



# *Carbon Management Planning*

*December 15, 2008*

Prepared by The Loyalton Group  
A Sodexo Educational Facilities Partner

# Today's Agenda ...

## A. Background: 10 minutes

1. What are other schools doing
2. Where is the industry going
3. Are we on track and on mission

## B. Carbon Planning: 30 minutes

1. The Green Committee recommendations in a carbon plan matrix
2. What can we discern from the suggestions and matrix
3. Computing potential cost and carbon benefits
4. What is missing from the matrix

## C. Carbon Management Plan Matrix: 30 minutes

1. Mission, goals, strategies, and projects
2. The hierarchy of our carbon plan
3. Setting priorities

## D. Plan for Next Steps: 30 minutes

1. Additional project potentials and details
2. Research assignments ... homework
3. Performing a facility audit
4. Next meeting and expectations

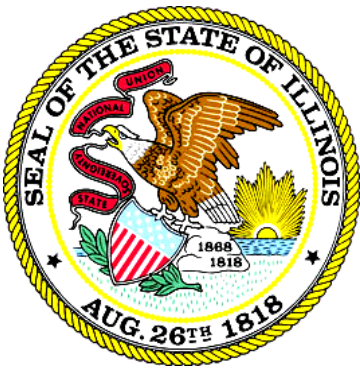
# A. Background ...

## *What are other schools doing...*

- Will other carbon footprints help provide context
- How do we stack up ... carbon-wise
- What can be learned from a comparison
- Hidden meanings in emissions factors
- What are other schools doing ...
  - *Incorporated PDF's*

# A. Other Schools ...

School	MTCDE / Student	Year	State	Students	MTCDE
Cal State Poly University	3.98	2005	CA	16,295	64,854
Carlton College	11.37	2006	MN	1,900	21,603
Carlton College	9.20	2007	MN	1,900	17,480
Champlain College	2.68	2007	VT	1,940	5,199
Connecticut College	9.00	2007	CT	1,900	17,100
Harvard University	15.86	2006	MA	20,000	317,200
Harvard University	9.15	2007	MA	20,000	183,000
Lewis & Clark College	3.40	2007	OR	3,560	12,104
Middlebury College	14.39	2007	VT	2,350	33,817
Oberlin College	16.80	2005	OH	2,700	45,360
Oberlin College	17.00	2007	OH	2,800	47,600
Smith College	12.70	2004	MA	2,600	33,020
Stevenson High School	2.78	2007	IL	4,530	12,593
Tufts University	2.20	2005	MA	8,400	18,480
Tufts University	2.50	2007	MA	8,500	21,250
Tulane University	4.10	2005	LA	10,400	42,640
UC Berkeley	6.09	2007	CA	34,593	210,671
University Colorado-Boulder	1.20	2005	CO	28,988	34,786
University of New Hampshire	4.55	2007	NH	14,000	63,700
University of Vermont	6.20	2005	VT	10,744	66,613
Whittier College	4.63	2007	CA	1,214	5,621
Yale University	25.10	2005	CT	11,341	284,659
Average of Sample	7.40		Subtotals	210,655	1,559,350
			Average of Samples	9,575	70,880



# Illinois Sustainable Schools Compact

IN COOPERATION WITH THE ILLINOIS LT. GOVERNOR'S OFFICE,

AGREES TO THIS VOLUNTARY COMPACT TO PROMOTE SUSTAINABILITY AND ACCOMPLISH THE FOLLOWING MARKED GOALS BY DECEMBER 31, 2010.

## Operations

- Conserve energy and lower carbon emissions by shutting off lights and computers when not in use and adjusting thermostat settings.
- Encourage recycling (including batteries and electronics), composting, and purchasing products with minimal packaging.
- Reduce fuel consumption and pollution from school transportation by limiting car and bus idling, encouraging carpooling, and increasing the fuel efficiency of school vehicles.
- Practice sustainable grounds maintenance by minimizing use of chemical fertilizers and following a conservative watering schedule.

## Buildings & Grounds

- Install solar panels, wind turbines, and/or geothermal units on school property.
- Convert a school rooftop to a green roof or a white reflective roof.
- Retrofit existing electric and water fixtures with high-efficiency models.
- Conserve soil and water resources by:
  - Incorporating rain barrels and swales into landscaping to slow and filter stormwater runoff.
  - Planting drought-resistant native species in landscaped areas.
  - Installing or retrofitting parking lots with permeable paving.

## Curriculum

- Participate in environmental community service projects, field trips, and assemblies.
- Start an environmental club to promote green awareness and track school-wide sustainability measures.
- Integrate environmental studies and green career development programs into the school curriculum.
- Lead students, teachers, and staff in creating a rain garden on school property.

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Lt. Governor Pat Quinn*

\_\_\_\_\_  
*Name (please print)*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*School or School District*

## Step 2: High School Sustainability Checklist “Where are we NOW?”

**Worksheet #1 – CURRICULUM**

*Please circle the appropriate number in questions with this scale:  
 0 (don't know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)*

1. Indicate the extent to which “YOUR SCHOOL” offers courses that include sustainability. (Such topics could include globalization and sustainable development; environmental policy and management; alternative energy; recycling; nature writing; sustainable agriculture; urban ecology and social justice; population, sustainable production and consumption; and many others.)

