objective of this option, more loading zones along College and Beaver Avenue are a possibility. One of the managers of a downtown business explained that other delivery vehicles frequently occupy the loading zone on College Avenue near his store, so his delivery vehicles instead park on Hiester Street, where there is no loading zone. Most businesses use Calder Way when adjacent loading zones on College or Beaver Avenue are occupied, but there still are some that do not.

A delivery vehicle parked in front of the Atherton Hotel along the right hand lane of Atherton Street caused considerable traffic buildup. The two lanes of westbound traffic along Atherton Street were turned into one lane because of this delivery vehicle. Traffic along the right lane virtually came to a stop because they had to wait for an opportunity to change lanes.

This option advocates:

- Requiring downtown businesses to direct delivery vehicles to Calder Way when loading zones are occupied or providing incentives for businesses to use Calder Way for their deliveries
- Making Calder Way more conducive to delivery trucks
- Strictly enforcing Atherton Street as a no delivery zone

Stakeholders: State College Borough, State College Planning Department (most notably transportation planners), downtown businesses, State College community

Measures of Success: Less traffic is observed downtown as a result of better delivery vehicle management. Fewer delivery trucks are parked along side streets, while more are parked along Calder Way. A reduction in accidents along Atherton Street, and College and Beaver Avenues due to increase visibility (less freight vehicles obstructing the driver's view) would save the Borough time and money.

Pros: A reduction in traffic downtown would result in less greenhouse gas emissions, mainly carbon dioxide. A decrease in these greenhouse gas emissions would make State College a

healthier community. Less traffic would also result in a more pedestrian and bicycle friendly community.

Cons: Businesses may not want to alter their current delivery vehicle parking location. More funding would probably be required from the State College Borough to provide incentives for the businesses to change the location of their deliveries.

Existing Programs: The North Central Texas Council of Governments has created a Diesel Freight Vehicle Idle Reduction Program. This program uses eligible federal funds in public/private partnerships to make capital improvements to the region's goods movement infrastructure.

Funding: The Borough could apply for a grant at: <http://www07.grants.gov/index.jsp>
The United States Department of Transportation and Environmental Protection Agency Websites were searched, but none of their respective grants specifically addressed freight vehicle management. Most funding would probably need to come from the borough.

For More Information:

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The North Central Texas Council of Governments. (2007). Accessed 12/11/07:
<http://www.nctcog.org/trans/goods/idling/>

Option T3.2: Restrict deliveries to certain hours

Description: While traffic congestion during certain times of the day is bad, traffic congestion throughout the course of the day is even worse. Deliveries, which are usually not received on a set schedule, are the reason why traffic can be so bad during off hours (non-rush hours). Currently, the State College Borough does not restrict the deliveries of downtown businesses to certain hours of the day. With deliveries only permitted at certain times of the day, a freight traffic reduction would be expected during the non-delivery hours, while breaking the pattern of continuous delivery vehicles throughout the day. This system of freight traffic management would be more efficient than the current “come-as-you-please” pattern. Most importantly, State College traffic would only be congested at certain times of the day instead of the entire day, creating a public awareness of bad and good traffic hours. This would ultimately result in cars spending a lesser amount of time on the downtown roads and emitting a lesser amount of carbon dioxide than before.

The majority of business managers in the Borough do not receive deliveries on a set schedule. The timing of the delivery depended on the need of the delivery, basically meaning that deliveries were received whenever they needed more of a certain product. The majority of managers said they would consider restricting deliveries to certain hours of the day if the State College Borough would provide them with some incentives, such as free advertising for example.

- Restrict deliveries to later in the night (9-11pm), early morning (4-7am), or during midday (10am-2pm) or whatever hours seeming to have the lowest amount of traffic on the road so there would be less interference between the regular traffic and delivery traffic
- Provide incentives for the downtown businesses so they would be more willing to adopt this option

Stakeholders: State College Borough, State College Planning Department (most notably transportation planners), downtown businesses, State College community

Measures of Success: Calculate traffic congestion before the implementation of restricted delivery hours with traffic congestion after the implementation of restricted delivery hours. Measuring the accidents pre-implementation with post-implementation would certainly be an indicator of success for safety reasons and cost savings.

Pros: Less traffic congestion would result in less greenhouse gas emissions, making State College a healthier environment to live in. Downtown businesses see a greater profit while making State College better economically.

Cons: Many businesses may be unwilling to cooperate with this option. Restricting deliveries to certain hours may hurt some businesses that need immediate deliveries, resulting in a shortage of products for a brief time.

Existing Programs: No existing programs were found.

Funding: The Borough could apply for a grant at: <http://www07.grants.gov/index.jsp>

Most funding would probably need to come from the Borough.

For More Information:

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Potential Borough Community Options

Option T3.3: Encourage businesses to use the smallest delivery vehicles possible

Description: While the government will need to play a big role to reduce greenhouse gases in State College, the community will also need to play a considerable role. For a noticeable cutback in greenhouse gas emissions, the government and the community will need to be active in their respective options. All too often large, expansive delivery vehicles are used when a smaller delivery vehicle would be better suited for the size of the load. These smaller delivery vehicles are friendlier towards the environment because they are more fuel-efficient and have lower emissions than the bigger delivery vehicles. With pressure from the community, these businesses may be willing to alter their delivery vehicle depending upon the size of the load. The greater the number of community members that are concerned about this issue, the more likely these businesses would be to change their delivery vehicle size.

While some businesses do vary their delivery truck size depending upon the load, some do not. From talking to businesses downtown, half said they changed delivery vehicle size and half said they always used the same size delivery vehicle. A common delivery vehicle seemed to be a UPS truck.

- Provide community incentives, such as creating a Website that notifies the public that a certain business practices in a “green” way by varying delivery vehicle size
- Give ways that the business would benefit from adopting this action (increase in number of customers because of “green” recognition, more customers may encourage the owner to invest in more “green” practices)

Stakeholders: State College community, downtown businesses

Measures of Success: Calculate the average size of delivery vehicles from one year to the next to see if there is a reduction.

Pros: The State College Borough might take the voice of the community more seriously if they observed changes. With smaller delivery vehicles, there would be fewer greenhouse gas emissions. This movement might serve as a way for the community to rally together and become closer.

Cons: Businesses may not be willing to change the size of their delivery vehicles. The community does not have the power of the government to enforce this option; therefore the business owners and managers may not take the community’s voice seriously.

Existing Programs: No existing programs were found.

Funding: The State College community could apply for a grant from the Centre County Community Foundation: http://www.centrecountycf.org/grant_making.htm

For More Information: Talk to the downtown businesses to learn more about their delivery vehicle size. Other than the information given by the downtown businesses, the remaining information put forth in this option came from the knowledge of the author.

Option T3.4: Work with the local businesses to create a remote drop off and pick up location for deliveries

Description: Reduce freight-generated traffic emissions by creating a remote drop off and pick up location for deliveries. By having a drop off and pick up location outside of the downtown area of State College or in a less crowded area of downtown State College, this would certainly help to alleviate some of the traffic resulting from large delivery trucks. Besides from alleviating the traffic issues, by staying out of the downtown area there would be less greenhouse gas emissions from these delivery vehicles. The State College community could help achieve this goal by encouraging businesses and by making them aware of their impact upon the environment.

Currently, there are no remote drop off and pick up delivery locations in the Borough or near the Borough. All of the downtown businesses receive deliveries within close proximity of their business.

- Provide community incentives for the businesses, such as creating a Website that makes the public aware of businesses that adopt this option
- Encourage the businesses by making them aware of the potential ways their business could benefit from adopting such an option (“green” recognition throughout the State College community, possible increase in sales because of this recognition)

Stakeholders: State College Community, State College Planning Department, State College Borough, downtown businesses

Measures of Success: Businesses see an increase in sales because of this recognition from the community. This increase in number of sales gives businesses extra money to invest in “green” technology. Less traffic congestion is seen downtown because delivery vehicles are at a remote location.

Pros: Downtown State College sees a cutback in greenhouse gas emissions, making it a healthier environment to live in. Fewer accidents are reported because of increased visibility that resulted from less delivery vehicles.

Cons: Downtown businesses may be unwilling to change the location of their drop off and pick up delivery location. A remote drop off and pick up delivery location would need to be created, it may require considerable funding from the community.

Existing Programs: No existing programs were found.

Funding: The State College community could apply for a grant from the Centre County Community Foundation: http://www.centrecountycf.org/grant_making.htm

For More Information:

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ACTION T4: CREATE PARKING OPTIONS THAT FAVOR CARPOOLS, FUEL-EFFICIENT VEHICLES, AND LOW EMISSION VEHICLES

Creating parking options that fuel-efficient and low-emission vehicles would encourage people to purchase and drive those kinds of vehicles, thereby helping to reduce greenhouse gas emissions. Additionally, carpooling could help to reduce overall traffic volume and congestion in the Borough, again reducing greenhouse gas emissions.

Potential Borough Government Options:

- 1) Increase parking for motorcycles and mopeds and/or provide such parking for free
- 2) Provide free parking for carpool and hybrid cars
- 3) Change zoning to reduce parking spaces for apartment buildings

Potential Borough Government Options

Option T4.1: Increase parking for motorcycles and mopeds and/or provide such parking for free

Description: Replacing existing street-side and garage parking spaces that are presently reserved for cars with free spaces reserved for motorcycles and mopeds would encourage use of those more fuel-efficient vehicles, which would reduce greenhouse gas emissions. Currently, there are only approximately a half dozen spaces reserved for motorcycles and mopeds downtown, with each space allowing up to six motorcycles/mopeds to park. If this number were to be increased and the new spaces were to be placed in strategic downtown locations, it would discourage motorists from using cars if they have a motorcycle or moped. Limiting parking spaces for cars might also encourage carpooling. Success of this option could be greater if the motorcycle/moped spaces were free.

Stakeholders: Motorists (both motorcyclists, and car drivers), State College Borough Planning Commission (decide where and how many spaces to convert), municipalities (control of land-use planning and zoning/site design), businesses (employees need to park; customers would need to park further).

Measures of Success: Calculate the decrease in the number of cars downtown. This decrease translates to a reduction in GHG emissions simply due to a fewer number of cars on the road. Calculating the number of increasing motorcyclists could also be a gauge of how many people are encouraged by the effort to increase and/or provide free parking for motorcycles/mopeds.

Pros: GHG emissions would be reduced as well as traffic congestion.

Cons: Spaces for visitors (especially on football weekends) would decrease. Income from parking would be forfeited if the new motorcycle/moped spaces were free.

Existing Programs: None found.

Funding: There is no real initial cost in turning spaces into motorcycle/moped parking, but since the spaces being converted would mean lost revenue, revenues generated from parking fines and other traffic-related income could help to offset that loss.

For More Information:

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Option T4.2: Provide free parking for carpool and hybrid cars

Description: People that carpool or own a hybrid vehicle would get free parking (both street side and in garages). This would encourage people to carpool and give more incentive for people who are currently on the market to buy a new car to purchase a hybrid one. Carpooling would decrease overall traffic due to fewer cars on the streets thus leading to less traffic congestion and less GHG emissions and more hybrid cars would decrease overall GHG emissions as well. Alternatively, instead of free parking being provided, premium parking could be an option for carpool and hybrid cars. This would still encourage people to carpool and drive a hybrid vehicle, especially if there are many vehicles looking for parking on a particular day (i.e. football weekends) and the Borough would not relinquish any revenues from providing parking spaces.

Stakeholders: Motorists, State College Borough Planning Commission (responsible for parking revenues).

Measures of Success: Calculate the decrease in the number of cars downtown; calculate the increase in the number of hybrid vehicle purchases. Both of these measures would correspond to a decrease in GHG emissions not only due to less overall emission, but also due to less congestion on the roads.

Pros: This would decrease vehicles on the road and increase hybrid vehicle ownership. The decrease in standard combustion engine vehicles would decrease overall GHG emissions.

Cons: The revenue generated through parking would be lost (except for the premium parking alternative). This could also be difficult to enforce; how would the Borough identify a parked vehicle as being a carpool vehicle or not?

Existing Programs: Cities such as San Jose, Los Angeles, Albuquerque, and New Haven have all implemented city-wide legislation declaring that street side metered parking is free for hybrid and alternative fuel vehicles. These are enforced by having the motorists of such vehicles obtain a registration sticker from a municipal building and displaying it on the vehicle. No programs concerning carpool vehicles were found.

Funding: As with option 1, there is no real funding needed to convert one parking space into a different kind of parking space, but since the spaces being converted would mean lost revenue that is used typically to run and maintain parking garages and street-side parking, revenues generated from parking fines and other traffic related income could help to offset that sacrifice.

For More Information:

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Option T4.3: Change zoning to reduce parking spaces for apartment buildings

Description: The majority of parking spaces available downtown are overwhelmingly owned by private businesses, mostly to rental agencies for apartment buildings. If the municipality could change the zoning laws so that they could be in possession of the property reserved for apartment parking, they could open up a number of options, which would help to reduce emissions. Some of those options are to eliminate the parking spaces altogether, or to use that space to help implement options one and two of action four. Then the Borough could provide free or premium parking to motorcycles/mopeds and/or carpoolers and hybrid vehicle owners without losing any current revenues. Additionally, people who live downtown would be more obligated to commute via an alternative method of transportation if their personal vehicles are located further from their residences. This would probably not be a welcome change for the downtown residents.

Stakeholders: Municipality, State College Borough Planning Commission, businesses who own parking spaces, motorists.

Measures of Success: Calculate the decrease in the number of vehicles downtown if parking is eliminated completely. For the other alternatives, calculate the increase in people who carpool, use motorcycles/mopeds, and/or buy hybrid vehicles. Both of these measures would decrease overall GHG emissions due to either fewer vehicles on the road, or an increase in carpooling or alternative/hybrid transportation.

Pros: Vehicles on the road would decrease if people were obligated to use an alternative method of transportation due to their vehicles being located further away. Also, revenues will not decrease if parking spaces are converted to free or premium spaces for motorcycles/mopeds or hybrids and carpools.

Cons: Businesses that own the spaces would not be content relinquishing property that they own and generate revenue from. If the parking spots are kept and turned into free or alternative parking, the overall number of parking downtown would increase which may encourage people to drive downtown. Turning the spaces into free or premium spaces for carpoolers would also be hard to enforce; how would the Borough identify a parked vehicle as being a carpool vehicle or not?

Existing Programs: None found.

Funding: Not Applicable; this option does not depend on funds so much as it depends on the cooperation of the private businesses as well as public opinion.

For More Information:

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ACTION T5: ALTER TRAFFIC DYNAMICS TO DECREASE TRAFFIC GENERATED EMISSIONS

Altering traffic dynamics can be an effective way to decrease traffic generated emissions because it can improve traffic flow, decrease congestion, and reduce idling of motor vehicles. Additionally, it can be safer and more pleasant for non-motorists. Three potential Borough government options and one potential Borough community options are addressed here.

Potential Borough Government Options:

- 1) Replace traffic lights with roundabouts
- 2) Create a “no motor vehicle zone” downtown during certain times or days
- 3) Develop a plan to replace some Borough municipal vehicles with hybrids each year

Potential Borough Community Options:

- 4) Work with other townships to synchronize traffic lights in order to decrease car idling

Potential Borough Government Options

Option T5.1: Replace traffic lights with roundabouts

Description: Replacing traffic lights with roundabouts could eliminate vehicles from stopping completely, which reduces vehicle idling and acceleration, both of which contribute to GHG emissions. This also increases general traffic flow, which could help pedestrians and bicyclists. However, the roundabouts need to be of a specific minimum diameter or accidents could increase. So there needs to be a significant amount of space available to implement these roundabouts. As a related option, jug handles could also be implemented to reduce idling times and vehicle acceleration.

Stakeholders: Motorists, pedestrians, bicyclists, State College Borough Planning Commission, municipalities.

Measures of Success: Calculate the decrease in the amount of time any one vehicle spends on that specific road due to the elimination of traffic lights. The less time a vehicle spends on the road, the fewer emissions.

Pros: Overall GHG emissions would be reduced by decreasing traffic congestion, and reducing vehicle idling times and acceleration. Another benefit of better traffic flow would be a safer environment for pedestrians and bicyclists.

Cons: It could be expensive to construct a roundabout and considerable space is needed for an appropriate size roundabout to be put in place. Also, the new traffic patterns could cause confusion for people in the road, but as long as drivers are alerted to the new traffic patterns appropriately, this concern could be alleviated.

Existing Programs: Roundabouts, as well as traffic jug handles, have been implemented successfully in numerous other cities domestically and overseas.

Funding: PENNDOT could be a viable candidate for funding the construction of roundabouts and/or jug handles because they would be interested in their effectiveness.

For More Information:

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Option T5.2: Create a “no motor vehicle zone” downtown during certain times or days

Description: A “no motor vehicle zone” downtown during specific times or days would discourage motorists from using the vehicles if unnecessary. This has been effective in eliminating traffic on Pollock Rd. in front of the HUB Robeson Center on campus. This also encourages the use of bicycles and alternative transportation. The eliminated traffic decreases overall GHG emissions and makes the road safer for pedestrians and bicyclists. This could, however, be inconvenient for people who are employed downtown within these “no motor vehicle zones” and may negatively impact the amount of people who go to businesses downtown that would lay within these “no motor vehicle zones.” Another inconvenience this may cause is to shipping and delivery trucks, which require close proximity to the places they are servicing.

Stakeholders: Motorists, State College Planning Commission, pedestrians, downtown businesses.

Measures of Success: Calculate the decrease in the number of cars due to the “no motor vehicle zone.” Also, a decrease in the number of motor vehicles could lead to an increase in the number of people utilizing alternative transportation, so that is likely to increase.

Pros: There is no implementation cost since nothing needs to be replaced or constructed. Due to the increase in alternative transportation use, there would be a decrease in overall traffic, and GHG emissions.

Cons: Could negatively impact the businesses that lie within the “no motor vehicle zones” both in terms of limiting the number of customers and in terms of inflexibility for shipping and deliveries. Motorists may also be inconveniences as well. Additionally, revenues generated from parking meters would be forfeited in the “no motor vehicle zone” during the implemented hours.

Existing Programs: Penn State University currently has a no motor vehicle zone on Pollock Rd during daytime hours (from 7am to 4pm). While this is an inconvenience for people who want access to the core campus or just need to do a pick up/drop off, it does make the road safer for non-motorists and reduces GHG emissions.

Funding: There is no cost to creating a “no motor vehicle zone”, although the revenues generated from parking during the zone hours would mean lost revenue that is used typically to run and maintain parking garages and street-side parking, revenues generated from parking fines and other traffic related income could help to offset that sacrifice.

For More Information:

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Option T5.3: Develop a plan to replace some Borough municipal vehicles with hybrids each year

Description: As all Borough municipal vehicles would eventually need to be replaced, replacing them with fuel efficient hybrid vehicles would be more environmentally friendly as well as money saving in the long run, especially with rising fuel prices. This would set a good example for the community and also should not be too costly to implement because the borough is simply replacing vehicles that need to be replaced anyway. Additionally, the premium of purchasing a hybrid vehicle over a standard combustion engine vehicle is declining.

Stakeholders: Municipality, Borough employees who drive the Borough owned vehicles.

Measures of Success: Calculate fuel savings of owning a fleet of hybrid vehicles over time versus a fleet of standard combustion engine vehicles. Replacing standard combustion engine cars with hybrid cars is a decrease in GHG emissions.

Pros: Money spent on fueling the fleet would decrease. Also, there would be a decline in overall GHG emissions by the Borough fleet. Having an entire fleet of hybrid vehicles would also set a very good example for community.

Cons: Hybrids may cost more than a standard combustion engine vehicle of the same class initially, but fuel savings over time could negate this, and hybrid cost premiums would eventually become negligible. This option may not have a great environmental impact until the majority of the fleet is converted into hybrids.

Existing Programs: CATA currently runs a fleet largely comprised of buses running on natural gas and is even retrofitting some of those to run on hydrogen. While not exactly a hybrid vehicle, it demonstrates that a transportation organization is capable of switching its fleet to a vehicle, which is more environmentally friendly with success.

Funding: The cost to implement this option should not be too difficult to cover presently because there should already be funding allotted to replacing vehicles, and the fuel cost savings over time should offset any current premiums of buying a hybrid vehicle over a standard combustion engine vehicle.

For More Information:

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Potential Borough Community Options

Option T5.4: Work with other townships to synchronize traffic lights to decrease car idling

Description: The execution of this option lies primarily with the municipality to communicate with other municipalities, but the community citizens have an important role by showing the government that they want to work with the other municipalities in achieving GHG emission reductions. Synchronizing traffic lights is an efficient way of decreasing idling and vehicle acceleration (both of which contribute to GHG emissions) by having vehicles stop less on the road. This could also help to decrease traffic congestion during peak traffic hours and make it safer for pedestrians and bicyclists on the road as well. The difficulty with this is that the success of this option depends not only on State College Borough, but the other township municipalities as well. However, the implementation of this option could be low cost if the traffic lights do not need to be replaced in order to be synched, it would only be a matter of programming them appropriately.

Stakeholders: State College Borough municipality, other municipalities, motorists, pedestrians, and bicyclists.

Measures of Success: Getting the Borough to collaborate with other townships in reducing GHG emissions would be a success by itself. Calculating the decrease in time any single vehicle spends stopped on a street and multiplying that by the total number of vehicles would provide estimation as to the total reduction of idling and acceleration on that street.

Pros: Simple collaboration between municipalities is of little or no cost. A decrease in overall GHG emissions, less congestion on streets, and a safer environment for non-motorists are also good benefits.

Cons: It could be difficult to collaborate with other municipalities, could be costly to implement if traffic lights need to be replaced.

Existing Programs: None found.

Funding: No funding is needed to collaborate with other townships, the only reason funding would be needed is if traffic lights need to be replaced, in which case PENNDOT may be a viable option.

For More Information:

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ENERGY SECTOR

Significance

The energy sector is one of the most important contributors to State College GHG emissions. The energy sector includes GHG emissions produced by electricity use (commercial and residential) and on site use of fossil fuels for heating and cooking.

Much of the power for State College is produced in coal burning power plants; the burning of coal produces more Greenhouse gases than other energy sources, so the energy mitigation options are especially useful in the Borough.

Energy efficient mortgage – allows buyers to pursue energy efficiency projects.

Driving Forces

Forces that are likely to reduce GHG emissions (either by reducing sector GHG emissions or enhancing GHG sequestration) are marked (-). Forces that increase GHG emissions are marked (+), and forces with unknown or variable outcomes are marked (+/-). This list targets some potentially important drivers but is not inclusive.

- (+) Increase in Borough population, and increase in number of houses
- (+) Decrease in number of people per house
- (+) Significant increase in average house size
- (+) Continuation of the landlord-renter energy efficiency conundrum
- (+) Increase in total commercial facilities
- (+) Increase in electric-powered appliances per home or business
- (+/-) Improvements in municipal building code energy efficiency requirements
- (-) Improved Allegheny Power Plant energy efficiency/green energy options

ACTION E1: PROMOTE ENERGY EFFICIENCY AND CLIMATE CHANGE AWARENESS THROUGH EDUCATION AND POSSIBLE BEHAVIORAL CHANGES

Behavioral changes are a key part of changing energy usage patterns and reducing GHG emissions. State College has a high number of students, a captive audience for influencing behavioral changes at this young age. The options included in this option are all relatively low cost. No potential Borough community options are listed here.

Potential Borough Government Options

- 1) Create an energy and climate change awareness Website that focuses on GHG reduction
- 2) Try to obtain a grant from the Pennsylvania Public Benefit Fund
- 3) Create a coalition of concerned citizens to discuss energy issues
- 4) Propose the introduction of general education “energy” classes in local schools to gain a larger audience for the energy reduction programs

Potential Borough Government Options

Option E1.1: Create an energy and climate change awareness Website that focuses on greenhouse gas reduction

Description: A Website linked to the Borough Website, or similar site central to the State College Borough would allow members of the community to share information and keep up to date on GHG mitigation strategies, research within the borough and the local Council and current climate change and GHG linked events. The possibility of links to student research at Penn State University and local schools could be a key way to connect the schools with the other members of the community in such a student based borough (See option #4).

Pages on this Website could benefit awareness programs by encouraging heating efficiency, lighting efficiency and more environmentally friendly behavior by listing potential options, ranging from simple behavioral changes to more costly technical changes to the home. It could contain information on other Websites and projects, which could help residents specifically in State College. This would be useful as many Websites contain useful information, but much of it is redundant for many areas as the funding available has place specific boundaries.

Stakeholders: Borough council members, local environmental coalitions, Penn State University Geography and Energy departments (new research projects and including students), national GHG reduction groups (to look at the problem on a larger scale), and local school and adult education centers.

Measures of Success: A quantitative analysis of the number of visitors to the site, and individual pages would allow the usage of such an educational tool to be analyzed. A comments form after visiting the site would allow user feedback, and changes could be made as necessary if comments arise repeatedly or if innovative ideas are included.

Pros: The Internet is a common source of information for all age groups, except small margins of elderly people and the very young. Internet is freely available to Penn State Students. It is a quick and easy way for information to be updated. The Borough Council has already included the hiring of a member of staff to create such a Website into their plans for 2008.

Cons: A professional Website as proposed would require a member of staff to maintain it. Collaboration between all groups requesting information to be included on the site would be necessary requiring time. Accessing the Website would require a computer and access to the Internet, in this way; it segregates potential users of such an information resource into those with the above and those without. A monthly newsletter, either sponsored by interested organizations or distributed to interested community members or for sale in a local store would be a possibility that would not have this segregation.

Existing Programs: Searching for general energy efficiency pages on Pennsylvania Council Websites did not find any, however many Borough Councils do have pages documenting individual projects and aims. See the West Chester Website: <http://www.westchester.com/bluer.php> for an example of an easy to read page that any resident could follow. However, it is not as separate from the main Council content as much as I hope for State College.

An interactive energy page, which is fun and educational, focused towards adults:
<http://www.energyhog.org/>

Funding: Funding for this option would be come from the Center for Sustainability to be part of the State College Borough council. Additional funding could come from sponsorship by local businesses.

For More Information: This may be part of the aim of the upcoming Sustainability centre for State College. Look at Borough Council Websites to see how they have created energy pages. Information could be easily added to the existing Borough Website until a new page could be created: <http://www.statecollegepa.us/>

The resources section of the Website for the Sustainability Energy Fund includes many links to pages that would be useful if included: <http://www.theseef.org/>

Option E1.2: Try to obtain a grant from the Pennsylvania Public Benefit Fund for education and energy efficient systems.

Description: According to Pew climate center, almost half of the states have funds, often called “public benefit funds” which are dedicated to supporting energy efficiency and renewable energy projects. The money to create these funds is collected from a proportion of energy bills, either voluntary or involuntary. Pennsylvania has funds that support energy efficiency and renewable energy.

Pennsylvania does not have a clear green energy fund, each of the utility companies created funds with the goals of promoting (1) the development and use of renewable energy and advanced clean-energy technologies, (2) energy conservation and efficiency, and (3) sustainable-energy businesses. The Pennsylvania public benefit fund is not directly aimed at giving money for education purposes.

About \$55 million was collected through the utilities’ distribution rates to promote the development of sustainable and renewable energy, with additional money added since.

It seems viable that State College could benefit from these funds. Some of the funds seem to be directed at large scale projects, such as funds for a green building association to promote green practices where others are available at a household level.

Stakeholders: Borough Council, Existing funds (see below), Residents, Businesses.

Measures of Success: The amount of funds that the Borough obtains. Funds may be divulged into multiple different projects. The distribution of funds needs to be towards the most effective projects.

Pros: Considerable money has been made available for public use for projects aimed at reducing energy usage through system retrofits and community initiatives.

Cons: Many funds have specific uses that are not always applicable to the project planned.

Existing Programs: Public benefits program available for Solar Water Heat, Solar Space Heat, Solar Thermal Electric, Solar Thermal Process Heat, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Geothermal Heat Pumps, Municipal Solid Waste. For the following sectors: Commercial, Industrial, Residential, General Public/Consumer, Utility, and Institutional.

Funding: Four funds are currently available provided by West Penn Power, Pennsylvania electric company, PPL sustainable energy fund of Central/Eastern PA, PECO energy. The PA Public Utility Commissions and the Database of Incentives for Renewable Energy Websites describe funding available: http://www.puc.state.pa.us/electric/electric_renew_sus_energy.aspx and www.dsireusa.org.

For More Information: The DSIRE Website is a good source of funding available across the whole of America, with a detailed section for Pennsylvania specifically (see above).

Metropolitan Edison Region SEF: <http://www.bccf.org/pages/gr.energy.html>

TRF Sustainable Development Fund: <http://www.trfund.com/sdf/>

West Penn Power SEF: <http://www.wppsef.org/>

Sustainable Energy Fund of Central Eastern Pennsylvania:
<http://www.theseef.org/kb/?View=entry&EntryID=38>

Community Foundation of the Alleghenies: www.cfalleghenies.org/penelec.htm

(Some of the above do not specifically cover State Colleges region, but are useful Websites nonetheless for suggestions of funds given out.)

Option E1.3: Create a coalition of concerned citizens to discuss energy issues

Description: This mitigation option has the goal of changing energy use to help in the reduction of greenhouse gases through the creation of an interest group within the community. Changes that need to be made could be shared and discussed on a personal level. There are already groups in the Borough who have an active interest in the promotion of practices, which would help improve the environment. These groups would be a good starting point for this more specific energy coalition.

Different options are appropriate depending on the situation and how much money individuals have available for efficiency improvements. These different options, and the decision of which to implement could be a topic for discussion as well as behavioral changes, which are cheaper but could still conserve significant amounts of energy.

The above group could meet once every two weeks or monthly to share knowledge and organize events within the community. Guest speakers could be invited, paid for by members to introduce issues that maybe are not as well documented

Stakeholders: Local environmental interest groups (could collaborate to focus on energy use issues), Borough council (could provide space for meetings) local businesses (to be involved with the group, and possibly fund events) residents, local schools

Measures of Success: The number of people joining the coalition, events organized to share information, and level of inclusion of new, interested residents.

Pros: This is a relatively low cost option; the only real costs involved would be guest speakers and the cost of hiring a venue for meetings; however Borough space could be used at no cost.

Cons: If the discussion is not followed up by action, little more than talking could be achieved. The group should be encouraged to branch out into State College community.

Existing Programs: Penn State University organizations e.g. Eco Action and the Sustainability Coalition

Funding: Borough council, local businesses

For More Information: Contact existing organizations. Nationwide energy issues are listed on the DOE's Office of Energy Efficiency and Renewable Energy Website: www.eere.energy.gov.

Option E1.4: Propose the introduction of general education “Energy” classes in local schools to gain a larger audience for the energy reduction programs

Description: In terms of existing environmental education within state college borough schools, (elementary, middle, and high), environmental classes are included into the curriculum. However, one principal informed me that it is not focused towards greenhouse gas problems and mitigation strategies. It is hard to believe that this is completely accurate, as that any teacher would try to at least briefly explain the role of the individual in greenhouse gas levels. This option hopes to have a more defined class introduced, either as a compulsory class, or as an elective for high school students. This class would explain in detail, the greenhouse gases, they ways in which they are produced, and the changes that need to be made globally, and on a scale relevant to State College, in order to slow down this trend. A link to the Borough Council’s declaration could be made. The students could also be given an active role in reaching the goals.

If the creation of a structured class were not viable within the curriculum, a presentation in front of an entire school, or within another class, would be useful way to introduce issues to unknowing students.

Measures of Success: If the class were an elective, the number of students taking it each year would be a clear measure of its popularity. The teaching style would need to in line with the age of the students, and should be less like a textbook, and more of an active learning experience.

Stakeholders: State College Area School District Website (www.scasd.org) includes links to all the schools, the teachers and class information; teachers, students, parents and local groups who could adopt the class.

Pros: The involvement of schools in mitigation options allows a large slice of the community to be reached, including the parents and siblings of a student. As long as the information is detailed enough, this class would have the potential to educate a large number of students on issues very relevant to today.

Cons: The class needs to be in line with the level of equivalent classes. Much of the information is already covered in environmental science classes and so overlap must be prevented as far as possible.

Existing Programs: Not applicable; no schools in the area that I communicated with had a specific class dedicated to energy education.

Funding: This could be sponsored by energy conscious businesses, or simply funded as part of the school budget.

For More Information: Contact local schools: www.scasd.org.

ACTION E2: PROMOTE LOCAL GOVERNMENT LEADERSHIP IN AIDING WITH ENERGY USE REDUCTION

The Borough government could set a good example for the residents of the community through good energy practices and the creation of rules and regulations to enforce building energy standards.

Potential Borough Government Options

- 1) Introduce new building codes and regulations to promote and or enforce more efficient lighting
- 2) Buy Green Power to run Borough facilities to set a good example for the community
- 3) Encourage businesses to increase their use of natural and energy efficient lighting and energy efficient systems
- 4) Use energy efficient lighting in public areas and municipality buildings to set a good example

Potential Borough Government Options

Option E2.1: Introduce new building codes and regulations to promote and or enforce more efficient lighting

Description: Pennsylvania’s statewide building code is called the Uniform Construction Code (UCC). The majority of municipalities enforce this locally, which is good if Center County wants to excel in its levels of GHG reduction through increased efficiency of local businesses. LEED certification, which provides third-party verification that a building is environmentally responsible, profitable, and a healthy place to live and work, needs to be constantly encouraged along with incentives.

At present, buildings are not inspected for energy efficiency. To ensure energy efficient constructions, local officials need to be kept up to date with new changes to codes and ensure buildings are checked.

Stakeholders: Municipal code officers, contractors and developers, Pennsylvania Department of Labor and Industry (DLI), and the US Department of Energy: www.eere.energy.gov.

Measures of Success: Need to investigate how consistent the current code enforcement is, before expansion or redevelopment of regulations. To determine the benefits of changes to the code, officials could calculate how many new buildings are added with each new update. If the code were comprehensively enforced, 100% of the benefits of each change would be gained.

Pros: Every new business would be energy efficient. Better mortgages could be offered to energy efficient homes.

Cons: A whole new system of inspections would be necessary to enforce new regulations. The level of daringness of the current code, and the amount of change the local and national government allow, limits success of this option.

Existing Programs: The US Green building council Website (www.usgbc.org), hosts “Greenbuild 365,” which aims to research green building practices and to share knowledge, supported by United Technologies. Energy Star is a “joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.”

Funding: The funding available for this action would be for training of officials to monitor new constructions for their energy efficiency. The Database of State Incentives for Renewable Energy (DSIRE) lists details of federal, state, regional, and local funding available for renewable energy and demand side energy management.

For More Information: The United States Department of Energy's Office of Energy Efficiency and Renewable Energy: www.eere.energy.gov

US Green Building Council: www.usgbc.org

Building Green: www.buildinggreen.com. Online resource for environmentally sensitive design and construction (subscription required)

Option E2.2: Buy Green Power to run Borough facilities to set a good example for the community

Description: The goal that by 2012, 20% of energy used by the Borough will be purchased from “green” power sources is included in the declaration of State College Borough as a climate change community. Mr. E. Dabiero is the current (at time of publishing) Purchasing Director for the Borough, and is the main point of contact regarding the purchasing of energy. At present, other than the promise of action in the declaration, no progress has been made. However, it has been assured that over the next few months, discussions and actions would unfold.

According to DSIRE, as of October 2007, 28% of the states government energy use was bought from green energy sources. “Penn Security Fuels Initiative” is aiming to have more energy efficient fuels produced in Pennsylvania and less imported from overseas.

Stakeholders: Purchasing Director for Borough Council, local pressure groups, local energy providers – Allegheny power.

Measures Of Success: The speed at which green power is purchased. The degree to which positive relations exist between borough council and energy providers would allow for future discussion between the two. The benefits balancing out any increased costs would be necessary for follow up research.

Pros: Greener energy is better for the environment, through reduced greenhouse gas emissions. Purchasing of green energy gives increased funds with which further research into renewable energy sources could be carried out.

Cons: Increased cost, difficulty in obtaining green energy, existing purchasing networks would be destroyed and new relationships need to be created; requiring, time and effort.

Existing Programs: The Borough Council has included the purchase of green energy in its declaration and, although the money may not be available immediately, the purchasing director assures that the money would be there to fulfill the goal. There is also the Alternative Fuels Incentive Grant (AFIG) Program to reduce Pennsylvania’s dependence on imported oil.

Funding: Funding would need to come from the Borough Council or the State government.

For More Information: Consult local energy providers on prices of renewable energy.

Option E2.3: Encourage businesses to increase their use of natural and energy efficient lighting and energy efficient systems

Description: Roads such as Beaver, College, Calder and Atherton have many stores which could, if they changed their energy use habits, potentially reduce their energy bills, reduce GHG emission levels for State College, and aid behavioral change in residents of the Borough. Downtown State College street lighting has all been fitted with more environmentally friendly light bulbs, however, for the stores along downtown streets the same cannot be said. This action would require action to educate business owners on the advantages of energy efficiency. This could also allow for discussion with the stakeholders surrounding viable options, or ones for which assistance would be needed.

This forum of interested businesses could be recognized in the local community and would in time encourage the joining of more hesitant business owners.

If changes occur with few problems, an idea for a couple of years after the implementation of education programs would be to enforce certain changes to ensure that all downtown businesses followed certain guidelines with regard to lighting and energy systems. Smart meters would be a useful mechanism to educate customers in a hands-on way about their energy use, by paying for the amount used.

Stakeholders: Store and business owners and/or managers, local pressure interest and pressure groups, Borough Council Planning Department, local green energy providers, contractors (to train in energy efficiency), US Department of Energy: Energy Efficiency and Renewable Energy. Energy and Technology Deployment Team (work alongside a community to help them reduce pollution and save energy): <http://www.depweb.state.pa.us/energy/site/default.asp>

Measures of Success: the number of small businesses changing their inside and outside lighting could determine Success. The level of GHG savings could be audited and different energy efficiency projects would save different amounts. Energy bills would be reduced as a result of changes, and these could be compared between similar sized and powered stores to see where further changes are needed.