*0 (don't know)      1 (none)      2 (a little)      3 (quite a bit)      4 (a great deal)*

Please list any courses you are aware of in which such topics are taught

What is being done?	Who is doing it?	If not, who could we ask to do this?

2. What courses do you regard as essential that are not being taught?

What courses should be taught?	If not, who could we ask to do this?.

3. In our school, how much is sustainability woven into traditional education in science, math, literature, history, the arts, etc.?

*0 (don't know)      1 (none)      2 (a little)      3 (quite a bit)      4 (a great deal)*

What is being done?	Who is doing it?	If not, who could we ask to do this?

Institute for Sustainable Energy [www.sustainenergy.org](http://www.sustainenergy.org)  
 Eastern Connecticut State University

4. Are students required to take a course on issues related to the environment, ecology or sustainability? \_\_\_YES \_\_\_NO

List courses	Who is doing it?	If not, who could we ask to do this?

5. The shift to sustainability requires considering the role of the school and its students in the social and ecological systems of the world. Circle which of the following “YOUR SCHOOL’S” (through individual, group or departmental efforts) attempts to teach its students:

1. How your school functions in the ecosystem (e.g. looking at its sources of food, water use, energy use, as well as the disposal of waste and garbage)
2. Giving students a sense of place in the natural features, ecology, history and culture of the region

What is being done?	Who is doing it?	If not, who could we ask to do this?

Institute for Sustainable Energy [www.sustainenergy.org](http://www.sustainenergy.org)  
 Eastern Connecticut State University

**School Sustainability**  
**Worksheet #2 - OPERATIONS**

1. What do you see when you walk around school that tells you this is a school committed to sustainability?

What do you see?	Who is doing it?	If not, who could we ask to do this?

2. Looking back at the 12 Steps to a Sustainable High School, rate the current performance of “YOUR School” in terms of the operational steps to developing a sustainable high school :

*0 (don't know)      1 (none)      2 (a little)      3 (quite a bit)      4 (a great deal)*

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Purchasing and Administrative Services</li> <li><input type="checkbox"/> Solid Waste Reduction and Recycling</li> <li><input type="checkbox"/> Energy Conservation</li> <li><input type="checkbox"/> Clean Energy Purchasing</li> <li><input type="checkbox"/> Water and Wastewater Conservation</li> <li><input type="checkbox"/> Hazardous Materials (collection, disposal and handling)</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Transportation</li> <li><input type="checkbox"/> Food and Food Service</li> <li><input type="checkbox"/> Campus Grounds and Land Use</li> <li><input type="checkbox"/> New Construction</li> <li><input type="checkbox"/> Campus Planning and Design</li> </ul> |
|---|---|

What is being done very well?	Who is doing it?

Institute for Sustainable Energy [www.sustainenergy.org](http://www.sustainenergy.org)  
 Eastern Connecticut State University

**Campus Sustainability**  
**Worksheet #3 – OUTREACH AND SERVICE**

1. A sustainable school supports sustainable community development in its local area and in the surrounding region through partnerships and relationships with local governments and businesses. It may also seek international cooperation in solving global environmental justice and sustainability challenges through conferences, student/faculty exchanges, etc. To what extent is “YOUR SCHOOL” involved in sustainable community work or partnerships at local, regional, national or international levels?

0 (don't know)      1 (none)      2 (a little)      3 (quite a bit)      4 (a great deal)

2. What sustainability related community service, service learning and/or internship programs exist at your school?

What is being done?	Who is doing it?	If not, who could we ask to do this?

3. To what extent are student groups in your school directly involved in sustainability initiatives?

0 (don't know)      1 (none)      2 (a little)      3 (quite a bit)      4 (a great deal)

What is being done?	Who is doing it?	If not, who could we ask to do this?

4. How is a concern for, and commitment to, sustainability given broad visibility on your campus? (for example: with guest speakers, conferences, Earth Day celebrations, etc.)? Please describe key events that have happened in the past year:

What is being done?	Who is doing it?	If not, who could we ask to do this?

Institute for Sustainable Energy [www.sustainenergy.org](http://www.sustainenergy.org)  
Eastern Connecticut State University

**Campus Sustainability**  
**Worksheet #4 –PLANNING**

1. What “next steps” are planned at “YOUR SCHOOL” to strengthen your commitment to sustainability?

What is planned?	Who is doing this? Who could help?

2. What “next steps” do you feel ought to be taken?

What should be done?	Who could we ask to do this?

Please add any additional comments below:

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## B. Carbon Planning ...

**Guidelines ...** Use GHG Protocol for terminology and organizing suggestions into matrix ... Assign new scope terminology to provide a collection point for non-GHG activities ... Group activities with undefined or likely to be non-GHG impacts together

### **Scope 1: Direct GHG Emissions**

1. Combustion, Generation, Production
2. Refrigeration Gases
3. Grounds-Keeping Chemicals
4. Products, Materials, Cleaning, Sanitation, Laundry, Paints, VOC's
5. Fleet Transportation, Maintenance Equipment
6. Livestock, Crops

### **Scope 2: Imported Emissions**

1. Electric, Steam, Chilled Water

### **Scope 3: Indirect Emissions (Optional Reporting)**

1. Waste Stream
2. Water Conservation, Site Management
3. Commuting, Air Travel
4. Events
5. Offsets

### **Scope 4: Mission & Management ...** Leadership, Administrative, Training, Education

## ***B. Carbon Planning ...***

### *1. The Green Committee recommendations in a carbon plan matrix*

- Incorporated PDF's ...

# SHS Green Committee Suggestions Matrix

December 12, 2008 – Page 1 of 1

Scope	Action / Suggestion	By
1.1	<i>Revise HVAC coil circulating pump controls (75 pumps)</i> <ul style="list-style-type: none"> <li>• Lower shut off 10 degrees sooner than current set-point</li> <li>• Add outdoor air temperature relay to shut off pumps at 45 degrees</li> </ul>	BH
1.1	<i>Revise Sports-Center and Field-House fan and temperature controls</i> <ul style="list-style-type: none"> <li>• Cut back to run fans every other day except for events</li> <li>• Trend reports indicate successful temperature and fan-ops reductions</li> </ul>	BH
1.1	<i>Lower domestic water heater temperatures</i> <ul style="list-style-type: none"> <li>• Reduce from 145 to 125 degrees</li> </ul>	BH
1.1	<i>Revise HVAC comfort zones</i> <ul style="list-style-type: none"> <li>• 74-76 summer ... 68-70 winter</li> </ul>	BH-MM
1.1	<i>Install solar heating for domestic hot water use and radiant heating</i>	DC
1.1	<i>Replace toilet water fixtures with energy and water conserving models</i>	GH
1.1	<i>Replace sink proximity faucets with self-charging pipe-flow-turbine power supply</i>	GH
1.4	<i>Conceive and implement green printing / paper reduction program</i> <ul style="list-style-type: none"> <li>• Print double-sided</li> <li>• Decrease margins</li> <li>• Avoided printing whenever possible</li> <li>• Use PC-based schooling when possible</li> <li>• Use online tools, blogs, digital books, digital class aide, online assignments, online reporting, online grading, to eliminate all unnecessary paper use</li> <li>• Eliminate all mass printing</li> <li>• Eliminate/reduce number of personal printers</li> </ul>	BL-JM-MM

Scope	Action / Suggestion	By
	<ul style="list-style-type: none"> <li>• Utilize multifunction machines</li> <li>• Standardize to minimize multiple printer cartridges</li> <li>• Go to green ink cartridges</li> </ul>	
1.4	<i>Investigate and implement green painting program</i> <ul style="list-style-type: none"> <li>• Inventory all paint products</li> <li>• Properly dispose of all toxic, hazardous, and high-VOC products</li> </ul>	GH
1.4	<i>Conceive and implement green product purchasing program</i> <ul style="list-style-type: none"> <li>• Research and list green rated products</li> <li>• Apply for “Model Community” and “Earth Flag” status</li> <li>• Use all-recycled content paper products</li> </ul>	GH-JM-MM
2.1	<i>Revise fan controls to shut down non-essential fans</i> <ul style="list-style-type: none"> <li>• Eliminate fan operations in routinely unoccupied and vacant spaces, such as Performing Arts Area and Team Locker Rooms</li> </ul>	BH
2.1	<i>Develop and install campus load shedding program</i> <ul style="list-style-type: none"> <li>• Automatically cut-off load circuits or shut down equipment based upon cooling-heating limits</li> <li>• Utilize existing BAS</li> <li>• Shed (reduce or cut back) loads for prescribed periods</li> </ul>	BH
2.1	<i>Conceive and deploy lighting load reduction program / low-light and off-lighting programs</i> <ul style="list-style-type: none"> <li>• Turn off lights in unoccupied rooms</li> <li>• Turn off display and decorative lighting</li> <li>• Install motion sensors and circuits to automatically turn off lighting in unoccupied spaces</li> <li>• Review big venue lighting control logic and switch accessibility</li> <li>• Install sky lights</li> <li>• Replace exit and warning sign lamps with LED technology</li> </ul>	BH-DC-MM

# SHS Green Committee Suggestions Matrix

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Scope	Action / Suggestion	By
2.1	<ul style="list-style-type: none"> <li>• <i>Install proximity sensors on hand-driers</i></li> </ul>	GH
2.1	<p><i>Conceive and implement a campus plug-load management program</i></p> <ul style="list-style-type: none"> <li>• <i>Shut off computers, printers, monitors when not in use Purchase only energy efficient computers and peripherals</i></li> <li>• <i>Utilize load management plug-strips for older equipment to draw down to sleep / off</i></li> <li>• <i>Begin to replace older “hot-draw” equipment</i></li> <li>• <i>Consult a systems and equipment expert</i></li> </ul>	GH-BH-MM
2.1	<p><i>Conceive and implement solar power system</i></p> <ul style="list-style-type: none"> <li>• <i>Utilize \$10,000 BP grant funds</i></li> </ul>	JM-MM
2.1	<p><i>Re-lamp Field House light fixtures</i></p> <ul style="list-style-type: none"> <li>• <i>Utilize halogen lamps</i></li> </ul>	MM
2.1	<p><i>Conceive and deploy sub-metering to provide more accurate facility management and reduction strategies</i></p> <ul style="list-style-type: none"> <li>• <i>Break-out large venues: Sports- Center, Field-House, Pool, Forum</i></li> </ul>	MM
3.1	<p><i>Develop personal use recycle / re-use drives</i></p> <ul style="list-style-type: none"> <li>• <i>Shoes, CD’s, used electronics, clothes</i></li> <li>• <i>Common area bins</i></li> </ul>	BL
3.1	<p><i>Create on-campus composting</i></p>	DC
3.1	<p><i>Develop and implement a continuous recycling improvement and compliance program</i></p> <ul style="list-style-type: none"> <li>• <i>Require that all vendors provide recyclable containers, crates, boxes, pails, etc.</i></li> <li>• <i>Roll-out custodial continuous assessment and compliance</i></li> <li>• <i>Assess best locations with point-of-use volume checks</i></li> <li>• <i>Devise high-level commitment program and incentives policy</i></li> </ul>	DC-GH-MM-JM