Pros: The idea should be well received by shop owners because of the many options available to them. Light bulb changes are very low cost, and the usage of power overnight when the shop is not open could be easily minimized. There is a wide range of support within State College, with the new Declaration and proposed new department of the Borough Council. Energy costs are set to rocket in the coming years, and so it is in the businesses best interest to invest in new systems. According to a state official, Energy prices in Pennsylvania could jump between 30 and 70 percent once the price cap expires in the coming year.

Cons: Some potential changes would require a one off payment for new systems or more energy efficient light bulbs. These would each have a certain payback period. If old light bulbs are replaced with energy efficient ones instead of an immediate retrofit, the extra cost is minimal. Ease of access to specific technologies may be a problem depending on the distance owners are willing to travel to meet with suppliers. As yet, businesses do not have inspections to assess their “greenness,” this means there is not the immediate push to change.

Existing Programs: Many companies already have guidelines within their framework to ensure energy efficiency across the board.

Funding: The USDA Renewable Energy Systems and Energy Efficiency Improvements Program is available, as are Business Energy Tax Credits. The database of incentives for renewable energy (DSIRE) includes federal, state, regional and local funding: <http://www.dsireusa.org/library/includes/genericfederal.cfm?CurrentPageID=1&state=us&ee=0&re=1>. Possible future “Energy Independence Fund.” The ECAP solar buyback program helps installation of solar energy systems. Generation Buy-Back is a program by Allegheny Power for voluntary peak load reduction.

For More Information: G. Kats and others (2003). *The Costs and Financial Benefits of Green Buildings*.

Option E2.4: Use energy efficient lighting in public areas and municipality buildings to set a good example

Description: Lighting which is under the control of the Borough Council both on and off street has all been assessed for its environmental effects. The public works director is aware of all the light bulbs that are used and their relative life spans and disposals. State College Borough council is already ahead of the game in terms of energy efficient lighting. Induction fluorescent and high-pressure sodium bulbs, which have long life spans and recyclable parts, have been placed downtown. The Borough Council has banned certain bulbs, such as mercury vapor. Any of these remaining will be soon replaced with one of the above. In summary, nearly all the light bulbs now used are environmentally friendly, there are also no incandescent bulb used in municipal buildings.

One problem public area in terms of lighting in the Borough is parking garages, for which around 50% are out of the Borough Council's control. Energy efficient lighting is not always aesthetically pleasing and practical; although the high-pressure sodium bulbs are very good giving out 2000 lumens with 100W, the light they give out is orange/yellow, which many residents have complained about. There is an opportunity here for the Borough to influence change to white fluorescent lights that would reduce energy costs and consumption significantly.

Stakeholders: Public Works Director, Allegheny Power

Measures of Success: Money saved through use of energy efficient lighting through use of energy efficient lighting. The number or percentage of streetlights with efficient light bulbs is the most obvious way of checking progress.

Pros: Energy usage by the Borough Council for lighting should dramatically reduce through simple light bulb exchanges.

Cons: A balance needs to be made between energy efficiency, quality of light given out and costs. Certain efficient lights may be unsuitable for some areas.

Existing Programs: Much work has already been done towards this option. See above for description of the bulbs used in municipality buildings. Ongoing monitoring of these changes is necessary to ensure positive movement forwards and not backwards.

Funding: All funding would be from the Borough Council, for its own lighting. Any additional work that is done out of Council owned property may be open to funding.

For More Information: The public works director for State College Borough is extremely knowledgeable on the energy efficiency of all the municipality buildings and so is an excellent point of contact.

ACTION E3: TAKE STEPS TO SOLVE THE LANDLORD-RENTER PROPERTY EFFICIENCY CONUNDRUM

The landlord-renter property efficiency conundrum is this: In State College Borough, landlords often maintain their rental housing units themselves, while renters typically pay for utilities, such as electricity and gas. Improvements on energy efficiency come at cost to the landlord, while the renter receives the benefit of cheaper utility bills. Since there is little personal incentive for the landlord to accept this cost, apartment buildings in State College maintain poor energy efficiency, and renters continue to pay expensive utility bills.

Potential Borough Government Options

- 1) Require landlords to disclose typical energy use statistics to potential renters
- 2) Provide subsidies for low- or no-cost energy saving measures like window film and water heater blankets
- 3) Set renewable energy portfolio standards for rental properties
- 4) Require energy efficiency standards for rental properties

Potential Borough Community Options

- 5) Work with Penn State fraternities to develop best practice energy efficiency standards
- 6) Work with local rental agencies and landlords to establish a board to handle concerns and complaints about rental property energy issues
- 7) Encourage realtors with properties located in the periphery to include bus passes in the cost of rent
- 8) Encourage landlords to make renters responsible for utility bills

Potential Borough Government Options

Option E3.1: Require landlords to disclose typical energy use statistics to potential renters

Description: As a direct result of the landlord-renter property efficiency conundrum, renters in State College remain oblivious to their apartment's efficiency, and do not take into account the potential energy and cost savings involved with more efficient buildings. This mitigation option proposes that building energy efficiency be disclosed to potential renters, so that energy efficiency could be taken into account when choosing a housing unit. Making energy efficiency a search criterion for potential housing would expose inefficient buildings, effectively making energy efficiency a concern for the landlord. According to the US Census, 74 percent of all State College Borough housing units are rented, so this issue is particularly significant.

Disclosures of results could occur several ways. While the Borough may not be able to force landlords to publish their efficiency statistics outright, efficiency could be evaluated as part of the inspection and licensing process. Inspectors could rank buildings on a three-tier efficiency scale (i.e. high, medium, low). By publishing the results of an efficiency inspection such as this, potential renters would not know specific energy statistics, but they would be given an idea building energy efficiency.

Stakeholders: State College Borough rental agencies, landlords, or building managers, State College Borough officials, including building inspectors/licensors, and potential and current renters.

Measures of Success: To estimate the benefits, Borough officials might compare building energy efficiency before and after the disclosure of energy efficiency. Realizing their energy savings, the renting habits of potential renters would be assumed to change, favoring efficient housing. These habits could be assessed in terms of a survey of potential renters. As inefficient housing is exposed, landlords would have to improve efficiency to draw in potential renters. Borough officials should expect energy use to continue to improve as buildings improve their efficiency.

Pros: We should expect improved energy efficiency in many of the rented housing units around the Borough because of self-regulation by rental companies. This would also develop energy efficiency as a concern for both the renter and the landlord. Energy conscious people tend to make energy conscious decisions, effectively improving energy efficiency and reducing GHG emissions.

Cons: We should expect that landlords and rental agencies would have a dispassionate view of the increased costs associated with efficient retrofits. As a result, some rental agencies may choose to include utilities in the rent and raise the price of rent based solely on energy costs. Also, some potential renters may outweigh the convenience of location, or the quality of amenities to the energy efficiency of a building. Often, parents, rather than the actual tenant, pay for off-campus student housing, so efficiency may be unknown to the person living on the premises.

Existing Programs: In 2004, the Australian Greenhouse Office, an Australian government agency, commissioned Faber Maunsell, an international consultancy specializing in buildings, transportation and environmental services, to undertake a study into international directions for the mandatory disclosure of the energy performance of buildings. Their findings were assembled into a formal report. See “For More Information.”

Funding: The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information:

Faber Maunsell (2005): [A Study into International Directions for the Mandatory Disclosure of the Energy Performance of Buildings](#). Australian Greenhouse Office. Accessed 12/10/07 at

<http://www.nfee.gov.au/public/download.jsp?id=199>

Option E3.2: Provide subsidies for low or no cost energy saving measures, such as window film and water heater blankets

Description: Not all potential energy efficiency measures needed to ease the landlord-renter conundrum are expensive. The low hanging fruit for this option comes in the form of such low cost energy saving measures as window film and water heater blankets.

Window film improves energy efficiency in two ways. First, it helps to block heat from the sun in warm summer months, blocking 70% of the sun's heat from entering the house through the windows. Energy is conserved by not having to run an air conditioner as often. Second, in winter months, the film helps to insulate the window and retain heat, keeping about 55% of a home's heat inside.

Water heater blankets improve energy efficiency by adding insulation to hot water tanks, preventing the loss of heat. This is especially important in winter months, as most water heaters are located in a garage or basement, exposed to cold temperatures. Blankets cost \$15-\$25 each, and save about \$8 a month

These products are relatively cheap and easy to install, giving a fast payback period with high-energy savings. Subsidies used to furnish rentals with these products would be well spent. Sources of subsidy might not only include State College Borough government, but also Allegheny Power, which invests in energy efficiency campaigns.

Stakeholders: State College Borough rental agencies, landlords, or building managers, State College Borough government, potential and current renters, Allegheny Power, NGOs, and other sources of funding

Measures of Success: To estimate the benefits, the agency providing the subsidy could perform a cost-benefit analysis, taking into account the initial cost of the product and the potential savings in energy bills to the tenants living in the rental. This could also continue to be monitored after the implementation of a product so that quality is tested and assured. We would expect energy savings to take place immediately after implementation, but may taper off as the product ages.

Pros: This mitigation option could be considered "low hanging fruit." It is relatively low cost, and easy to implement, with a high potential for substantial energy savings. There is no cost for installation, and it does not require professional services.

Cons: While the cost is minimal, there is still a cost and energy subsidies may be hard to come by for such a large-scale product distribution. People may not care about the efficiency of their rental, and may perceive the installation of such products, simple as it may be, an unnecessary burden.

Existing Programs: See "Funding."

Funding: The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information: “Choosing and Applying a Window Film.” Lowes. (2002). Accessed 11/1/07: <http://www.lowes.com/lowes/lkn?action=howTo&p=/Energy/WndFlm.html>

Stone, Barry. “Water Heater Blankets.” Do-it-yourself. (2004). Accessed 11/1/07:

<http://www.doityourself.com/stry/waterheaterblankets>

Option E3.3: Set renewable energy portfolio standards for rental properties

Description: In November 2004, Governor Ed Rendell signed Act 213, requiring that electric distribution companies and electric generation suppliers include a specific percentage of electricity from alternative resources in the generation that they sell to Pennsylvania customers. As a result, Allegheny Power has announced its proposal of a wind energy program. This program gives Pennsylvania customers the opportunity to support an emission-free source of renewable energy from wind farms. Customers could participate in this program for an additional monthly fee, starting at \$2.50. Allegheny power has released the following statement:

“Renewable energy is electricity generated from natural resources. These resources will never be depleted and do not release emissions into the air. It is estimated that signing up at \$5 per month for 200 kilowatt-hours (kWh) of clean energy has the same environmental benefits as offsetting 3,000 pounds of carbon dioxide or not driving 3,400 miles in your car.” (Businesswire, 2007)

State College Borough Government’s involvement with this option could be through one of two actions:

1. Require that rental agencies participate in this program to gain licensure from the Borough.
2. Encourage rental agencies to participate by offering incentives, or helping to procure funding through Borough endorsement of the program.

This would effectively set a renewable energy standard for rental agencies in State College Borough.

Stakeholders: State College Borough rental agencies, renters, Allegheny Power, generators of green energy, Borough officials including inspectors/licensers, NGOs, other funding sources.

Measures of Success: In Allegheny Power’s statement above, they have outlined the potential for lowered emissions at a given rate of subscription. Lower emissions could be assumed through the replacement of energy from fossil fuel power plants with renewable energy sources. Greenhouse gas emissions prevented could be calculated on a per household basis assuming that Allegheny Power releases wind program subscription statistics.

Pros: This mitigation option is a definite way to decrease greenhouse gas emissions attributable to State College Borough. In addition, investments in renewable energy promote the development of energy technology. As renewable energy sources begin to reach more people, the reliance on fossil fuels would be reduced, and energy costs should decrease.

Cons: To date, renewable energy comes at a higher cost than conventional energy. It is expected that both rental agencies and renters will have a dispassionate view of the increased cost, which may prevent program subscription, or cause it to end abruptly if the subscriber decides that they could no longer afford it. For the price of renewable energy to go down, its constituency needs to continue to grow. For large-scale subscription to occur, subsidies or financial incentives would need to exist.

Existing Programs: Existing Programs include Allegheny Power’s renewable energy initiative, and PA Act 213, as described above.

Funding: The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information: “Alternative Energy.” Pennsylvania Public Utility Commission (PAPUC). (2007). Accessed 11/20/07 at

http://www.puc.state.pa.us/electric/electric_alt_energy.aspx

“Allegheny Power Seeks Pennsylvania Authorization of Wind Energy Program.” Allegheny Power Newsroom. Businesswire. (2007). Accessed 11/26/07 at

http://www.businesswire.com/portal/site/alleghenyenergy/index.jsp?epi-content=GENERIC&newsId=20071120006013&ndmHsc=v2*A116765640000*B1196733466000*C4102491599000*DgroupByDate*J2*N1002131&newsLang=en&beanID=1989900650&viewID=news_view

Option E3.4: Require energy efficiency standards for rental properties

Description: As mentioned in option E3.1, many renters in State College Borough enter a housing agreement without sufficient knowledge of their home's energy efficiency. Currently, rental agencies are not required to adhere to an energy efficiency standard. Because of the conflict of interest involved in the landlord-renter conundrum, many landlords see little incentive in maintaining and ultra-efficient building while the renter receives the benefits of lowered energy costs. To put an end to this difficult situation, the Borough of State College could require energy efficiency standards for rental properties. The evaluation of building efficiency could be added to the routine health and safety inspections required in current State College rental buildings to receive licensure. To ensure quality and consistency among current and future buildings, the Borough could employ the criteria used in Leadership in Energy and Environmental Design (LEED) Certification.

The U.S. Green Building Council states that LEED-certified buildings:

- Lower operating costs and increased asset value
- Reduce waste sent to landfills
- Conserve energy and water
- Healthier and safer for occupants
- Reduce harmful greenhouse gas emissions
- Qualify for tax rebates, zoning allowances and other incentives in hundreds of cities
- Demonstrate an owner's commitment to environmental stewardship and social responsibility

Though LEED certification can be rigorous and explicit, Borough licensers could choose to start small and implement the standard over a span of years. This would prevent the shock of comprehensive costs, and allow time to procure sufficient funding.

Stakeholders: State College Borough rental agencies, landlords, building managers, State College Borough officials, including building inspectors/licensers, certified energy raters, contractors, developers, potential and current renters, NGOs, other sources of funding.

Measures of Success: To estimate the benefit, the Borough could track the amount of certified homes in the Borough. By knowing the number of energy efficient homes, energy savings could be modeled using the standard savings under LEED certification. The Borough may also provide an outlet for renters to report the energy savings recorded in bills. In addition, this outlet could also serve as outreach education for other renters and homeowners who have not yet achieved the energy efficiency standard.

Pros: Since 74 percent of State College housing units are rented, this mitigation option would be a good way of achieving substantial energy savings, and lowering GHG emissions. By creating a public outlet for the reporting of these savings, an outreach program is also established. Energy consciousness would be greatly improved as those who live in conventional housing realize their potential savings. Rising energy costs are likely to increase the popularity of energy efficiency and conservation projects such as this. Finally, this project could be implemented over time, making small changes early on and working up to the larger retrofits.

Cons: Though the potential for energy savings is very high for this mitigation option, little of those savings benefit the landlord. Large-scale projects such as this would eventually need to be subsidized so that the cost could be shared between the landlord, local government, and NGOs. Otherwise, landlords and rental agencies may become defensive and abruptly raise the rental fees. There are many steps involved in accomplishing this mitigation option, each of which requires much time and money. It could take a very long time for State College Borough to achieve hard results as a whole.

Existing Programs: The state of Wisconsin's Department of Commerce successfully maintains energy efficiency standards for rental properties through a certification process in Building Code Comm 67. See "For More Information."

Locally, Penn State successfully employs LEED standards in their green building initiative to ensure energy efficiency. Again, see "For More Information."

Funding: The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information: The U.S. Green Building Council (2007). Accessed 11/12/07:

<http://www.usgbc.org/>

Wisconsin Department of Commerce Safety and Buildings Division (2007). Accessed 12/10/07:

<http://www.commerce.state.wi.us/SB/SB-RentalWeatherizationProgram.html>

Comm 67. Wisconsin Department of Commerce (1999). Accessed 12/10/07:

<http://www.legis.state.wi.us/rsb/code/comm/comm067.pdf>

PSU Green Buildings. Penn State Office of the Physical Plant (2005). Accessed 12/10/07:

<http://energy.opp.psu.edu/green-buildings>

Potential Borough Community Options

Option E3.5: Work with Penn State Fraternities to develop best practice energy efficiency standards

Description: Approximately 4000 students in 88 chapters of fraternities and sororities are involved in Greek Life at Penn State. Penn State fraternities occupy 52 houses in State College Borough. Though brothers of different organizations occupy each of these houses, they share a common government in the Interfraternity Council (IFC). This interconnectedness allows for top down decision making for all fraternities. By encouraging the IFC to institute an energy initiative, local fraternities could improve the energy efficiency of their building, and lower greenhouse gases attributable to State College Borough. Unlike most landlords, fraternity-housing corporations exist for the benefit of their respective chapters and are not concerned with profit. Therefore, a greater willingness to make improvements and renovations exists in these alumni-run organizations. Fraternity members would receive the benefit of lower heating and electricity bills, and the satisfaction of lowering greenhouse gas emissions. This motivation, combined with the Greek community's presence as a large and influential segment of the student population, suggests that fraternities could be significant vehicles for change.

Best practice energy efficiency standards may include:

- Retrofitting window/door seals and insulation
- Replacing inefficient appliances with energy star appliances
- Improving HVAC systems and water heater efficiency
- Conserving electricity through improved lighting efficiency, and energy conscious decision making

Stakeholders: The IFC, local fraternities, Penn State University, alumni, other sources of funding.

Measures of Success: To measure the benefits of an energy efficiency initiative, fraternity house treasurers could compare energy bills before and after retrofits take place. Taking into account the initial cost, they could estimate the payback period of the retrofit. Substantial savings would be expected initially after implementation. Building Efficiency could be continually monitored through the logging of energy bills.

Pros: Greenhouse gases in State College Borough would be effectively lowered through the implementation of this energy initiative. With energy prices on the rise, energy efficiency and conservation projects are sure to gain popularity as money saving tactics. In addition to saving money, projects such as this one improve energy consciousness and improve environmental sustainability.

Cons: Though smaller retrofits and behavioral changes come at little to no cost, larger retrofits, such as the ones mentioned above, come at a high cost. Securing sufficient funding for large scale retrofits may be difficult and time consuming, and may deter interest.

Existing Programs: The National Wildlife Federation’s Campus Ecology Program tracks college campuses across the nation that take energy efficiency initiatives. At the University of Florida, a push to reduce fraternity energy consumption resulted in the binding agreement between the College of Building and Design and the Inter-Fraternity Council. See “For More Information.”

Funding: The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information: Penn State Interfraternity Council (2007). Accessed 11/26/07:

<http://www.greeks.psu.edu/ifc/index.html>

National Wildlife Federation’s Campus ecology Program (2007). Accessed 12/10/2007:

<http://www.nwf.org/campusEcology/index.cfm>

University of Florida Campus Ecology Profile. National Wildlife Federation (2005). Accessed 12/10/07: <http://www.nwf.org/campusEcology/docs/Yearbook%20Entry%20FINAL17%2Epdf>

Option E3.6: Work with local rental agencies and landlords to establish a board to handle concerns and complaints about rental property energy issues

Description: All too often, the energy concerns of renters caught within the landlord-renter conundrum fall on deaf ears. The renter is often unwilling or unable to improve the energy efficiency of their home, while the landlord refuses to endure the cost of retrofits when they receive no financial benefit. Based on the severity of inefficiency, such problems could affect not only the cost of the tenant's bills, but also their health and wellbeing. To improve the acknowledgment of tenant concerns and complaints regarding rental property issues, this mitigation option suggests that renters living in State College Borough work with local rental agencies and landlords to establish a complaint board. A neutral third party often settles stonewalled disputes more easily. By implementing a complaint board, neither party has to waste time in argument.

Stakeholders: State College Borough rental agencies, landlords, or building managers, current renters, manager of dispute settlement and subsequent board

Measures of Success: After rendering a venue for landlord-renter conundrum concerns, the number and of length of lingering energy efficiency problems would be expected to decrease. Subsequent to the logging of many concerns and complaints, the complaint board could establish a protocol follow upon the rise of similar disputes, further expediting the process.

Pros: A resolution could be achieved on landlord-renter energy efficiency problems. There would be an established venue and protocol for any type of rental energy efficiency dispute. Though this mitigation option does not directly affect the emission of GHGs, it does help to alleviate the underlying issues surrounding the landlord-renter conundrum, which, as this report has outlined, has much to do with energy savings and GHG reduction.

Cons: It is difficult to predict a level of tenacity that a board of complaint would be able to provide to improve the landlord-renter conundrum. There would most likely be a cost involved with the establishment of such a group. You cannot estimate potential savings in terms of money with this mitigation option.

Existing Programs: While many municipalities offer landlord-renter dispute resolution through a department of health and housing, none were found to handle energy efficiency disputes.

Funding: Funding for an energy efficiency board of complaint would be the responsibility of State College Borough Government.

For More Information:

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Option E3.7: Encourage realtors with properties located in the periphery to include bus passes in the cost of rent

Description: The further a renter's home from downtown State College, the more likely they are to drive personal automobiles in and out of the city. Most people find this to be more convenient than walking or paying to ride the bus. While most realtors located on the State College periphery offer some form of transportation advantage, such as free parking or a bus pass, others offer no such amenity. Free parking also creates no provides no amenity to renters that do not own a car. This mitigation option suggests that State College Borough community members encourage all realtors to include a bus pass in the cost of rent. This would effectively decrease the number of cars in downtown State College, reducing GHG emissions from personal vehicles. With fuel prices steadily increasing, this option will continue to gain popularity, and GHG emission attributed to the Borough will continue to decrease. In addition, this change leaves no renter behind. There are no prerequisites for riding the bus. An increased number of bus riders may lead to low or no cost bus passes in the future. If realtors implemented or increased to charge for personal parking spaces, they could supplement the cost of bus passes, or use the added financial benefit to improve building energy efficiency.

Stakeholders: State College Borough rental agencies, landlords, or building managers, potential and current renters, CATA bus line

Measures of Success: The number of bus riders could be monitored to make sure that the bus passes are being used. After establishing that the number of renters using the bus has increased, a decrease in the number of cars would be expected. Though GHG emission savings would be difficult to calculate exactly, it could be modeled based on number the reduced number of personal vehicles driven.

Pros: Fewer cars on the road dictate lower GHG emissions in the transportation sector. In addition to this, realtors have the opportunity to capitalize on a charge for personal parking, which would further discourage car driving. Money saved could be invested in maintaining or improving efficiency. Increased ridership may also encourage CATA to lower the cost of a bus pass.

Cons: As long there remains an added convenience in personal modes of transportation, there will continue to be people that prefer to drive themselves. Rental agencies may not want to endure the cost of bus passes, even if they justify that cost by charging a parking fee.

Existing Programs: As discussed above, many rental agencies located on the periphery of State College offer a transportation amenity such as this.

Funding: Funding for bus passes would be the responsibility of the individual rental agency.

For More Information: Not applicable

Option E3.8: Encourage landlords to make renters responsible for utility bills

Description: Though most rental agencies in State College require renter responsibility for utility bills, a handful of agencies include the cost of utilities in the rent. While this may appear to be a captivating amenity, renters should consider that they are forfeiting their control over building energy efficiency. If utility bills are expensive, the rental agency can simply increase the rent across the board for all renters. This keeps energy efficiency statistics hidden from the renter, and holds no accountability on tenants with exorbitant utility use. In such a case, a renter would be less inclined to develop energy efficient practices because they would not result in financial savings. Renters should encourage their landlords to make each leaseholder responsible for their utility bills. This would restrict the routine rent increases occurring as a result of inflated utility costs, and would increase energy consciousness among all renters.

Stakeholders: State College Borough rental agencies, landlords, or building managers, potential and current renters

Measures of Success: To monitor the success of this mitigation option, renters living in buildings that formerly included utilities could be surveyed on their energy use habits. It would be expected that the added financial responsibility of utilities would make each tenant more energy conscious, and therefore more energy efficient. In addition, rent charges on buildings that formerly included utilities should be monitored to ensure lowered costs to accommodate this extra responsibility.

Pros: Tenants responsible for their own utility costs are expected to be more energy conscious and use more energy efficient practices. This change in responsibility would be expected to reduce energy use and subsequent GHG emissions across the Borough. The community could embrace this initiative and advertise energy efficient practices to help tenants further reduce their energy reliance.

Cons: Rental agencies choose to include rent in their utilities for many reasons: added amenity, simple metering, etc. But, this method of utility payment often works out for the landlord as well. By concealing the utility costs within the rent, rental agencies can control utility costs by charging all tenants a straight fee regardless of energy use. This is also a way to hide energy inefficiency so that renters remain oblivious to their building's energy use. Landlords are not likely to embrace a change that takes away simplicity, amenity, and control. Current and potential renters may not want the additional responsibility as opposed to the ease of paying one fee each month. Finally, most student renters are transient, and do not pay for their living expense themselves. They may not care to become energy conscious since the cost is not their own.

Existing Programs: Many rental agencies in State College Borough already make their renters responsible for utility bills. This mitigation option is targeted at the few that do not.

Funding: Not Applicable

For More Information: Not Applicable

ACTION E4: RECOGNIZE LOCAL BUSINESSES AND LANDLORDS USING GREEN BUSINESS PRACTICES

With extra recognition, these business and landlords should expect to reach a larger customer base. In addition to spreading energy consciousness throughout the Borough, added profits could be invested in future green projects to further reduce the Borough's greenhouse gas emissions.

Potential Borough Government Options

- 1) Create a coalition of green businesses who adhere to fixed environmental standards in their business practices
- 2) Provide free advertising to green coalition members on the previously proposed Website
- 3) Recognize and promote green coalition members with unique window stickers and other identifiers

Potential Borough Government Options

Option E4.1: Create a coalition of green businesses who adhere to fixed environmental standards in their business practices

Description: Building a group of environmentally friendly businesses in State College could be useful for many reasons. It could create a pressure group that over time could affect the behavior of other businesses not behaving in an energy-conscious manner. A green sticker in their window, which would allow customers to see that they are a “green” business, could identify businesses that are part of the coalition. Customers may question what this status means, leading to the education of State College Borough residents, with the additional bonus of maybe changing their behavior and/ or the energy systems they use in their own homes.

Stakeholders: Local businesses, Center County Chamber of Business and Industry

Pros: With increased energy costs, businesses should respond well to suggestions that would reduce energy bills. Other business coalitions could take up energy efficiency practices to add to the number of businesses included. This option does not have to mean expensive system changes; it could include smaller behavioral changes that any business could adapt to.

Cons: Small businesses often do not have the money available for expensive retrofits, and may not see beyond a medium to long sized payback period.

Existing Programs: The Bay Area Green Business Program in California has adopted a certification program that recognizes businesses in cities that have incorporated sustainable practices into their operations. Recognition is achieved not only through the distribution of window decals, but also includes free advertising in city publications and local media. See “For More Information.”

Funding: Funding for the creation of a coalition of green businesses would be the responsibility of State College Borough Government. Additional funding may come directly from Centre County Chamber of Business and Industry through their endorsement of a green business project.

Businesses may find funding to achieve green retrofits from:

The Database of State Incentives for Renewable Energy (DSIRE) reports details of federal, state, regional, and local funding available for renewable energy and efficiency and conservation projects:

<http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=PA>

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy tracks use of DOE funding for regional energy efficiency and conservation projects:

http://www.eere.energy.gov/state_energy_program/projects_all_by_state.cfm/state=PA

Allegheny Power is another source of funding. Grants are given to fund projects that improve energy efficiency and conservation. For more information visit:

<http://www.alleghenypower.com/>

For More Information:

Centre County Chamber of Business and Industry (2007) Accessed 12/1/07:

<http://www.cbicc.org/>

Bay Area Green Business Program (2000). Accessed 12/10/07:

<http://www.greenbiz.ca.gov/index.html>

Option E4.2: Provide free advertising to green coalition members on the previously proposed Website

Description: As proposed earlier in option E1.1, State College Borough government could help to spread energy education and consciousness through the establishment of energy and climate change awareness Website that focuses on greenhouse gas reduction. Information on this Website would not be focused only on the residential sector, but also to local businesses seeking information on energy use, efficiency, emissions, and mitigation. Option #1 proposed the implementation of a coalition of green businesses who adhere to fixed environmental standards in their business practices. As an added advantage, State College Borough could provide free advertising to green coalition members. This advertising would help to spread energy consciousness to State College Borough residents that shop downtown. By pledging their commitment to saving energy and reducing GHG emissions, green coalition businesses may inspire residents to take on energy efficiency endeavors in their homes. Additional advertising would be expected to expand the customer base of green businesses as well.

Stakeholders: State College Borough public relations (PR) staff, Webmaster (s), local businesses in the green coalition, State College residents, and consumers.

Measures of Success: A Borough Website moderator could monitor the number of hits to a web page that contain advertising for green coalition businesses. Businesses could monitor customer base within their store. Additional advertising would be expected to draw more consumers. Green coalition membership should also be monitored, as it would be expected to increase based with member success.

Pros: This mitigation option would be expected to improve energy consciousness through the residential and commercial sectors of State College Borough. As mentioned in previous sections, energy conscious people tend to yield lower GHG emissions in the long run. Advertisements on the Website would be easy to maintain and update.

Cons: This option requires that the Borough employ a PR staff and a Webmaster. This employment would come with all associated costs to the Borough. In addition, an increasing number of coalition members may mean that only a few businesses could be advertised. The Borough would have to rotate ads so that each business gets the same amount of advertisement. Finally, there is a chance that local residents will not be concerned with the energy efficiency of local businesses, rendering the advertisements ineffective.

Existing Programs: The Bay Area Green Business Program in California has adopted a certification program that recognizes businesses in cities that have incorporated sustainable practices into their operations. Recognition is achieved in part through free advertising in city publications and local media. See “For More Information.”

Funding: The Funding for such a Website and the employment of appropriate staff would be the responsibility of State College Borough Government.

For More Information:

Bay Area Green Business Program (2000). Accessed 12/10/07:
<http://www.greenbiz.ca.gov/index.html>

Option E4.3: Recognize and promote green coalition members with unique window stickers and other identifiers

Description: As in option E4.2, this mitigation option seeks to spread energy consciousness among all sectors of State College Borough. By implementing an identifier to green coalition members, local business could advertise their pledge to energy efficiency and GHG reduction to passersby. Similar to option E4.2, green coalition businesses may inspire residents to take on energy efficiency endeavors in their homes. Energy conscious consumers may be more inclined to shop in stores that are taking strides to improve the local environment.

Stakeholders: State College Borough PR staff, local businesses in the green coalition, State College residents and consumers.

Measures of Success: To monitor the success of this mitigation option, local green coalition members should keep track of their customer base inside the store. Green coalition membership should also be monitored, as it would be expected to increase based with member success.

Pros: As with option E4.2, this mitigation option would be expected to improve energy consciousness through the residential and commercial sectors of State College Borough. As mentioned in previous sections, energy conscious people tend to yield lower GHG emissions in the long run.

Cons: There is an associated cost in printing and distributing green coalition identifiers. This cost would either have to be fronted by State College Borough or the businesses themselves. Also, distribution of identifiers would be another task requiring the employment of a PR staff person.

Existing Programs: The Bay Area Green Business Program in California has adopted a certification program that recognizes businesses in cities that have incorporated sustainable practices into their operations. Recognition is achieved not only through the distribution of window decals, but also includes free advertising in city publications and local media. See “For More Information.”

Funding: Funding for the cost of printing and distributing the green coalition identifier would be the responsibility of State College Borough Government.

For More Information:

Bay Area Green Business Program (2000). Accessed 12/10/07:

<http://www.greenbiz.ca.gov/index.html>

WASTE SECTOR

Significance

Despite the fact the waste sector is one of the smaller sectors contributing to GHG emissions and global warming; it still does pose a serious problem. Waste generated does not directly produce emissions like burning energy in a car or power plant. But the energy required to mine, refine, and transport those goods are all included. So efforts to increase recycling and organic waste collection are vital.

Solid waste management practices are one of the largest budget drains in any townships budget. Everyone produces waste, and to collect, transport, and deposit waste is an expensive ordeal, made worse by additional tipping fees and taxes. Landfill space could be kept to a minimum by focusing on important recycling and reuse efforts. But this must come from not only government regulated programs, but community help. Without participation, no program can be successful.

Conservation is also an important sector of study. By using less, more products go a longer way, and teaches residents about less wasteful living. One such area is in liquid waste areas, like sewage treatment and water sterilization. Water is a luxury, and much of it goes into the distribution and purification of clean useable water. Learning about this and practicing good methods is a great way to reduce use, and stop excessive emissions from being emitted to the environment.

Driving Forces

Forces marked (-) are likely to reduce GHG emissions (either by reducing sector GHG emissions or enhancing GHG sequestration) are. Forces marked (+) increase GHG emissions, and forces marked (+/-) have unknown or variable outcomes.

- (+) Population growth
- (+) Increase in commercial and residential facilities
- (+) Increase in waste generation
- (+/-) Instituting Recycling programs and collection
- (+/-) Collecting organic material
- (-) Diverting material from common waste stream
- (-) Increase recycling awareness and opportunities
- (-) Encouraging businesses/residents to live “greener”
- (-) Conservation of water sources
- (-) Purchase and use of recycled/sustainable material

ACTION W1: REDUCE STATE COLLEGE BOROUGH'S CURRENT WASTE GENERATION

The reduction of waste saves energy, landfill space, and money. Reusing products and recycling efforts are one of the ways to prolong a product's life, and cut energy demands for making new products.

Potential Borough Government Options

- 1) Develop a program to collect and compost organic material from residential and commercial areas, documenting GHG reductions
- 2) Replace synthetic chemical fertilizers with organic compost on Borough properties
- 3) Increase the number of recycling bins on Borough streets and encourage recycling through distinctive signage, thus increase downtown recycling awareness
- 4) Implement a single-string waste pick-up process
- 5) Support the implementation of a can and bottle redemption policy at the state level
- 6) Recycle waste products of Borough building and development projects
- 7) Develop a plan to decrease landfill waste from the current level of 48% to near 0%
- 8) Enact a fee-schedule charging residents and businesses only for garbage that is picked up
- 9) Require large event promoters to submit recycling plans and to attend periodic recycling workshops

Potential Borough Community Options

- 10) Encourage businesses and residents to separate organic materials from other waste through a green business recognition program
- 11) Discourage the use of garbage disposals
- 12) Encourage businesses to reuse woodchips and/or pallets generated as waste for fuel or heat
- 13) Develop a grant program whereby businesses could obtain consulting to improve waste management practices
- 14) Encourage county landfill to use aluminum to oxidize waste and sequester hydrogen
- 15) Develop a program for the recycling and reuse of electronics
- 16) Encourage local businesses to minimize packing materials used with their products
- 17) Develop a program where residents could choose to reduce the amount of junk mail they receive
- 18) Encourage businesses and residents to buy locally grown foods
- 19) Encourage businesses to reduce paper use

Potential Borough Government Options

Option W1.1: Develop a program to collect and compost organic materials from residential and commercial areas, documenting GHG reductions

Description: Composting is an excellent way to save organic material from entering the waste stream. By avoiding leaf, grass, sticks, and tree litter, from taking up space in dumpsters, it could save much money in tipping fees, fuel costs, and economic efficiencies.

The Borough currently has a well working composting operation already. It is a Multi-Municipal facility being utilized by 4 surrounding municipalities. These are Ferguson Township, Patton Township, College Township, and the local Borough. The site is located in Patton Township. Here is how it works:

Leaves – leaf litter is commonly delivered to the compost site in the fall and spring where they are put into specialized containers that turn the material.

Grass – grass is also added to the windrows as a source of nitrogen, and to speed up the composting process. Water is regularly added, and temperatures checked. After about 12 weeks, the finished product is removed from the leaf pads and goes through a screening process. After this the now nutrient rich soil is made available for bagging at Patton Township Municipal Building, or the Borough’s Service Facility, for sale by bulk scoop. Finished compost is also taken to drop off sites at one of the five Borough Parks for residents to pick up.

Yearly, approximately 7,000 tons of leaves and 2,000 tons of grass are dropped off. Currently there is no system to keep track of GHG emissions, but the program has been extremely successful, and could be implemented later as a tracking system. In fact, 2007 was the first year the Borough actually ran out of material.

Further development of this program could include food waste from residents and commercial facilities.

Stakeholders: Currently, local residents, landscape contractors, compost facility, surrounding townships and residents, township municipal workers, Borough service facility, park managers, CCSWA, landfill operators. In the future, downtown businesses like restaurants and grocery stores could become part of this cycle, along with commercial entities.

Measures of Success: Direct results from the program would show its progress. Each year the current system grows in popularity, so currently it is working. Adapting the composting to take on food waste could be measured in a similar way. Surveying of trash in trucks, and cost-benefit analysis of landfill runs would also show if this system is working.

Pros: As of now, the system benefits local residents in a few ways. First, they could recycle their leaves, without having to worry about obtaining burning licenses, or where to dump them. Secondly, the result is nutrient rich free compost from the Borough’s park drop off. Residents are welcome to use this compost to do work in their own gardens. With no added costs, and no added emissions, this process currently is very environmental. And since drop off is so closely monitored, it allows the introduction of GHG emission counting to begin... in what was saved by otherwise dumping the waste.