Scope	Action / Suggestion	By
	<ul style="list-style-type: none"> <li>• <i>Develop dual stream trash and recycling</i></li> <li>• <i>Validate waste stream recyclable break-out</i></li> <li>• <i>Improve recycling education / awareness</i></li> <li>• <i>Improve student impacts</i></li> <li>• <i>Reinforce non-littering policy</i></li> <li>• <i>Reduce Styrofoam and similar products use in cafeteria and other areas</i></li> </ul>	
3.2	<p><i>Consider permeability/rainwater runoff footprint</i></p> <ul style="list-style-type: none"> <li>• <i>Install rain gardens</i></li> <li>• <i>Increase square footage of green roof</i></li> <li>• <i>Consider use of permeable paving surfaces</i></li> </ul>	DC-JM- MN-GH- MM
3.2	<p><i>Reshape campus into community model of sustainable grounds management</i></p> <ul style="list-style-type: none"> <li>• <i>Re-design with native species</i></li> <li>• <i>Utilize perennial species</i></li> <li>• <i>Annual grounds review with a master arborist</i></li> <li>• <i>Treat turf-area as biomass laboratory</i></li> <li>• <i>Vastly improve storm-water run-off management</i></li> <li>• <i>Consider negative grade islands in paved areas</i></li> <li>• <i>Replace trees with hardier native species, rethink planting and maintenance strategy</i></li> <li>• <i>Employ more robust landscape training and maintenance improvements</i></li> </ul>	GH
3.3	<p><i>Conceive and implement a bicycle rack utilization program</i></p> <ul style="list-style-type: none"> <li>• <i>Add more bike racks</i></li> <li>• <i>What will encourage greater bike use</i></li> <li>• <i>Where should racks be installed</i></li> <li>• <i>Can racks be integrated with other site improvements</i></li> </ul>	BL-MM

# SHS Green Committee Suggestions Matrix

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Scope	Action / Suggestion	By
3.3	<i>Create on-campus biodiesel plant to fuel district vehicles</i>	DC
3.3	<i>Conceive and implement a parking pressure reduction program</i> <ul style="list-style-type: none"> <li>• <i>Offer incentives to car-pooling students</i></li> <li>• <i>Offer incentives to non-car users</i></li> </ul>	JM
3.3	<i>Explore alternative modes of transportation for students, faculty and staff</i> <ul style="list-style-type: none"> <li>• <i>shuttles to and from train station</i></li> <li>• <i>add transportation costs to employee Flex Spending Account</i></li> </ul>	MM
3.3	<i>Explore alternatives for District vehicles</i> <ul style="list-style-type: none"> <li>• <i>fleet of four security vehicles</i></li> <li>• <i>fleet of six 15 passenger vans</i></li> <li>• <i>fleet of four leased 60 passenger busses</i></li> <li>• <i>fleet of four District trucks</i></li> </ul>	MM
4	<i>Continue toward LEED certification</i>	DC
4	<i>Create curriculum &amp; training</i> <ul style="list-style-type: none"> <li>• <i>Divisions should connect curricula with sustainability issues</i></li> <li>• <i>Provide staff development &amp; training about sustainable practices</i></li> <li>• <i>Train FMP's on recycling</i></li> </ul>	DC
4	<i>Research partners, sources, and grants to fund projects</i>	DC
4	<i>Create a green coordinator position to oversee and organize efforts</i>	DC
4	<i>Improve student and faculty environmental education, awareness, policy, and action programs</i>	JM
4	<i>Provide greater context of carbon footprint and comparisons to other schools</i> <ul style="list-style-type: none"> <li>• <i>Help in determining course of actions for carbon reductions</i></li> </ul>	JM
4	<i>Develop and implement a consistent community involvement approach to environmental and energy use matters</i>	MN

# SHS Green Committee Suggestions Matrix

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Scope	Action / Suggestion	By
	<ul style="list-style-type: none"> <li>• <i>Utilize video orientation for freshman</i></li> <li>• <i>Utilize more out-side professionals in community forums related to environmental issues</i></li> </ul>	
4	<p><i>Conceive, publish, and implement SHS Community Member green commitments</i></p> <ul style="list-style-type: none"> <li>• <i>lifelong learning about the environment, conservation of natural resources, and reducing energy use</i></li> <li>• <i>protecting the environment during personal and professional activities</i></li> <li>• <i>Incorporate readings and activities related to green initiatives into curriculum and instruction to fullest extent possible</i></li> </ul>	MR
4	<p><i>Develop and implement 5-year energy risk management plan</i></p> <ul style="list-style-type: none"> <li>• <i>Cap 2013 consumption at 2008 levels</i></li> </ul>	VS
4	<p><i>Develop and implement energy emergency preparedness</i></p> <ul style="list-style-type: none"> <li>• <i>Mitigate risks to volatile or steeply rising energy costs</i></li> <li>• <i>Building energy impacts / reactions</i></li> <li>• <i>Transportation impacts / reactions</i></li> <li>• <i>Emergency budget adjustments</i></li> </ul>	VS