Landscapers also benefit from the compost, as a cheap and close source of soil enrichment for their businesses. The local Borough buildings and parks already use this compost in their

flowerbeds and new tree plantings. This composting program saves the township added tipping fees at the CCSWA, and provides a peace of mind to all residents in the area.

Cons: Since this program is currently a free service, it does come as a high cost to the Borough, and they are in fact taking a hit. However the peace of mind and positive results from this composting program almost negate this program. Adding on additional food waste would add additional expenses in the future, by requiring more trucks running, and new machinery. A proper cost-benefit analysis should be done to ensure any changes to the current program would save more money.

Existing Programs: Many composting programs exist in townships across the nation already. Further research could be extracted to see how State College's program could be improved.

Funding: In order to fund expansion projects the Borough could begin charging a small dumping or collection fee. Perhaps residents could pay for a license to dump/collect, and the money raised could be used to expand the current program. If the quality and quantity of dirt produced is raised, local landscapers may also be willing to pay a higher price to get better material.

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Option W1.2: Replace synthetic chemical fertilizers with organic compost on Borough properties

Description: Many synthetic chemical fertilizers contain a variety of harmful substances that can harm the environment and people. On another scale, heavy use of fertilizers can cause eutrophication, or contamination of ground/surface water. Fertilizers used over a long-term basis for heavy growing purposes can cause the top layer of soil to wash away, causing heavy erosion, and mineralization. Organic fertilizers are not harmful to the environment, so buying from local farmers could give them extra income, while the net balance of emissions remains zero. While the Borough of State College certainly does NOT operate on such a wide scale as a farmer, these are the possible future effects. Currently, very little fertilizers are actually used in the Borough, only mainly on flowerbeds, landscape beds, and lawn areas around municipal buildings. Less than 100lbs of bagged fertilizers and 15lbs of Miracle Grow are currently in use; however there has been no proposed switch to organics.

Compost and woodchip mulch are currently in use, both from the Borough's current program. Compost is added to flowerbeds each year, and to topsoil for planting. Woodchips are later added as a dressing to flowers and landscape beds for aesthetics, and to hold in moisture.

Stakeholders: Municipal maintenance workers, local cow/pig farmers, budget officials.

Measures of Success: By creating a system where a purchased bagged fertilizer is replaced by organic fertilizers from local surrounding farms, emissions would certainly be lowered. Due to the close proximity, the life cycle analysis for organic fertilizers would be lower, since less energy went into packaging, distributing, and transporting this product. Local farmers would see a rise in profits. And depending if a deal could be arranged, the Borough could probably see a discounted rate to purchase this fertilizer, and thus a lower budget for maintenance.

Pros: Organic fertilizer is plentiful on surrounding farms, and could offset emissions released by chemical fertilizers. This also opens a path for future business transactions between the Borough and local farmers

Cons: Due to such minimal amounts of fertilizers used, the impact of emissions released is close to none. While some problems may result, the findings are probably unnoticeable, and implementing a program would probably see very little results, besides perhaps a few saved dollars.

Existing Programs: Current program with woodchips/compost and the Borough already in place. This could perhaps be expanded in the future to include fertilized soil.

Funding: Working a deal with local farmers could supply the Borough with a cheaper source of organic fertilizer, while also improving the local economy.

For More Information: Agriculture Methods (2006). "Agriculture and the Environment": <http://www.pollutionissues.com/A-Bo/Agriculture.html>

Alan W. Sam - Borough Arborist

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Option W1.3: Increase the number of recycling bins on Borough streets and encourage recycling through distinctive signage, thus increase downtown recycling awareness

Description: One of the most obvious ways to combat emission and prevent waste is to recycle goods and reuse them. So a plan to try and capture more recyclable goods that find themselves into landfills by increasing the opportunity to recycle is ideal. The energy saved by not having to refine raw materials is staggering. In fact, it is estimated that recycling just one ton of material in a typical curbside recycling program can conserve at least \$187 worth of electricity, petroleum, natural gas, and coal. By using less fossil fuel to extract, refine, and transport new materials, far fewer emissions are released.

Borough recycling is handled exclusively by Centre County Solid Waste Authority (CCSWA), located in Bellefonte, PA. The recycling program currently in place is already very well established and produces fine results

Recycling for businesses and apartment buildings is primarily down with large, roll-off units that contain separate compartment for recycling. There are 16 of these located in various sites downtown. There are 34 drop-off sites in the Borough for corrugated cardboard, and these are the heaviest collected areas for this substance.

Currently there are 10 sets of “on-street” recycling containers already in place, but a plan to increase these would certainly help. These containers see respectable use, but the most common issue is contamination. If enough trash is thrown in with recycling, the whole bag is wasted. More cans just add to this problem. However in the greater scheme, more recycling units send a bigger message to the public. It raises local awareness, promotes and provides an active environmental lifestyle, and sends the public “We Care” mentality. Higher efficiency and understanding could be done through local Websites, newsletters, announcements along with waste/recycle pickup information, personal visits, awards, and working with associations (Downtown Business Association, Tavern Owners Associations, Restaurant Manager Associations... etc).

Stakeholders: All local businesses, residents, CCSWA employees, Borough members, landfill operators. Anyone who uses recyclable material would be impacted by this policy.

Measures of Success: Currently recycling popularity is measured based on how much material is collected. Ultimately to see if adding more cans is a success, the amount of contamination in each bin would need to be measured. Initially, this would probably be high because new cans would probably be treated as garbage. But over time, as people adapt, and public information rises, the Borough should see significant reductions in waste, and higher levels of recycling.

Pros: The current recycling program is seeing many positive results; by providing more opportunities to recycle, this increases the chance of collecting what is normally thrown out. Cans located near grocery stores or restaurants that produce high volumes of container waste would be a great start. Recycling has been proven to reduce the energy need to make new products, and helps maximize the use of current products, so numbers are kept down. Recycling reduces space in landfills, and would save the Borough thousands of dollars over time in reduced tipping fee costs, dumping fees, and gas by taking fewer trips to the landfill.

Cons: Currently key areas of recycling problems are the multi-family residential segment. Large apartment buildings have recycling available, but normally outside the building. Residents are

often too lazy to take the time to sort and carry their recycling down. Most buildings are not fitted with recycling shoots; retrofitting them would be very costly. Other large waste areas are fraternities, who produce very high volumes of aluminum cans and bottles, but mostly toss these into dumpsters. Education and awareness in this sector could produce dramatic results, but is probably the hardest to achieve. Perhaps stricter rules on fraternities and what could be trashed would help stop this. Fines could be administered if houses are found in violation of these rules. In terms of “on-street” recycling, contamination of recycling bins is and would probably always be an ongoing problem.

Existing Programs: Current additional recycling programs that are happening now occur during large events like Arts Fest, homecoming, or holiday festivals (See Option #9 for more information). Football games are also a source of recycling improvement currently underway. Volunteers go out before games and provide bags for tailgating families to dispose their recycling into. Later, maintenance crews pick these bags up, and send them to SWA.

Funding: Currently, the CCSWA funds all recycling efforts for the Borough, paid for by resident tax dollars.

For More Information: Center County Solid Waste Authority (CCSWA) (2007). “Recycle”:
<http://www.centrecountyrecycles.com/index.htm>

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Option W1.4: Implement a single-string waste pick-up process

Description: Waste disposal for the Borough is a big expense. Large trucks burn considerable fuel by idling and operating for longer than they need to. Reduction could come in two ways: changing the type of truck used, and the route trucks take. Both of these options must work in combination to best reduce emissions released from burning fossil fuels.

Currently, about 2/3 of the trash created comes from the commercial sector, and 1/3 from residents. The residential collection uses a front-loading truck to allow one-man collection. This allows a single vehicle to collect 300-500 homes a day. Commercial collectors primarily use front loading dumpster trucks. These simple “fork” dumpsters, and dump the contents into the truck.

The Borough has undergone some changes already to make the trash pick-up system more efficient. With costs for collection coming from expensive vehicles, high fuel costs, licenses, employee payrolls, and tipping fees (which could total more than \$1,000,000 a year), there is already a strong incentive to cut costs.

The Borough has already made some changes. With newer trucks they could collect more in fewer days. Also Borough sectors were broken down and routes created to maximize efficiency. The Borough has changed a policy to always pick up bulk items, to now a call-in program where residents call to have larger items like furniture, large appliances, etc picked up.

So reductions and changes have been made, but other changes could also happen in the future. Some possible ideas for the Borough to look at could be an introduction of bio-diesel instead of petrol-diesel for trucks. Bio-diesel contains far less harmful emissions when it is burned, and requires no new mechanical changes to be made to engines. The only drawback is finding an adequate supply to fuel all trucks ongoing. On the commercial side, large trash compacting units could be put downtown. This reduces the need for daily pickups, and each unit could hold much waste. When full, they could simply be towed away and dumped. This would also benefit large apartment complexes.

Stakeholders: Borough members, financial planners, residents, commercial businesses, and Somerset Landfill. Almost everyone is affected. Anyone who throws trash away would be impacted by changes. If new operations were added, additional costs would be split to the producers of trash.

Measures of Success: The main way to tell if this program is working would be through a cost-benefit and ROI (return on investment) analysis. Since trash is produced in such high numbers, and costs are so high, any kind of change should produce noticeable and dramatic results. However, to achieve those results, it would take initial capital. Looking at the current program before and after would give an initial show of savings, so further efficiency increases could be based off of this.

Pros: By further increasing pick up efficiency, and fewer trips, more money could be saved in tipping and fuel costs. Switching to bio-fuels would help drastically reduce emissions. Compacting units downtown would allow more garbage to be collected and hauled together, increasing economies of scale. Over time, these savings would lower trash collection bills for all Borough residents and businesses

Cons: Initial capital and buying costs would be high. This would create a heavy burden on the Borough, as well as community members. Higher bills would cause an overall disapproval, and anger from the community. But proper advertising and information distribution would hopefully quell these disputes. Also the Borough is currently collecting in a very efficient way already. So anything more may just add to costs without gaining too much more efficiency. Proper cost-benefit analysis for program implementation is therefore necessary.

Existing Programs: The current collection program, and future implementation plans are being created.

Funding: Implementation of a bio-fuels program could potentially provide funding down the line. Environmental groups and Pennsylvania state government groups may appreciate the “green” initiatives State College is taking and provide funds. Adequate promotion and marketing would need to be done. But the creation of a local bio-fuel supplier could also lead to an adaptation of other bio-fuel based businesses down the line.

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Option W1.5: Support the implementation of a can and bottle redemption policy at the state level

Description: Can and bottle redemption programs are a touchy and controversial topic. This is because there is a dispute between bottle manufacturers and distributors, and recycling enthusiasts. Essentially a deposit law works like this. Retailers would pay deposits to the distributor for each can or bottle purchased. This cost gets passed down to the consumer, who pays the deposit to the retailer when they purchase the beverage. When the consumer returns the empty container, the deposit is refunded.

Currently eleven states, eight provinces, and many countries have deposit laws, but no two are alike. Pennsylvania has tried many times, but failed to pass any measures. This is often due to the fact that so much recycling infrastructure already exists in Pennsylvania, so this program would make these obsolete. This redemption policy works best for a state that has a very poor recycling percentage. Pennsylvania policy to try and introduce this bill has consistently been initiated and failed.

Stakeholders: CCSWA, local and national food and beverage container manufacturers, and local residents

Measures of Success: If a legislative bill passes, new state policy would be enacted. If this happens, then results would occur, but if not, nothing changes.

Pros: Bottle bills create a number of positive results. They reduce litter as previous suddenly has value, and so save energy and so protect the environment as old bottles and cans are reused. This also creates higher levels of recycling, so promotes economic activity, and new job industries. It is said that if every state had a deposit system, over 100,000 new estimated jobs could be created. This recycling effort then reduces landfill space. Current systems have reduced up to 20 million cubic yards of waste a year. Recycled cans save approximately 65% of the energy required to make new ones. Glass recycling saves about 10% energy, and plastic bottles save around 50% of energy. So less energy burned means fewer emissions released.

Cons: Bottle bills also come with a variety of negative aspects though. Bottle bills are not a new thing, and have previously been met with much rejection. These bills do increase the prices of all drinks, and puts the reliance on the customer to collect, store, and return the containers. This means far more driving and trips to the drop-off center. That could be an inconvenience to many people who do not value the small monetary exchange it results in. However many argue with this fact.

Funding: Support of this program would come from influential political groups and approval by Governor Rendell. No real money would need to be raised, only public interest. Funding for the cans would be provided by retailers consumers purchase containers from.

Existing Programs: Implementation of a nation-wide recycling program could lead to unexpected good things. Germany for example uses such a program, so the homeless population would scour the streets looking for cans and bottles to turn in for money. This creates very clean roads, as all litter is naturally picked up.

In depth information about pending legislation affecting the commonwealth could be found at the Professional Recyclers of Pennsylvania (PROP) Websites: www.proprecycles.org

For More Information: GreenWorksRadio (2004). “Bottle Bill”:
<http://www.greenworks.tv/radio/todaystory/20020422.htm>

Container Recycling Institute (CRI) (2006). “Bottle Bill Toolkit”:
<http://toolkit.bottlebill.org/facts.htm>

Professional Recyclers of Pennsylvania (PROP) (2004). <http://www.proprecycles.org/>

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Option W1.6: Recycle waste products of Borough building and development projects

Description: Currently all construction projects are permitted under strict rules from the Centre Region Council of Governments (COG) codes office. Depending on the project, and the specified codes, the contractor is given information as to what the proper waste disposal and recycling rules are. The current Building Demolition Disclosure form defines the proper disposal requirements as thus: “*waste resulting from construction, demolition, or renovation of buildings and other structures includes wood, plaster, drywall, metals, asphaltic substances, bricks, block and un-segregated concrete. Dredging waste, grubbing waste, street sweepings and Non-Friable Asbestos*” also are included. Uncontaminated soil, rock, stone, gravel, brick and concrete, as well as waste from land clearing, grubbing, and excavation like trees, brush, stumps, and vegetative material are NOT included. All waste must go through the CCSWA. These rules exist to reduce added weight and landfill space, hopefully creating less energy demand.

Unfortunately, this system is under terrible compliance, and often times excluded material finds its way in the trash. Representatives from CCSWA are currently working with COG to redraft new documents with stricter rules, and helping local haulers with better compliance. Currently corrugated cardboard is the most common material recycled.

Stakeholders: Local haulers, Construction Contractors, CCSWA, COG, Landfills operators

Measures of Success: Compliance is regulated by CCSWA under COG rules, so unless adequate monitoring by these agencies happen, the problem would go unchecked. Reports and analysis of yearly construction projects, and comparative measuring would best measure notable changes.

Pros: With stricter compliance waste disposal could be minimized. The less waste that could be otherwise recycled or composted means less waste would be found in landfills, and take up less space. This also means less fuel would be burned for transportation. Well known recycling methods would create a more environmentally friendly site, and hopefully end up reducing the cost for new materials.

Cons: Despite the strict rules already in place, compliance seems to be lacking. As no one is going to sift through truckloads of various wastes, there is no real way to monitor exactly what is in the trash. Also current recycling for construction projects requires a special recycling site. None currently exist in the Borough. So it is easier for contractors to simply throw the excess away, and not worry about it, rather than hold on to it searching for a place to deposit it. Time and fuel is very valuable to contractors, obvious problems with the current system.

Existing Programs: All contractors operate under strict construction rules, but how strongly enforced these are remains a source of speculation. Many items from sites are hard to recycle without the proper facilities. The Borough could team up with the University to dispose of waste together.

Funding: Grant or State sponsorship for a C&D recycling site within Borough property could be very beneficial, especially considering the area’s population and building growth. Combined efforts with the university, and coordination with recycling for its construction projects could help strengthen this argument.

For More Information: Centre Region Council of Governments (CRCG) (2007). “Code Administration”: <http://www.centregioncode.org/>

Building Demolition Disclosure Form (2007).

<http://www.collegetownship.govoffice.com/vertical/Sites/%7B6F77EE0A-5147-4D68-88D3-B3066A5A57B4%7D/uploads/%7BF5ECDE73-A95D-4160-BEDC-B5623F040E18%7D.PDF>

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Option W1.7: Develop a plan to decrease landfill waste from the current level of 48% to near 0%

Description: Waste in State College is a big expense. Everyone produces it, and costs of hauling it to a landfill can really add up. But if residents and businesses were to watch what they threw away, thousands of dollars could be saved. Developing a plan to deal with organic waste like yard waste, sticks, grass clippings, leaves, and food scraps, could really make a difference. Some ways to deal with this organic waste comes from composting (see W1.1 for more information), and recycling. But either way, a reduction in this waste could lead to very large savings for the Borough. In fact only a 10% reduction could yearly save the Borough over \$100,000 in just tipping fees. So the initiative to reduce organic waste should be a big incentive.

In order to achieve this reduction, a few challenges need to be addressed. The first is an organic pickup requires a secondary system of trucks to be running, each requiring energy. Secondly, without wide acceptance, or knowledge, many people would not use the system. Some of the more challenging areas are multi-family homes, and apartment buildings, as getting many people to cooperate are often difficult.

Stakeholders: Local residents, businesses, students, Borough members. Anyone who produces and throws out organic waste.

Measures of Success: A pilot program that sees positive results would measure this as a good or bad idea. Essentially, the more organic waste collected, the more this would work. Borough public works members should also see a noticeable decline in trash hauling fees. General public acceptance and opinion would also be an excellent way to monitor results.

Pros: Separating organics from normal garbage not only cuts costs, but also allows the Borough is already growing composting program to get bigger. This allows other areas like organic fertilizers, home self-improvements, and lower trash bills to result. The less waste would also require fewer trips to landfills, and more to the local composting facility, creating fewer emissions produced. An organic lifestyle also improves general temperament and environmental moods.

Cons: Certain sectors for organic collection pose problems. Namely, multi-family homes and apartment buildings. These buildings operate under different rules of the Borough, and so do not follow the same collection policies as a normal residency. Local businesses have established levels of waste, but these areas lie in a strange middle-ground. Also, general awareness and acceptance of this policy requires behavioral changes. Most people see a trashcan as a place for all waste, and do not differentiate. Education would be key.

Existing Programs: The Borough already does offer a collection service for yard waste. Most of this material ends up going to the local composting facility (See Option #1 for more information). However plans for a 3 year pilot collection composting program are also underway. Organic food waste from grocers would be collected and composted during year one, with restaurants being added given successful results during the second year. Finally curbside pickup would be implemented for residents in two pilot neighborhoods during the final year. This is just in the planning stages as of now, but surveys and documentation are currently underway to obtain public and business opinion. Currently the Borough is working with the DEP

(Department of Environmental Protection), Penn State, and CCSWA (Centre County Solid Waste Authority), with the CCSWA handling the education and awareness portion of the program. This pilot is being performed to analyze potential future costs. An educational program will be launched initially to promote the idea of organic separation.

Funding: Funding is already in place for the current composting program, as well as the adoption of a new organic collection program. The CCSWA monitors this.

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Option W1.8: Enact a fee-schedule charging residents and businesses only for garbage that is picked up

Description: The pay-as-you-throw (PAYT) program is a well endorsed economic system of garbage collection. Essentially, residents are charged only for the collection of waste (household trash, not organic or recyclable material) they generate. Most waste collection systems charge based on property taxes or a fixed fee. But this system, much like electricity, gas, or water utilities are based, only charges for what you produce. Residents could buy clear plastic bags, or some areas weigh the garbage. Households that produce less waste therefore save money over more wasteful neighbors.

The idea promotes environmental sustainability by putting a price on throwing things away. A local system for example could use transparent bags. When trash collectors came by, if they saw any recyclable material in the bags, they simple would not collect the garbage. This helps increase recycling, and organic waste disposal (See Option #8). Less waste and more recycling means less fossil fuels are being burned. This also improves the economic sustainability for municipal waste management expenses. Also, a shared sense of fairness and trust forms, because residents are earning exactly what they are charged for. Pennsylvania currently has over 213 PAYT programs in many counties working successfully

Stakeholders: All Borough residents, waste collectors, CCSWA recycling, landfill operators.

Measures of Success: Implementing a policy like this would best be measured by collected bags per house. If some house suddenly were not producing trash, than its apparent there is a flaw in the system. Waste collectors would need to monitor this. Measurements by the CCSWA should show increases in recycling. Also, general public opinion on this issue is important as to whether or not they are willing to comply. If a system like this works, it could save much money, and produce great results. But if people found loopholes, it would ruin it for everyone else.

Pros: PAYT programs serve as an excellent way to decrease recyclable waste. By charging residents for only what they dispose of, there are no hidden fees or taxes. Homeowners therefore could save money. This encourages recycling efforts. This policy also helps implement an organic waste system, allowing trash to be more finely sorted. This serves as an excellent way to combat expensive solid waste management issues, and a well designed system could save thousands annually.

Cons: A proper working PAYT system needs to be finely tuned to the surrounding community. State College has a multitude of dumpsters in the downtown area. With the PAYT system, the incentive for illegal dumping would rise, since residents who did not want to pay, and still dispose of garbage easily could drop it off an a nearby dumpster. Since this system only works on residential garbage, monitoring dumpsters would be difficult. Also, currently, the Borough produces around 15,000 tons of trash annually, with around 12,000 of that coming from the commercial/business division dumpsters. So a PAYT system would only be affecting the other 3,000 tons from resident homes. Such a small percent of the total trash problem may not be worth the policy change.

Existing Programs: Many PAYT programs exist all over the US, but locally there is an excellent example of a hybrid system in nearby Lewistown, in Mifflin County. Fine tuning the

system to best meet local demands is crucial. In Kyoto Japan, a PAYT program in place has already lowered household garbage by 15%, and reduced recyclables in landfills by 20%, in just one year.

Funding: Funds come primarily from residents, by replacing what they already pay for trash services. By offsetting these services, residents save these costs, and continue to pay only for what they throw away.

For More Information: Japan for Sustainability (2005). “Pay-Throw Program”:
<http://www.japanfs.org/db/1921-e>

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US Environmental Protection Agency (EPA) (2007). “Pay As You Throw”:
<http://www.epa.gov/epaoswer/non-hw/payt/intro.htm>

Option W1.9: Require large event promoters to submit recycling plans and to attend periodic events recycling workshops

Description: When a large event comes around, the line of events they must go through is fairly well known. Things like homecoming, Arts Fest, Park festivals, “First Night”, farmer’s markets, holiday events, summer festivities, and even football games all understand that a permit is required to operate on Borough streets. Generally the SWA works with the Borough public works division to ensure more proper receptacle containers are put out on the streets. The Borough understands the general situation and pre-plans for the necessary equipment. Volunteers during events like Arts Fest do an adequate job. Most of the problem comes from the vendors themselves, and the recycling of corrugated cardboard. Often vendors are spoken to, but no enforcement is put forth, so recycling slackens.

A more organized and structured set of rules for promoters could help strengthen this weakness on the vendor/guest side, rather than the Borough. Planning committees should be welcomed to meet with SWA and Public Works officials before events to discuss plans.

Stakeholders: Planning committees, Public works office, SWA, local vendors/salesmen, local residents

Measures of Success: During a large event, large volumes of waste would be generated. So comparing the percentage of normal waste vs. recycling gathered with these events could show whether additional recycling units proved successful. Since State College has a proven track records with events, comparative data from many events should show some results. From there, Borough members could decide if more forceful actions on the planning committee’s behalf need to be implemented.

Pros: More planning and enforcement could ensure more recycling, and so less material going to landfills. Proper planning could also target high volume areas, specifically grocery stores, and restaurants. Enforcement from volunteers/local vendors would add to this, without increased costs.

Cons: The Borough planned events already are seeing a respectable level of recycling planning currently. Requiring additional plans could just lead to wasted efforts. Pursuing this option may also not see very dramatic results.

Existing Programs: Current programs already in place show what is being done

Funding: None Found

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Potential Borough Community Options

Option W1.10: Encourage businesses and citizens to separate organic materials from other wastes through a green business recognition program

Description: Implementation of an organic collection system could only happen if local businesses and residents separated their organic materials (See Action #1 – Borough Government Options for more information). As of now there is not much of an incentive for anyone to do this, since no program exists, and there are no real rewards for the additional effort. But if a green recognition program were created that could provide businesses with something they valued, and then definite change would result.

Currently Borough enforcement for local businesses is operated through the Health Department, as well as commercial collection personnel. This is primarily to enforce trash and recycling ordinances, and protect against illegal dumping. Collection personnel contact the health department if a surrounding dumpster is in violation. Businesses are given a set period of time to correct the violation before a citation is written, or fine levied. Normally, businesses cooperate, and warnings do not go far beyond one strike.

Developing a program that supports cooperation and furthering environmental initiative through a non-negative way is essential to developing a working organic collection system. A green business recognition program could then be created. The ideal program would focus on local businesses, and work in conjunction with the Downtown Business Association. This would give it some local flavor, and inherently create playful “green” competition amongst businesses. Rewards for their efforts could take many forms. A “green award” ceremony at a yearly banquet could take place, with plaques to be displayed in store windows for winners. Perhaps the Borough could work out some kind of discount for disposal fees to be provided as well, that way residents could also compete in a similar competition. A grant program could award businesses money as well.

Stakeholders: All local businesses and residents, Downtown Business Association, Tavern Owners Association, Restaurant Manager Association

Measures of Success: The amount of organic waste collected and recorded would show how well this program is working. If businesses cooperate, there would be a noticeable increase. Also, general opinion, and public interest in this program would be a topic of discussion.

Pros: This green business recognition program provides an excellent source of incentive for green thinking through public notice, while costing very little to implement. People would naturally want to become involved due to curiosity, and the thrill of competition. Also, reduced waste would lower disposal costs for local businesses, saving them money.

Cons: Initial implementation may be very difficult to begin. Rewards/prizes must be researched, and would require time and money on the Borough’s behalf to organize and implement.

Existing Programs: Currently, the SWA does write PA Waste Watch Award applications for businesses that have undertaken green initiatives. They are normally found online at Professional Recyclers of Pennsylvania’s Website (PROP). This is a state-wide list that publicizes their

efforts. Businesses may then be treated to a lunch, and/or receive an award at a state wide convention.

Funding: Money that was saved by higher efficiency in trash pickup could be used to fund the program. It could serve as both a statement, and reminder that their cooperation is producing real results.

For More Information: Professional Recyclers of Pennsylvania (PROP) (2004).
<http://www.proprecycles.org/>

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Option W1.11: Discourage the use of garbage disposals

Description: Whether a garbage disposal is good or bad thing is debatable. Here are the basic facts: food leftovers are one of the single largest components of the waste stream by weight in the US; Americans throw away more than 25% of the food they prepare, or roughly 96 billion pounds per year. The question is, where that should go: in the trash, or down the drain?

Home composting and organic collection is the best choice by staying out of the waste stream, but high oil based foods should not be composted. In a landfill, food does not get oxygen so it does not decompose. Disposals use high volumes of water and so allow food to be broken down quicker. But sewage water with high organic content has higher biochemical oxygen demands, or BOD, which is measured at treatment plants to gauge how many chemicals are needed for treatment. Higher BOD values also require more water. This puts a strain an unnecessary strain on the sewage system. Depending on the design, chunks of material could also lead to clogged pipes. Many older sewage systems may not be able to handle this load.

Stakeholders: Residential home owners, appliance installers

Measures of Success: Measurements of BOD levels at local waste-treatment plants would tell the quality of the water

Pros: Less food down the drain helps ease the strain on waste treatment plants. It also uses less water, and chemicals for treatment.

Cons: Many people do not view this issue as one sided. Garbage disposals grind food that is already slipping down the sink to a point that water treatment plants can easily handle. Composting food is a lot of hassle that many people may not do, and this provides an alternative to letting waste to go landfills. Decomposition in a landfill releases methane, 34% of all of it in fact. Decomposition through sewage lines does not break down the same, and release less harmful emissions. Many sewage plants collect the sludge, which is more nutrient rich from food as a soil treatment. Food through water lines is essentially a low-effort composting method already. Also, most households that already have garbage disposals are not going to pay, or be willing to remove them when they work fine. So it is a personal choice.

Existing Programs: No mass removal of garbage disposals could be found. It is really a personal choice, depending on people's opinions.

Funding: None Found

For More Information: Sierra Club (2006). "Hey Mr. Green":
http://www.sierraclub.org/sierra/200611/mrgreen_mailbag.asp

GRIST Magazine. (2007). "Disposal Proposal":
[\(http://www.grist.org/advice/ask/2003/03/27/umbra-disposal/](http://www.grist.org/advice/ask/2003/03/27/umbra-disposal/)

Option W1.12: Encourage businesses to reuse woodchips and/or pallets generated as waste for fuel or heat

Description: Reuse of woodchips and/or pallets serves as another form of recycling. By reusing pallets for deliveries, this could save the businesses expenses for having to get new pallets for every deliver. Extra pallets also provide excess storage, and eliminate space in dumpsters. When being disposed of, wood could be added to the local composting program to be created into woodchips for use at parks. Most businesses probably do not use woodchips regularly, but those that do like park services, could perhaps re-enter these into the compost system for added nutrients.

Stakeholders: Local businesses, CCSWA, park maintenance staff

Measures of Success: Less pallets and woodchips would be noticed in dumpsters, causing less to be dumped in landfills.

Pros: Recycling uses less energy, and reduces costs for businesses. Less waste is generated overall. Excess wood could be used as kindling for residents during winter months.

Cons: Most businesses do not burn wood as a source of heat, but rather are heated by natural gas, or electricity. So burning wood or woodchips is impractical. Also, woodchips start to decompose as they age, so burning them would not be effective as they are already wet. Wood could perhaps be used as kindling, assuming it has not been treated with chemicals of any sort. Many deliveries may come with pallets included, for ease of transportation from a forklift, so modifying this is not within business's ability.

Existing Programs: None Found. This idea could work better for residents who have fireplaces, or wood stoves, as opposed to businesses.

Funding: None Found

For More Information: Vermont Heat Research (2006). "Experimental Wood Chip Furnace": http://www.sredmond.com/vthr_index.htm

Option W1.13: Develop a grant program whereby businesses could obtain consulting to improve waste management practices

Description: Local businesses could learn how to improve their waste management practices if a consulting program helped them improve those practices. A program run through local collection facilities that currently exist would be best, as many businesses would already be familiar with who they are, as compared to an outside firm.

Currently a program like this does exist. All businesses are offered waste assessments through the CCSWA office, free of charge, mostly headed by Joanne Shafer. This program has seen some positive results, however high-turnover rate from student employees make this effort an ongoing challenge. Perhaps if the program was a bit more intensive, and was adapted so teaching became crucial for employees daily tasks, a more concrete waste management system could be developed. See Existing programs for more information.

Stakeholders: All local business owners and employees, CCSWA members

Measures of Success: Measured recycling output, and perhaps future organic pickup totals would determine the strength of this program.

Pros: Currently most restaurants and bars are doing an excellent job, as waste disposal patterns are set. It does provide a challenge because employees constantly need to be re-educated due to high-turnover rates from student workers. But promising results could create a much greener environment from all businesses on a wide spread scale.

Cons: Currently the major problems with the system are the multi-family dwellings like apartments. This audience is tough to reach, and they have no incentive to listen. Landlords play a poor role in getting information to tenants, and too have little incentive. Education is an ongoing effort that cannot really be made more efficient as student employees are constantly taking and leaving local jobs.

Existing Programs: Currently the Borough does operate such a system. CCSWA officials provide this free service for the Borough's "captive audience"—that is, businesses using the Borough's trash/recycling service. The CCSWA rates businesses to see which ones are doing a good job and which ones need improvement. Statistical information is generated from the collection routes. Businesses get an annual report telling them what they recycled the previous year, and an offer for free waste assessment.

Funding: Funding is currently already in place for this program.

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Option W1.14: Encourage county landfill to use aluminum to oxidize waste and sequester hydrogen

Description: With most of the waste generated coming to landfills, having it decompose is a big concern. Most landfills are very well engineered to prevent leaks, prevent methane from escaping, maximize space, and allow for maximum decomposition. However, one idea could be proposed for the local county landfill to speed decomposition up. State College sends its trash to Somerset County's landfill. So the Borough could potentially encourage that landfill to use aluminum to oxidize its waste and to sequester hydrogen.

Aluminum is very reactive when exposed to water; it acts as an oxidizer and creates a combustion reaction, thus generating heat. This heat raises landfill temperatures, and helps speed up decomposition. Waste could then potential undergo combustion... so careful monitoring is necessary or fires could result.

Stakeholders: Somerset County landfill operators/staff, Borough contract makers

Measures of Success: Somerset could monitor the level of waste and decomposition to see if change is happening.

Pros: Waste is decomposed faster, so it is not sitting in a landfill forever, never disappearing. Nutrients released back to nature.

Cons: This idea would not necessarily benefit the Borough, but the air in general. Though it could add to budget costs. Aluminum in its purest form is very expensive, and highly reactive, so it is a potential danger. Large quantities of aluminum and rain could be disastrous. Without close monitoring, fires could start at the landfill, which could lead to great losses. Implementing such a solution would require re-engineering an already working landfill, thus putting it out of business, and costing money to relocate trash. Also, decomposition releases GHG emissions, so by it decomposing faster, that just releases even more emissions quicker. This process by nature creates CO₂, one of the GHG being combated. Hydrogen sequestration is also a very expensive process. Trapping and storing hydrogen requires expensive and precise metals, and a natural geography to store it. This idea is very impractical, expensive, and does not really help the Borough's problem.

Existing Programs: A few test landfills are currently in operation, though this idea is mostly implemented at the start of construction.

Funding: The Borough could work out a deal to help fund this installation for reduced tipping fees and dumping rates.

For More Information: "Aluminum Production Waste Advisory": (July 2007)
http://www.epa.state.oh.us/dsiwm/document/newsPDFs/aluminum_advisory_2.pdf

US Department of Energy (DEP) (2004). "FutureGen: Sequestration Research":
http://fossil.energy.gov/programs/powersystems/futuregen/futuregen_factsheet.pdf

Option W1.15: Develop a program for the recycling and reuse of electronics

Description: Electronic recycling is an often under-thought type of recycling. In this day and age, when we want the newest and hottest products, electronics are very important. And since technology improves so rapidly, this generates a lot of waste, with most of that going in landfills. By developing a program for recycling and reusing electronics, and informing local residents/businesses, we could save landfill space, and harmful chemicals within electronics from being released to the environment.

Currently the Solid Waste Authority does do eCycling. Beginning in May 2007, a permanent drop off point was added to the transfer station open to all Centre County residents at no charge. They recently collected over 231,000 lbs in just over two days. Currently they use the federal prison, Unicor, as their deconstructor/recycler. The program does not currently accept large quantities of electronics, such as from commercial businesses. But they do defer them to a private sector recycler in Tyrone, Reclamere. SWA employees are currently working with businesses to advise them to get into a leasing program for their electronics, and include recycling contracts with suppliers.

More information and education about this opportunity, perhaps with trash collection bills, would help encourage more active recycling from local residents.

Stakeholders: All local owners of electronic equipment (residents, businesses, and commercial entities)

Measures of Success: Monitoring by the SWA should determine if there are rises in electronic recycling rates. Weighing collected material is a good indicator of change, and could be applied over a year schedule to see when peak collection times may happen.

Pros: Saves electronics from going into landfills. Reduces the energy needed to create more raw materials. Allows for the production of alternative products from old electronics. Eliminates environmental damage from corrosive substances in materials.

Cons: Ease. Many people find it easier to just throw things away in a garbage can, rather than drive it to the collection agency. Education and notices are important to ensure residents know this program is available.

Existing Programs: There are many nationally recognized electronic “take-back” programs currently in operation. Dell for example will accept old computers and recycle them if you mail it to their plant. More information about these could be found online.

Funding: Many online organizations, and local groups, (like the CCSWA and local NGO) offer free to little cost programs for electronic recycling. The current program is already being funded.

For More Information: ElectronicsRecycling.com (2006). <http://www.electronicrecycling.org/> Take Back Coalition (2005). http://www.computertakeback.com/the_solutions/pa_recyclers.cfm

Option W1.16: Encourage businesses to minimize packing materials used with their products

Description: Local businesses need to get things places. Much like food needs to be protected to optimize appearance, and quality, so too do deliveries. But oftentimes, once the roles of packaging material are done, they get discarded, and this could create a big toll on the environment. Businesses should be educated and informed about the impact their packing materials have.

Businesses should try to minimize the size of boxes required for the object shipped. Boxes or bags that just fit material maximize efficiency, and eliminates the need for excess packing material. This is less wasteful, and ends up taking less space during transport. Businesses should also look to try to replace packing material when applicable. Plastic wrap sits in landfills, while less tape could do the same job. Try replacing Styrofoam with recyclable cardboard inserts. Also, many types of packing peanuts are non-biodegradable. Try looking into the degradable kind that simple melt away with water. By taking these actions you are helping the environment, and saving your own business time, hassle, and added expenses.

Stakeholders: Local businesses, consumers

Measures of Success: A reduced amount of waste from packing material should show this program is working.

Pros: Many more economic and environmental options are available as substitutes for packing material. These options save energy, offset pollution, and could end up cutting costs over time. Plus it is less wasteful in the end and provides a peace of mind.

Cons: Many packaging materials may come from outside vendors which local businesses have no control over. In this case, creating a change may be difficult. Also, finding substitutes could raise upfront costs initially, and become a problem for vendors.

Existing Programs: Many large corporations are already trying to take a greener approach with their packaging material. European countries also have a more established packaging industry that often codes packages by size and material according to strict standards. The Borough could study these practices and apply them to local businesses.

Funding: By switching to a more environmentally conscious packaging system, local businesses could pay for these costs with the money they have saved. The Borough could also offer a small grant for businesses willing to change their practices and be recognized as “green” businesses.

For More Information: Danish Environmental Protection Agency (DEPA) (2001).