## ***B. Carbon Planning ...***

### *1. What can we discern from the suggestions and matrix*

- Mix of ideas and projects
- Some projects underway

### *2. What is missing from the matrix*

- Specific projects
- Specific goals
- Overall mission

## B. Sample Missions ...

- **Major hotelier** ... shall develop, operate, and manage our lodging and hospitality assets to ensure that they enhance and safeguard the natural environment ... reduce the consumption of natural resources ... and conserve capital
- **Smith College** ... commits to ... 1-limit greenhouse gas and toxic emissions ... 2-reduce the reliance on non-renewable resources ... 3-survey and conduct a cost/benefit analysis of the use of toxic materials in its operations ... 4-equips students to understand and deal with sustainability related issues ... 5-improve sustainability practices in ... construction, food, transportation, materials and energy use, waste management, purchasing, investment, curriculum
- **University of California, Santa Barbara** ... will become a steward for our community and a global leader for sustainability through education, research, and action.
- **University of Michigan** ... will encourage sustainable and restorative practices through education and engagement with our stakeholders ... assess and reduce the long-term environmental impacts of our decisions ... reduce our use of water, energy, and materials by incorporation of sustainable practices ... reduce pollution and use of toxins ... openly communicate and monitor our progress ... provide staff with training and resources to meet these sustainability goals
- **Franklin & Marshall College** ... will seek to live, work, and play such that we enhance the environmental, economic, and social well-being of our communities, minimize our use of natural resources and our environmental impacts, and educate ourselves and others about the roles and responsibilities of citizens in a sustainable world.
- **Hy-Vee** ... is committed to doing business in a manner that promotes the well-being of our customers, employees, communities and the global environment

## B. Sample Goals ...

- *Reduce energy use in buildings by 20% by 2010, as compared to 2000 on a BTU per sq. ft. basis*
- *When possible, improve building performance so that every building less than 20-years old achieves Energy Star Rating of 75 or better*
- *Cap the footprint emissions at 2008 levels and reduce emissions 20% by 2015*
- *Increase use of renewable electricity to 20% of total consumption by 2015*
- *Increase use of car-pool commuting by students to 40% of total commuting miles by 2012*
- *Design new buildings and rehab existing ones in accordance with the ASHRAE High-Performance Building Standards, or similar rating standards*
- *Procure energy and fuel at competitive prices while managing price risk in accordance with a prudent, clearly defined, and documented Energy Risk Management Policy*

## B. Sample Projects ...

1. *Georgia Court*
2. *Balsz School District*
3. *SUNY Comprehensive Energy & Sustainability Plan*
  - PDF's incorporated
  - What can we learn from others
  - Lots of generalities
    - *Fragmented industry*
    - *Complex issues*
    - *Mow the lawn*

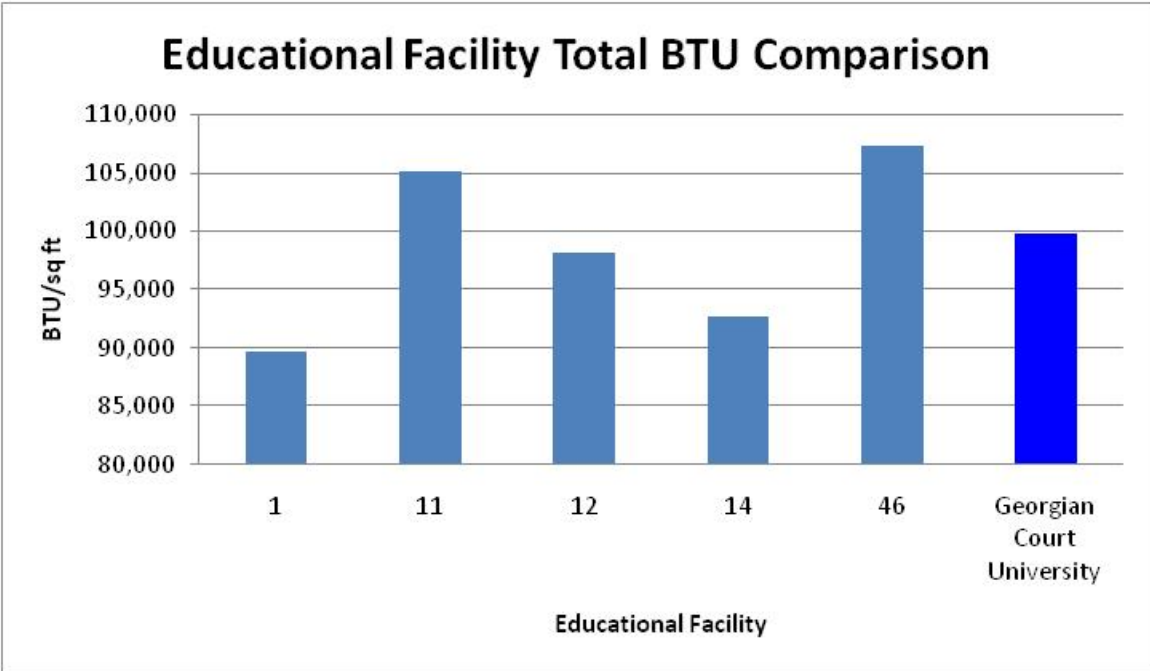
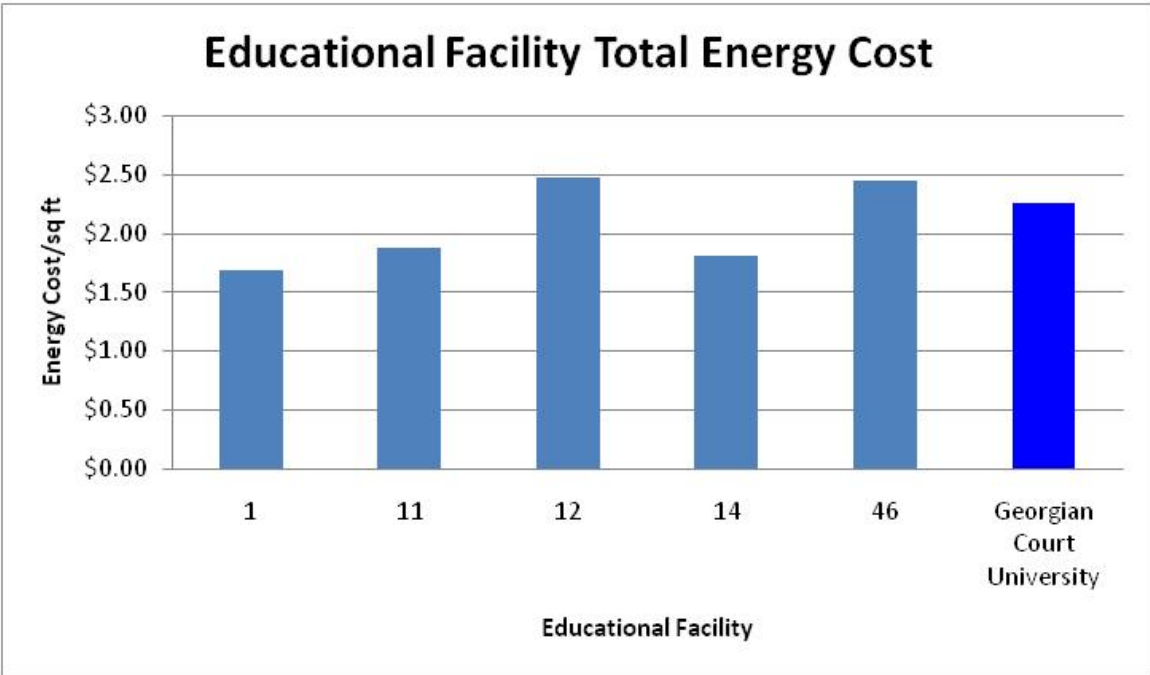
# Georgian Court Energy & Water Conservation Audit Summary

## Project Recommendation Table

Recommended Low/No Cost Energy/Water Projects & Paybacks					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate	Payback Years w/Known Rebates	Priority
Georgian Court Sustainability Committee	\$18,000	\$1,000	\$0	0.1	1
Staff & Student Awareness	with above	with above	with above	with above	with above
PC Energy Star	\$25,000	\$0	\$0	0.0	1
Insulate HW Piping & Tanks (3 buildings)	\$2,850	\$3,500	\$0	1.2	2
Vending Misers	\$4,282	\$3,085	\$0	0.7	1
Dishwasher 0.07 GPM Pre-rinse Spray Nozzle	\$3,000	\$160	\$0	0.1	1
Walk-in Cooler & Freezer Air Curtains	\$800	\$1,200	\$0	1.5	1
<i>Sub Total/Average Low/No Cost Projects</i>	<i>\$53,932</i>	<i>\$7,945</i>	<i>\$0</i>	<i>0.7</i>	
Recommended Capital Energy/Water Projects & Paybacks					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate	Payback Years w/Known Rebates	Priority
Upgrade, retro-commission, expand & schedule Metasys BAS	\$175,400	\$407,000	\$0	2.3	1
Lighting Upgrade Projects	\$51,543	\$108,903	\$23,860	1.6	1
Telkonet Dorm Room Controller	\$35,000	\$48,925	\$0	1.4	1
Intellidyne Boiler Controllers	\$30,000	\$9,079	\$0	0.3	1
Kitchen Exhaust Hood MELINK System	\$6,145	\$18,011	\$1,395	2.7	2
Install Motor VSDs (2 buildings)	\$7,592	\$16,000	\$1,200	1.9	2
Water Conservation Projects	\$45,924	\$105,626	\$0	2.3	2
<i>Sub Total/Average</i>	<i>\$351,604</i>	<i>\$713,544</i>	<i>\$26,455</i>	<i>2.0</i>	
<b>Grand Total All Recommended Projects</b>	<b>\$405,536</b>	<b>\$721,489</b>	<b>\$26,455</b>	<b>1.7</b>	
Projects Recommended for Engineering Evaluation/Maintenance/Not Recommended at This Time					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate or EPACT Tax Deduction - Credit	Payback Years w/Known Rebates	Priority
Energy Recovery Ventilation for Fume Hoods	Engineering evaluation of ducting hoods to ERV				
Steam to HW Conversion at Mansion	Engineering evaluation				
Renewable Projects	Engineering evaluation				