“Environmental Impact Packaging

Material”: <http://glwww.mst.dk/homepage/default.asp?Sub=http://glwww.mst.dk/waste/Packaging.htm>

Industrial Council for Packaging and the Environment (INCPEN) (2007). <http://www.incpen.org/>

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Option W1.17: Develop a program where residents could choose to reduce the amount of junk mail they receive

Description: Junk mail in our mailboxes is no unique thing, something we are all very used to. However, that mail over time creates two very serious problems. The first being waste. It is estimated that each adult in America receives over 41 lbs of advertising mail a year. In the long run, that is a lot of wasted paper, and trees being cut down. This accumulates to a rise in emissions, as there is nothing to counteract carbon-dioxide release. However, another very dangerous result is identity theft. Over 3 million Americans each year have credit-cards processed in their names, with over 400,000 of these coming directly from stolen mail. The most dangerous of these types being pre-approved offers. The reason is because many companies sell your personal information to advertising companies, and so your name gets on mailing lists. Luckily, there are a number of public Websites individuals can e-mail and numbers they can call to stop this, depending on what your junk mail source is.

- Pre-Approved Credit Cards and Insurance Offers – Call 1-888-56 OPT OUT (1-888-567-8688). Households can opt-out of mail for up to 5 years, but they must include each member of the family.
- Direct Marketing Associations – Use telephone, Internet, and mail to directly contact consumers. Go to www.dmaconsumers.org and search for the Mail Preference Service (MPS) form. Fill this out, and pay the \$1 charge to be removed from these lists
- Anonymous Mail – This is mail addressed to “Current Resident.” You can remove your name and address at www.advo.com/consumersupport
- Catalogues: E-mail optout@abacus-us.com, and simply ask to be taken off their mailing list.

Stakeholders: Local residents, who would see a large reduction in the waste mail they receive daily. In a large sense, paper makers would also need to print less.

Measures of Success: The amount of mail you receive would decrease if it were working. The whole process would cost you close to nothing, and take less than an hour.

Pros: Less mail in your mailbox, peace of mind, uninterrupted meals, personal and financial safety, and dramatically less paper waste – up to 100 million trees are destroyed annually for junk mail

Cons: Residents need to take the time to do these themselves. Each adult in the household (anyone over 13 yrs) must be personally included. Also if you move or change names, the process must be repeated.

Existing Programs: For more information/further details see <http://www.msnbc.msn.com/id/18530707/>. Also <http://www.41pounds.org/> has lots of information for consumers, and offers offset options through Carbonfund.org

Funding: To get off mailing lists, simply go to Websites, and call companies. There are slight fees involved, but many are free. Borough advertisement would best show these to the community.

For More Information: Kirchheimer, Sid. (2006). “Scam-Proof Your Life”
Today Show – MSNBC (2007). “Hate Junk Mail?”: <http://www.msnbc.msn.com/id/18530707/>

Option W1.18: Encourage businesses and residents to buy locally grown foods

Description: Buying locally grown foods is a very simple way to make a big difference in the energy value of all foods. When many people go to the supermarket, they do not think about where their food came from. However, most food on average travels more than 1,300 miles from source to your fridge. That distance requires massive amounts of energy and water, in growing, harvesting, and transportation. Buying locally grown foods supports the local economy, making everyone overall healthier. But there are also a number of other reasons to buy locally:

- Support local farmers – most of the money spent on grocery foods go to suppliers, processors, and middlemen, while only 3.5 cents of each dollar goes to the farmer. Food bought locally allows farmers to keep 80-90% of each dollar.
- Add to local economy – By buying local, money stays in the community longer. Small farms actually re-invest more money into local economies by purchasing feed, seed, and other materials from local businesses. Larger farms purchase bulk from distant manufacturers
- Fresh taste and safety – Fruits and vegetables shipped from distant states can spend between 7-14 days in transit, and are often chosen for their ability to withstand harvesting equipment and travel... not taste. This produces little variety. Local fruit is often fresher, tastier, and safer, because consumers know where it came from. Many small farmers do not use pesticides or growth hormones larger producers use, so the quality is just higher.

By encouraging the purchase of local farms, the benefits seep into the surrounding community, not big corporations.

Stakeholders: Local farmers, residents, businesses, grocers, farmer markets, local economy

Measures of Success: A working program would show rises in profits of local farmers, and a much higher quality of food for consumers, so a content overall feeling would show this.

Pros: Exceptional taste and freshness. The local economy is strengthening, as well as smaller farms. Because the product is safer and people know where it came from, it gives peace of mind. But mostly, it protects the environment. By saving energy, this reduces emissions, and fights global warming.

Cons: Finding local suppliers falls on the residents as of now, so things are not readily available. But by establishing more existing programs would let this program grow.

Existing Programs: There is a Farmers market currently in place, but only on a very small scale. Expansion of this would be an ideal way to introduce this idea.

Funding: None Found. Further promotion for the farmer's market and community awareness should make this happen naturally.

For More Information: Food Routes.Org (2003). <http://www.foodroutes.org/>
Sustainable Table (2007). "Buy Local": <http://www.sustainabletable.org/issues/buylocal/>

Option W1.19: Encourage businesses to reduce paper use

Description: Through an active education approach, local businesses can be encouraged to reduce their paper use and waste. Though it may not seem like a big deal, paper is one of the most commonly used, and wasted materials. Cutting down trees puts a big strain on the environment, as this eliminates sources of carbon sinks, and pollutant filters. The CCSWA Website has a multitude of great and interesting facts about all kinds of materials (<http://www.centrecountyrecycles.com/Facts/Waste%20Management%20Facts.html>).

- One tree can filter up to 60lbs of pollutants from the air each year
- Recycling paper uses 60% less energy than processing new timber, and annually saves 11.4 million tons of BTU per ton of material
- Recycling one ton of paper saves 17 trees, 6,953 gallons of water, 463 gallons of oil, and 3 cubic yards of landfill space
- The EPA recently found that making paper from recycled goods results in 74% less air pollution, 35% less water pollution says EPA
- Newsprint can be recycled up to 8 times before it becomes too weak
- 70% of corrugated cardboard is recycled annually in the US

These are just a few facts, but it is important that local businesses try to reduce their paper use to keep our environment as clean, healthy, and pristine as it can be. By educating local businesses about these facts, change can happen.

Stakeholders: All local businesses, Borough residents and students, paper manufacturers, paper distributors, and the CCSWA paper recycling plant

Measures of Success: The less paper wasted the less that needs to be purchased. Businesses are also encouraged to actively recycle their paper waste, which would then see higher totals at the CCSWA.

Pros: The benefits of reduced paper use could be seen in saving air-purifying forests, reduced costs, and a better standard of living. Less paper would also mean less waste, so lower costs for hauling. The CCSWA currently has an active paper-recycling program in place

Cons: Using less paper may be more difficult for businesses to adjust to. Generating paper waste is a natural part of any business. Reductions must come from employees, who may not be willing to make changes.

Existing Programs: The CCSWA has a paper-recycling program already in place. Good paper use methods are commonplace and can be found online for more tips.

Funding: None Found

For More Information: Department of Environmental Protection (DEP) (2007).
<http://www.depweb.state.pa.us/dep/site/default.asp>

Center County Solid Waste Authority (CCSWA) (2007). “Waste Management”:
<http://www.centrecountyrecycles.com/Facts/Waste%20Management%20Facts.html>

US Environmental Protection Agency (EPA) (2007). “Municipal Solid Waste”:
<http://www.epa.gov/epaoswer/non-hw/muncpl/facts.htm>

ACTION W2: PURCHASE AND USE GOODS THAT REDUCE THE POPULATION'S ENVIRONMENTAL IMPACT

In supporting the use of goods that reduce environmental impacts, items and goods made from renewable resources, items that conserve paper, and items that are reusable could help in saving resources that may become scarce. Many of these resources are petroleum based and require distance transportation that emits many greenhouse gases over the products life cycle.

Potential Borough Government Options

- 1) Set all borough government printers to duplex printing
- 2) Require the purchase of office products made from recyclable materials for borough government operations
- 3) Enact a producer responsibility law whereby local businesses are financially responsible for the environmental impact of their products or sales

Potential Borough Community Options

- 4) Work with borough government and local businesses to promote and make available brown paper bags or compostable plastic bags for waste disposal
- 5) Discourage the use of plastic bags at grocery and other retail stores
- 6) Encourage residents to buy reusable products and to reuse them
- 7) Encourage local businesses to use packing materials for their products that have minimal impact on the environment

Potential Borough Government Options

Option W2.1: Set all Borough government printers to duplex printing

Description: Developing a program to promote duplex printing on all government borough printers to duplex printers. Duplex printing is a feature of computer printers that allows the automatic printing of a sheet of paper on both sides. Most printers can only print on a single side of paper automatically; this is called simplex printing. Simplex printers can still print duplex jobs. However, the user has to manually turn the print job over and re-initialize the printing of the document. Because the State College Borough does a lot of printing, printing on both sides of the paper can get tiring if you are fussing with piles of documents to print, then you may want to consider a printer that does it for you. Printers capable of double-sided printing usually have an internal tray that catches the paper after the first side is printed, flips it, and runs it through the print cycle again. A few printers have external trays that can be added after you buy the printer, but for the most part, you need to opt for the duplex printer at the time of purchase.

For each sheet of paper used, a company incurs not only purchasing costs, but also storage, copying, printing, postage, disposal, and recycling. Electronic forms can now make that job easier and more efficient. Businesses that have converted to electronic forms and filing systems have found that it takes less time to both find and process information. This does not mean that electronic forms should replace all paper. In some instances, paper would be the best tool, but most businesses find that reducing their paper use increases their efficiency. Paper is an office necessity for some essential tasks, but it has an environmental cost. Creating paper from trees requires a lot of natural resources: trees, water, and energy.

Stakeholders: State College Borough Operations, State College Borough Business Owners

Measures of Success: Is the government being economical, environmental, and efficient? Saving paper saves money. Saving paper reduces the Boroughs environmental impact. Saving paper may increase efficiency.

Pros: Saved Paper. Michigan University pays roughly \$.0049 per piece of paper. If we multiply that number by 22,956,030 (our 2004 total page count) we have a cost of \$112,484. If we were to default to duplex printing we could save half that amount (\$56,242) per year in paper costs. Also, generating savings in the production and delivery of paper, the inks and energy used in the printing process, the physical space needed to store the printed documents as well as cutting down on recycling and disposal activities once employees have finished with documents.

Cons: There is usually a \$0.06 to \$0.14 increase in cost per page printed in simplex to duplex printing. Also, money and difficulty in upfront implementation are problematic.

Existing Programs: Unable to find any programs. However, many universities are looking into creating duplex printing options in their computer labs.

Funding: Funding should come from within the State College Borough Government and individually within State College Business owners. The payback period involved by saving paper should be incentive enough.

For More Information: For additional energy savings examples and associated cost savings see the EPA's regional Website, available at:

<http://www.epa.gov/reg3artd/globclimate/energystar.htm>.

Option W2.2: Require the purchase of office products made from recyclable materials for Borough government operations

Description: Purchasing office products made from recyclable materials for all Borough government operations could present a few options. Everything from envelopes, binders, notebooks, report covers, calendars, ink cartridges, coffee cups to storage boxes can be found in environmentally friendly designs. Many of these green office products can be purchased in bulk, thus savings are available depending on the vendor. Products are usually made of recycled content, biodegradable/compostable material, and reduced chemical content. Everything from recycled and unbleached file folders to paper, stationery to toilet paper, and towels to coffee filters can now be purchased.

Write or call Green Seal to get the most up to date list of recycled and unbleached products, their Green Certified Products list, or the Green Buying Guide:

Green Seal
1730 Rhode Island Avenue, NW Suite 1050
Washington, D.C. 20036
Phone: 202-331-7337.

Stakeholders: State College Borough Operations

Measures of Success: Is the government being economical, environmental, and efficient? Saving paper saves money. Saving paper reduces the Boroughs environmental impact. Saving paper may increase efficiency. Many of these products can be composted. By composting such materials, the Borough offices could reduce its waste stream and thus, its dumping fees. Also, by purchasing these materials the Borough is doing its part in being responsible.

Pros: Buying recycled-content products ensures that the materials collected in recycling programs would be used again in the manufacture of new products. There are incentives to purchase environmentally friendly office products. These include

Cons: Money requirements. Often, many of these materials are more expensive to purchase. Therefore individuals are reluctant to begin to implement such actions.

Existing Programs: EPA's Environmentally Preferable Purchasing (EPP) Program is a federal-wide program that encourages and assists Executive agencies in the purchasing of environmentally preferable products and services.

The Comprehensive Procurement Guidelines (CPG) is a key component of the government's "buy-recycled" program and is part of EPA's continuing effort to promote the use of materials recovered from solid waste. Buying recycled-content products ensures that the materials collected in recycling programs would be used again in the manufacture of new products.

Funding: Unless a government subsidy is proposed, funding should come from within the State College Borough Government and individually within State College Business owners.

For More Information: The EPA Environmentally Preferred Purchasing (EPP) Website and comprehensive procurement guidelines (CPG).
Available at <http://www.epa.gov/epp/> and <http://www.epa.gov/cpg/>

Option W2.3: Enact a producer responsibility law whereby local businesses are financially responsible for the environmental impact of their products or sales

Description: In a plan to make State College Business owners financially responsible for the environmental damage caused by operations there would need to guidelines so business owners had an opportunity to mitigate its risk. These might include environmentally friendly purchasing or waste management requirements. If business owners do not meet these requirements they may be subject to a fine. If a business owner fails to meet the average standard, the company could be assessed a fine of a dollar amount per “violation.” Looking at this economically, the business owner would produce where his/her marginal cost to produce at the pre-defined standards is equal to the marginal benefit from the pre-defined standard. Marginal cost is your supply curve. When marginal cost is less than dollar amount specified, they would act in an efficient manner. If the marginal cost to produce the environmental requirements were greater than the specified dollar amount the business owner would gladly pay the fine. Therefore, it is in the best interest of the Borough to come up with guidelines that are achievable and would yield a positive result. With the fine money, the Borough should facilitate further green initiatives.

Stakeholders: State College Borough, State College Business Owners, and the Centre County Waste Management Authority

Measures of Success: The purchase of environmentally friendly products. An increase in energy savings and less waste would be produced. Also, businesses would operate at their efficient level where the additional cost is equal to their additional benefit per unit of environmental impact.

Pros: This option would facilitate the necessity to produce environmentally friendly practices within every business under State College ordinance. Businesses would ultimately participate because at some point along their MB and MC curves, it would be beneficial to take action. As the law becomes more stringent, the action taken by business owners would be more environmentally friendly as well.

Cons: Forceful in nature due to its “pay or perform” attitude. This action would essentially put a tax on environmental practices.

Existing Programs: Not Applicable – Examples include “cap & trade permitting” and “emissions taxing”

Funding: Not Applicable – the market will determine pricing if a “fine” is initiated.

For More Information:

Motivating Recycling: A Marginal Cost Analysis <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1465-7287.1993.tb00390.x>

Environmental Economics: http://www.env-econ.net/carbon_tax_vs_capandtrade.html

Potential Borough Community Options

Option W2.4: Work with Borough government and local businesses to promote and make available brown paper bags or compostable plastic bags for waste disposal

Description: A wide range of environmentally friendly bags made from sugar cane, corn, wheat, potato starch, and falling leaves have entered the market. Greening your waste management practices can be made possible. Compostable bags are an alternative replacement for traditional petrochemical based plastic bags that take hundreds of years to breakdown in a landfill, creating serious issues with sustainable practices. The plastic bags release carbon dioxide upon breakdown. By using compostable bags in businesses and downtown waste pick-up, one is able to “close the loop” by returning the goods to nature. A variety of environmentally friendly, nontoxic, and sustainable products are available. It is in this market niche that seeks to make a difference, helping to “close-the-loop” by marketing recycled and other environmental products.

Stakeholders: State College Borough, State College Business Owners, Waste Management Company, Composting Facilities

Measures of Success: By implementing waste management programs geared towards the separation of organic, compostable material and the transportation to a composting site, businesses and the Boroughs waste stream would be reduced. Ultimately, the composted material may be used for fertilization on Borough grounds.

Pros: This would “close the loop” if collected properly. Also, this would result in a reduction of greenhouse gas emissions, especially carbon dioxide. Finally, composting would be more noticed within the Borough, hopefully initiating compost use.

Cons: There are many restrictions as to what may be composted and how long it takes certain materials to compost. Therefore, it is very important to separate waste that may be composted from the waste unable to be composted.

Existing Programs: There are numerous vendors that provide such products. Vendors include Eco-Products and Excellent Packaging and Supply, among others. Currently, there are cities that have adopted such programs. The city of Whitehorse in Yukon, Canada has agreed to a composting program. Also, universities have adopted such programs. The University of California at Berkley

Funding: A local grocery store initiative could be created by allowing free advertising on community Websites or on community television programs in return for using these products. Also, partner with the composting facility to promote compost purchasing by local residents in return for financing for the bags.

For More Information:

City of Whitehorse composting program:

http://www.city.whitehorse.yk.ca/index.asp?Type=B_BASIC&SEC=%7B77390DA8-6BDA-46C9-AF0E-9EDB615E33E1%7D

UC Berkley Program: <http://sustainability.berkeley.edu/calcap/> <http://www.compost-bin.org/compostable-bags/>

Option W2.5: Discourage the use of plastic bags at grocery and other retail stores

Description: This option could be looked at two different ways. First, it should be required that grocery and retail stores offer an incentive for customers to use reusable bags to pack their items in. An incentive could be a certain amount of money off their purchase with the use of each bag. Many grocery stores already perform this gesture. However, after speaking with the manager at McLanahan's and a representative from Giant Supermarkets, the \$0.10 per bag does not provide a huge amount of response with the customers. Alternatively, grocery and retail stores should opt away from using plastic, non-biodegradable bags and switch to more environmentally friendly bags made from renewable resources. These bags therefore support less oil imports, the agricultural industry, and new niche markets. Polyethylene is made from ethylene gas derived from nonrenewable natural gas or crude oil. And once made, it does not go away. Like all petroleum-based plastics, polyethylene will last many human lifetimes without biodegrading, whether we put it in a landfill or leave it out in the rain. That is not true for biodegradable bags. Moreover, petroleum-based plastic is not a renewable resource, but organic materials—such as corn and sugar—are. By providing cash incentives and alternative bio-bags, grocery and retail stores can practice and promote environmental stewardship.

Stakeholders: State College Borough Grocery Stores (McLanahan's), State College Borough retail stores.

Measures of Success: Communicating the idea, as well as actually using compostable material, would help citizens lessen their environmental footprint. Also, as stated in Option W2.1, implementing waste management programs geared towards separating organic material and transporting it to a composting site would reduce the Borough's waste stream. Ultimately, the composted material could be used for fertilizer.

Pros: This would “close the loop” if collected properly. Also, this would result in a reduction of greenhouse gas emissions, especially carbon dioxide. Finally, composting would be more noticed within the Borough, hopefully initiating compost use.