# Georgian Court Energy & Water Conservation Audit Summary

## Utility Performance Benchmarking

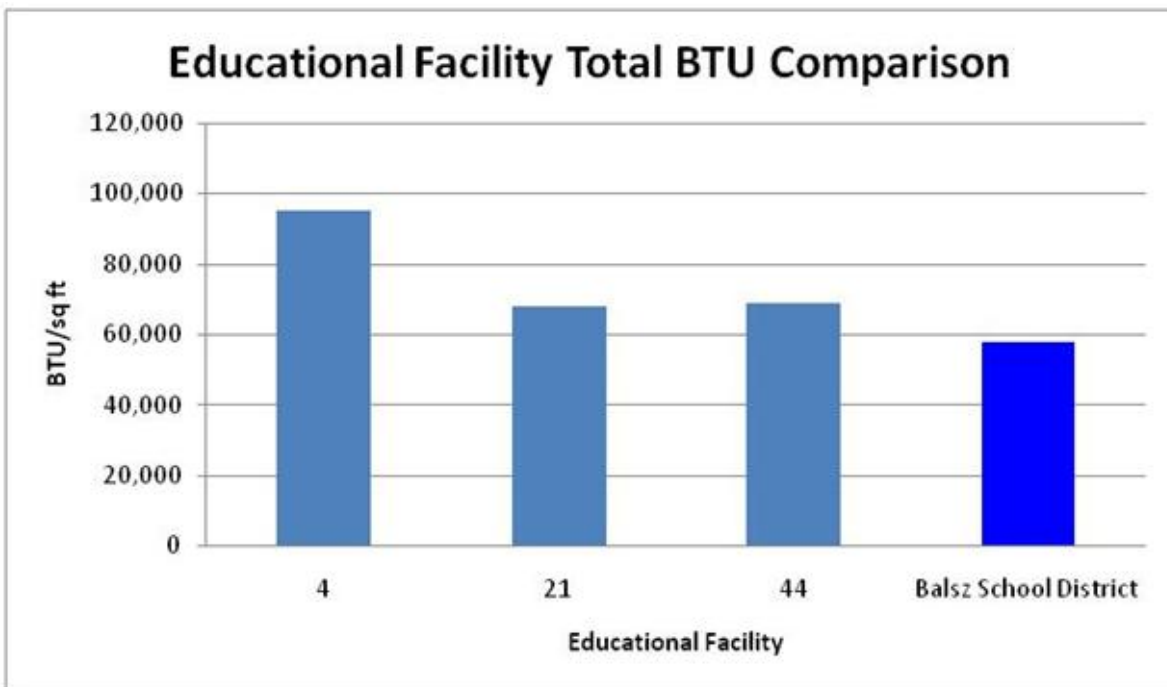
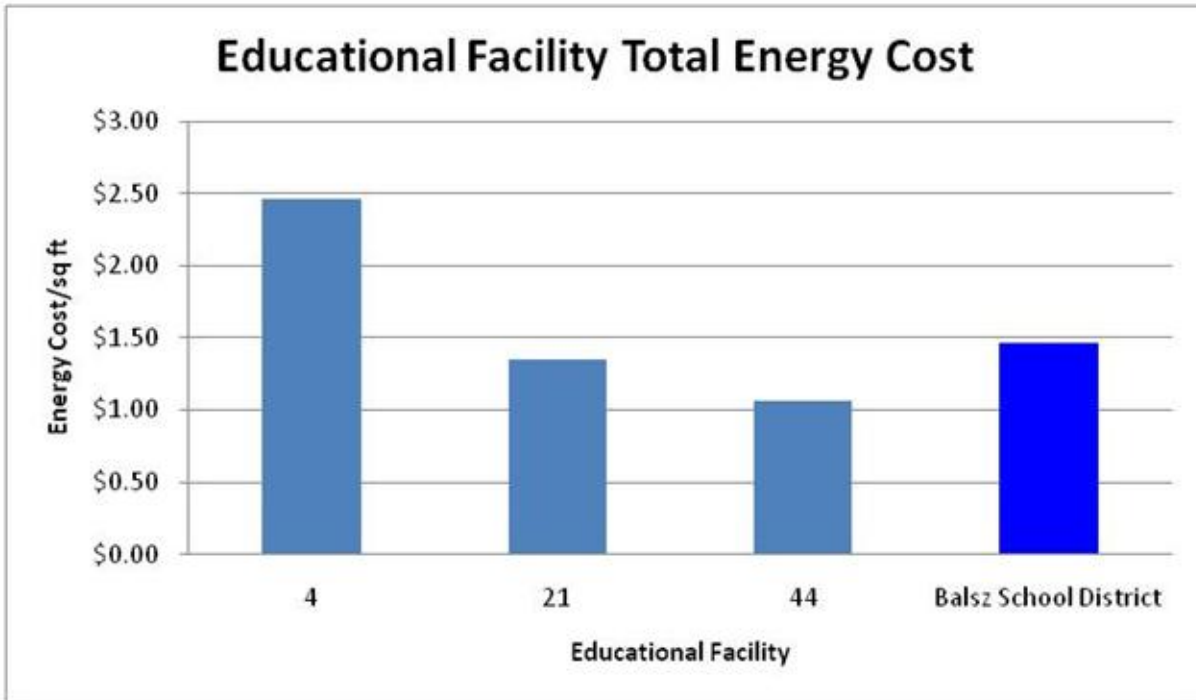