Cons: The hardship to actually have citizens respond to the discouragement of simple, easy plastic bag use (solution: eliminate plastic bags). There are many restrictions as to what may be composted and how long it takes certain materials to compost. Therefore, it is very important to separate waste that may be composted from the waste unable to be composted. Knowledge on how to separate these materials must be taught.

Existing Programs: San Francisco officials proposed a \$0.17 tax on every plastic bag. AB 2449 – Recycling plastic carryout bags - California Integrated Waste Management Board. Please see For More Information regarding this action.

Funding: It is possible to create a local initiative by allowing free advertising on community Websites or community television programs in return for using these products. Also, the Borough's grocery stores should partner with the composting facility to promote compost purchasing by local residents in return for financing for the bags.

For More Information: San Francisco nears ban of plastic bag use:
<http://www.npr.org/templates/story/story.php?storyId=8888798>

AB 2449 - California Integrated Waste Management Board:
<http://www.ciwmb.ca.gov/LGCentral/Basics/PlasticBag.htm>

Option W2.6: Encourage residents to buy reusable products and reuse them

Description: State College residents and small businesses produced over 60,000 pounds of rubbish, the majority of which ended up in landfills. Most landfill sites are old quarries and gravel pits, but due to the fact that the average person in the State College produces about 450 pounds of waste per year, this space is quickly running out. Landfill sites are unsightly and can be extremely hazardous to the environment, releasing gases that contribute to global warming and chemicals that can pollute waterways. Disposing of our waste in this way is also very costly, and the Council should be made to face severe financial penalties if we fail to make significant reductions in the amount of waste going to landfill. Taking steps to reduce, reuse, and recycle ones waste could help minimize the amount of waste State College is sending to landfill. Product reuse involves the multiple use of an item in its original form, for its original purpose or for an alternative, with or without reconditioning. In many cases waste that cannot be prevented could be reused instead of buying new products. For example, you can reuse rechargeable batteries numerous times to avoid waste from single use batteries. Also, the reuse helps to ensure that State College gets the most out of our waste and saves valuable natural resources.

Stakeholders: State College Borough, State College Business Owners, and State College Residents

Measures of Success: By using reusable products a reduced waste stream and reduced greenhouse gas emissions would result. A reduced waste stream would save the borough money by reducing dropping fees at the landfill.

Pros: Saving money over the long-term by not buying goods repeatedly. Also, reduced waste stream would lower the amount of waste dropped in the landfill, thus saving the Borough money

Cons: As always, there is great difficulty in implementing behavioral change. Also, people resist buying sturdier, reusable packaging (that is, most people think disposable carryout bags are a right, not realizing that they are paying for the privilege).

Existing Programs: Not Applicable – There are many reusable products. However, there was little information regarding an actual program aimed toward reusable products.

Funding: Not Applicable – Funding would likely need to be independent within the Borough, businesses, and homeowners. Payback period from the products reuse should be incentive enough.

For More Information:

City of Long Beach: Environmentally Preferable Procurement Policy
<http://www.longbeach.gov/civica/filebank/blobdload.asp?BlobID=12446>

Option W2.7: Encourage local businesses to use packing materials for their products that have minimal impact on the environment

Description: The impact of packaging waste on the environment can be minimized by prudently selecting materials, following EPA guidelines, and reviewing expectations of packaging in terms of environmental impact. Still, the primary purpose of food packaging must continue to be maintaining the safety, wholesomeness, and quality of food. New materials, combinations, and technologies would allow the move from cradle-to-grave to cradle-to-cradle by eliminating negative environmental impact altogether.

In a new niche market, “bio-compostable” packaging has emerged as an environmentally friendly alternative to traditional petroleum-based styrofoam and plastic packaging. However, it is necessary to raise awareness of compostable disposables made from readily renewable resources like sugarcane, corn, and potatoes and to bring to market a range of compostable and biodegradable disposable and packaging products for use in schools, restaurants, and other businesses. After the introduction of such products, composting could become a secondary part of this option.

Stakeholders: State College businesses

Measures of Success: Replacement of petroleum-based packaging with biodegradable, renewable resource-derived products.

Pros: First, this action supports energy independence while also supporting a niche market. This would “close the loop” if collected properly. Also, this would result in a reduction of greenhouse gas emissions, especially carbon dioxide. Finally, composting would be more noticed within the Borough, hopefully initiating compost use.

Cons: The initial price is near three times more expensive than conventional materials. Also, the amount of vendors that produce these products is relatively low. Until more vendors enter the market or until the government provides some sort of subsidy for the product, the price would remain relatively high. Finally, it is argued the quality of the product is not up to par with that of the petroleum derived, conventional Styrofoam and plastic.

Existing Programs: Not Applicable

Funding: If packaging materials are compostable, it may be possible for the Borough to contract with the composting facility to provide minimal funding to business owners to support these products with the additional revenue the composting facility would generate by the use of the products.

For More Information: Excellent Packaging and Supply: www.excellentpackaging.com
World Centric: www.worldcentric.org

ACTION W3: EMPLOY LIQUID WASTE PRACTICES THAT MINIMIZE GHG EMISSIONS

Liquid waste reduction strategies are able minimize water consumption, and thus energy consumption related to the operation of the water utilities. By involving community and government actions to be both behavioral and permanent change, reduction in consumption is possible.

Potential Borough Government Options

- 1) Develop a program to promote residential use of high efficiency shower heads, faucet aerators, toilets, or washing machines
- 2) Develop a program to promote business use of high efficiency kitchen pre-rinse sprayers, toilets, urinals, washing machines, and power washers
- 3) Create a Website with information about water conservation

Potential Community Options

- 4) Encourage local business to install automatic faucets
- 5) Collaborate with Penn State to enlist student help in educating residents to lower water consumption
- 6) Provide free water conservation consultations for residential homes and commercial businesses
- 7) Encourage the use of rain collection barrels to irrigate residential lawns and gardens

Potential Borough Government Options

Option W3.1: Develop a program to promote residential use of high efficiency showerheads, faucet aerators, toilets, or washing machines

Description: To develop a program to promote residential use of high efficiency shower heads, toilets, urinals, washing machines, and power washers requires conservation/efficiency efforts to be coordinated among the municipalities and districts that share river basins and aquifers. Public water conservation programs must address leaks and unaccounted water use, drought planning, water efficiency awareness and communications, and residential program coordination; enact appropriate billing structures; and serve as role models for water use efficiency in public facilities. When residents use water more efficiently, it saves money while helping the environment. Equipment changes could be seen as a permanent fix to water efficiency problems. Changing human behavior must be addressed as well, although it may be more challenging to create awareness. Promoting shorter showers and not running the dishwasher everyday is a tough thing to change.

Stakeholders: State College Borough Residents, State College Borough - help projects stay operational while also facilitating implementation through legislation and funding

Measures of Success: Create a water audit analyzing current water efficiencies within the Borough, present regulatory or supply issues, and total water usage. Next, implement efficiency strategies and analyze billing and consumption trend over a 3-year span. Use the year before the implementation of efficiencies to track results in savings in regards to consumption and cost.

Pros: Water conservation has many benefits. These include reduced water demand, reduced costs in water and wastewater treatment facilities, less environmental impact due to less surface and subsurface withdrawals, and it curtails demand for new water supplies of lesser quality. Also, there is less energy use in regards to water heating and cooling

Cons: The cost involved in purchasing these devices. Also, it would be to enforce their implementation. Finally, the renter conundrum is always present.

Existing Programs: Many programs and organizations such as the EPA Water Use Efficiency Program and the American Water Works Association offer resources for efficiency in municipal, commercial and residential use, including Guidelines for Water Conservation Plans, references on Drought Management, Conservation Pricing and High-Efficiency Toilets, etc.

Funding: Unless a government subsidy is proposed, funding should come from within the State College Borough Government and individually within State College Business owners.

For More Information: WaterSense – Sponsored by the US Environmental Protection Agency. Available at: <http://www.epa.gov/owm/water-efficiency/index.htm>

“The water Efficiency Manual” provided by the North Carolina Department of Environment and Natural Resources.

Available at: <http://www.p2pays.org/ref%5C01/00692.pdf>

Option W3.2: Develop a program to promote business use of high efficiency kitchen pre-rinse sprayers, toilets, urinals, washing machines, and power washers

Description: This is very similar to option 3.1. However, this is in regards to business use. To develop a program to promote business use of high efficiency kitchen pre-rinse sprayers, toilets, urinals, washing machines, and power washers requires conservation/efficiency efforts to be coordinated among the municipalities and districts that share river basins and aquifers. Public water conservation programs must address leaks and unaccounted water use, drought planning, water efficiency awareness and communications, and residential program coordination; enact appropriate billing structures; and serve as role models for water use efficiency in public facilities. When industrial and commercial facilities use water more efficiently, it saves money while helping the environment. Equipment changes could be seen as a permanent fix to water efficiency problems. Changing human behavior must be addressed as well, although it may be more challenging to create awareness.

Stakeholders: State College Borough business owners, State College Borough (help projects stay operational while also facilitating implementation through legislation and funding).

Measures of Success: Create a water audit analyzing current water efficiencies within the municipality, present regulatory or supply issues and total water usage. Next, implement efficiency strategies and analyze billing and consumption trend over a 3-year span. Use the year before the implementation of efficiencies to track results in savings in regards to consumption and cost.

Pros: Water conservation has many benefits. These include reduced water demand, reduced costs in water and wastewater treatment facilities, less environmental impact due to less surface and subsurface withdrawals, and it curtails demand for new water supplies of lesser quality. Also, there is less energy use in regards to water heating and cooling

Cons: The cost involved in purchasing these devices. Also, it would be to enforce their implementation. Finally, the renter conundrum is always present.

Existing Programs: Many programs and organizations such as the EPA Water Use Efficiency Program and the American Water Works Association offer resources for efficiency in municipal, commercial and residential use, including Guidelines for Water Conservation Plans, references on Drought Management, Conservation Pricing and High-Efficiency Toilets, etc.

Funding: Unless a government subsidy is proposed, funding should come individually within State College Business owners. The payback period from water utility savings should be incentive enough.

For More Information: WaterSense – Sponsored by the US Environmental Protection Agency. Available at: <http://www.epa.gov/owm/water-efficiency/index.htm>
“The water Efficiency Manual” provided by the North Carolina Department of Environment and Natural Resources.
Available at: <http://www.p2pays.org/ref%5C01/00692.pdf>

Option W3.3: Create a Website with information about water conservation

Description: As referenced before in Option 2.1, water conservation should be part of the Borough's Website. The Internet has become a mainstream source of communication. Using this tool could help communicate ideas, thoughts, actions, and responses freely and quickly. The State College Borough should create a Website that describes past actions taken, current actions pursuing, and future actions in regards to water conservation. Also, the Website should include a blog or response section so the borough and residents may be heard simultaneously. The sharing of ideas, such as particular ways to conserve water in everyday use, would help in having more people educated on the subject. The Website should provide the borough water consumption and demand details and look at trend analyses to show residents and business owners how the conservation measures are performing. Communication is a key to behavioral change.

Stakeholders: State College Borough

Measures of Success: Water consumption and demand analysis should be performed to see if action is required or conservation has taken place. Also, updated information regarding policies, actions taken by other municipalities, researched publications on the subject should always be provided.

Pros: Water conservation has many benefits. These include reduced water demand, reduced costs in water and wastewater treatment facilities, less environmental impact due to less surface and subsurface withdrawals, and it curtails demand for new water supplies of lesser quality. Also, there is less energy use in regards to water heating and cooling

Cons: People may not use the Website. Also, Website maintenance and the payment of a Webmaster are required.

Existing Programs: Not Applicable

Funding: Not Applicable

For More Information: Not Applicable

Potential Borough Community Options

Option W3.4: Encourage local businesses and households to install EPA approved WaterSense or automatic faucets

Description: Automatic faucets limit the amount of water that is provided by the faucet due to time restrictions and flow speeds. The average flow speed of an automatic faucet is .5 to 1 gallons per minutes compared to 3 to 7 gallons per minute in a traditional, older faucet. Depending on the businesses demand for water, automatic faucet could drastically cut water usage. Initial cost of automatic faucet could be anywhere from \$100 to \$400 more expensive than a traditional faucet.

Automatic Faucets sensors continuously scan the detection zone around the faucet spout. When the user's hands come into range of an automatic faucet sensor's zone, the valve is activated. After the user removes their hands, the valve closes. The circuit of the automatic faucet resets automatically for the next user. The automatic faucet sensors would only detect living beings; therefore, no false trips from light reflections or continual Infrared beam.

WaterSense, a program sponsored by the U.S. Environmental Protection Agency, is helping consumers identify high-performance, water-efficient bathroom sink faucets and faucet accessories that can reduce water use in the home and business to help preserve the nation's water resources. By installing WaterSense labeled bathroom sink faucets or faucet accessories, an average household would be able to save more than 500 gallons each year. Also, since these water savings would reduce demands on a home's water heaters, households would also save energy.

Stakeholders: State College Borough Residents and Businesses

Measures of Success: Analyze water demand and consumption in commercial buildings, schools, and businesses. Hopefully, the result would be less water use and less electricity use by water heaters.

Pros: There should be decreased water and energy consumption in all buildings where the action is implemented.

Cons: The initial cost of the automatic faucets. As of now, the faucets are more expensive than the conventional faucets used. Finally, the renter conundrum problem is always present with those who are paying the bills.

Existing Programs: WaterSense – please see below for more information.

Funding: Unless a government subsidy is proposed, funding should come individually within State College Business owners. The payback period from water utility savings should be incentive enough.

For More Information: WaterSense – Sponsored by the US Environmental Protection Agency. Available at: <http://www.epa.gov/owm/water-efficiency/index.htm>

Automatic Faucets:

<http://www.edcmag.com/CDA/Archives/51fc142e8e697010VgnVCM100000f932a8c0>

Option W3.5: Collaborate with Penn State to enlist student help in educating residents to lower water consumption.

Description: This option is based on the fact that a large proportion of State College residents are Penn State students. Two campaigns are needed:

1. To educate on campus residents living in residence halls
2. To educate off campus residents living in houses and apartments.

Posters, emails, and education incorporated in general education classes could achieve this aim. Students could also create student action clubs that, like Penn State's Eco-Action Club, strive to influence the water usage and consumption of other community members.

Stakeholders: The State College Borough, Penn State University Student Organizations, Penn State Faculty, and State College Residents.

Measures of Success: Analyze water consumption and demand in all residential areas in State College Borough. Perform year-to-year analysis in water and energy use.

Pros: No cost to State College Borough if Penn State is providing the education.

Cons: It might be difficult generating sufficient student interest in topic area to create the necessary clubs and organizations.

Existing Programs: GEOG 493- Penn State GHG Emissions Mitigation Action Plan

Funding: Not Applicable

For More Information: Please Contact Brent Yarnal, Howard Greenberg, and Penn State Eco-Action Club

Option W3.6: Provide free water conservation consultations for residential homes and commercial businesses

Description: The Borough should hire or educate consultants in regards to water and business efficiency. At first, it could be a voluntary position. However, if successful, it may be incorporated into the Borough budget. Businesses could be targeted for high water usage such as cafes and restaurants. The Borough must advertise the free consultation so residents and individuals know that it is available. This could be television, Internet, newspaper articles, or mailings. Also, teaming with the Borough Sewage and Water Authority by providing information on the Website and helpful tips on water bills could be utilized. The actual consultation itself is dependent on the business or home but many things would be covered. Consultations may include advice on the following:

- Water efficiency products
- Lawn care techniques
- Current usage issues
- Retailers
- Pricing

Stakeholders: State College Borough residents and business owners

Measures of Success: This may help lower water usage bills by residents and businesses. Also, this may result in less amount of water measured by the Water Authority.

Pros: Consultations would provide greater knowledge and expertise to all community members. Also, ultimately the primary goal is to reduce water consumption. By performing a year-to-year Borough wide water audit, the Borough would find results.

Cons: Initial Cost of the possible changes found based on the consultation. Also, behavioral change is always a problem. Finally, the payment of consultants is may be necessary.

Existing Programs: There were no existing programs in pursuit of individual water consultations. However, many municipalities have hired water authorities to perform an audit and make suggestions on a wider, broader scale. Many environmental consulting firms have water as a primary operation.

Funding: Funding should come individually within the State College Borough. The payback period from water utility savings should be incentive enough.

For More Information: State College Borough Water Authority Website:
<http://www.scbwa.org/>

Option W3.7: Encourage the use of rain collection barrels to irrigate residential lawn and gardens

Description: By collecting water from rainstorms, homeowners can create an alternative supply that will not tax the groundwater or increase the water bill. Because rain does not contain the minerals found in wells or the chlorine in municipal supplies, it is ideal for watering the lawn, washing the car, doing the laundry, or even taking a shower. A rainwater-collection system can be as simple as a rain barrel at the end of a downspout or as elaborate as a whole-house system. Cost and complexity depends on how much water the resident needs and how much the resident plans to use it. A house with a sloped roof and gutters has an ideal setup to harvest rainwater for landscape irrigation or other non-potable uses. Residents need a few simple components:

- Wire-mesh gutter screens to keep out debris
- Storage tank
- Way to move the water out of the tank

The storage tank can be made from almost any material. Gardening stores sell 55 to 75 gallon plastic rain barrels, complete with leaf screens and spouts, for \$50 to \$250. The barrel incentive program started in 2000 and since its inception has granted over 6,000 rain-barrel rebates or volume-purchase discounts. There is advising of local residents on water conservation as well as giving local conservation seminars and hands on rainwater harvesting seminars.

The State College borough should follow Austin, Texas's program by providing barrels to each home for use and offering seminars. Also, the Borough should market a water saving initiative and set an achievable goal for water irrigation reduction.

Stakeholders: State College Borough, State College Borough Residents

Measures of Success: Analyze water usage during summer months taking into account rainfall and temperature.

Pros: There would be decreased water consumption while, at the same time, promotion of environmental stewardship.

Cons: There would be difficulty in achieving resident behavioral change. Residents would perform what is easy and available to them. Also, water barrels may not look very nice around the house.

Existing Programs: City of Austin Xeriscape Program –for more information please follow the link below.

Funding: Not Applicable

For More Information: Harvesting the Water with Rain Barrels:

<http://www.thisoldhouse.com/toh/article/0,,1180779,00.html>

City of Austin Xeriscape Program: <http://www.harvesth2o.com/peterson.shtml>

CONCLUSIONS

This report presented 79 greenhouse gas mitigation options available to the local government and community of State College. The sectors covered included the most important sources of greenhouse gases: transportation, energy use, and wastes. Although the report covered a large range of issues within each of the chosen sectors, many other options are available to State College to reduce emissions and, at the same time, improve life in the Borough. The options presented here are specifically attuned to the needs of State College Borough, but are transferable to other municipalities. Most important to the Borough are the surrounding townships and boroughs of Centre County: without regional cooperation, all advances on reducing Borough emissions would be limited because of the interdependence of the Borough and surrounding municipalities.