# Balsz School District Energy & Water Audit Summary

## Recommended Energy & Water Projects Table

Recommended Low/No Cost Energy/Water Projects & Paybacks					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate	Payback Years w/Known Rebates	Priority
Energy Conservation Committee	\$4,000	\$1,000	\$500	0.1	1
Faculty, Staff & Student Energy Awareness Education	with above	with above	with above	with above	1
BAS System Schedule Coordination	\$10,000	\$0	\$0	0.0	1
Programmable T-Stats in District Office/Maintenance	\$8,100	\$600	\$300	0.0	1
Dishwasher Pre-rinse Spray Nozzle	\$1,000	\$400	\$0	0.4	2
Walk-in Freezer Smart Defrost Kit	\$696	\$1,400	\$0	2.0	2
<i>Sub Total/Average Low/No Cost Projects</i>	<i>\$23,796</i>	<i>\$3,400</i>	<i>\$800</i>	<i>0.1</i>	
Recommended Capital Energy/Water Projects & Paybacks					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate	Payback Years w/Known Rebates	Priority
Add Cryogel ice balls to water storage tanks (Crockett & Griffith)	\$34,900	\$147,000	\$0	4.2	1
Lighting Upgrade Projects & Occupancy Sensors	\$62,545	\$146,146	\$12,628	2.1	1
Metasys BAS System Retro-commission	\$21,725	\$21,725	\$4,000	0.8	1
Cool Roof - White overlay for certain roofs (requires more evaluation)	\$66,463	\$744,769	\$6,789	11.1	2
Intellidyne Boiler Controllers	\$2,092	\$2,790	\$0	1.3	2
Vending Misers	\$1,547	\$2,100	\$1,200	0.6	2
Kitchen Exhaust Hood MELINK System	\$7,456	\$43,687	\$250	5.8	2
<i>Sub Total/Average Capital Projects</i>	<i>\$189,272</i>	<i>\$1,064,530</i>	<i>\$24,617</i>	<i>5.5</i>	
<b>Grand Total All Recommended Projects</b>	<b>\$213,068</b>	<b>\$1,067,930</b>	<b>\$25,417</b>	<b>4.9</b>	
Projects Recommended for Engineering Evaluation or Maintenance Items					
Project Name	Estimated Annual Savings	Estimated Cost	Estimated Known Rebate	Payback Years w/Known Rebates	Priority
Test & Balance Gym AAON Roof Top Units (4 schools)	unknown	unknown	unknown	unknown	1
Cooling Tower Assessment & Replacement Plan (3 schools)	unknown	unknown	unknown	unknown	2
Evaluate Plate & Frame Installations (2 cooling tower schools)	unknown	unknown	unknown	unknown	2

### Total Energy Cost - Combined Electric and Natural Gas



# STATE UNIVERSITY OF NEW YORK

## 2007 Energy Conservation and Sustainability Implementation Plan

<b>GOAL #1:</b> <i>Reduce energy use in buildings by 37% by 2010, as compared to 1989-90 on a BTU/sq. ft. basis. If reduction target is not applicable/attainable then obtain Energy Star Rating of 75 or better on all specific buildings. See Attachment A for campus-specific goals for 37% reduction (assuming no Energy Star 75 ratings).</i>		
<b>ACTIONS</b>	<b>TIMELINE</b>	<b>COST</b>
<b>Management and Planning:</b>		
<p>Campus Energy Coordinator and Campus Sustainability Task Force. Each campus will designate a campus energy/sustainability coordinator who will be responsible for supervising energy conservation and sustainability activities, monitoring energy performance, and reporting. Each campus will establish a campus sustainability task force to develop plans and policies and work with the sustainability coordinator to execute those plans and policies. The task force should have representation from all parts of the campus, management, faculty, students, and facilities staff.</p>	<ul style="list-style-type: none"> <li>o December 2007, campuses identify/establish energy coordinator and sustainability task force</li> <li>o January 2008, SUNY holds training for coordinators and task force chairs</li> </ul>	<ul style="list-style-type: none"> <li>o Estimated \$3 million annually in PSR and OTPS for sustainability coordinators and task force activities; \$100,000 average cost per campus</li> <li>o \$10,000 for University-wide training(System Administration)</li> <li>o Sustainability Manager and Energy Conservation Manager for system Administration \$200,000</li> <li>o NOTE: \$3M assumes that each campus will have to establish new position for this function. May not be the case. Also, if properly executed, energy sustainability coordinator positions should pay for themselves with savings.</li> </ul>
<ul style="list-style-type: none"> <li>o Campus Conservation and Sustainability Plans. Each campus will develop and execute a sustainability plan to including, but not limited to the following:               <ul style="list-style-type: none"> <li>o Heating and cooling temperatures for occupied academic and research buildings</li> <li>o Heating and cooling temperatures during unoccupied periods</li> <li>o Building shut down schedules during periods when classes are not in session or during low enrollment periods</li> <li>o Maintenance of HVAC and lighting systems</li> <li>o Electric load shedding priorities and procedures to meet Emergency</li> <li>o Demand Reduction Program requirements (15% for State facilities)</li> <li>o Campus strategies for incorporating sustainability and energy conservation into capital planning</li> <li>o On-campus marketing plan to encourage student and staff involvement in sustainability</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>o March 2008, campus plans submitted to System Administration</li> </ul>	<ul style="list-style-type: none"> <li>o Effort primarily supported by funds available for costs of energy coordinators and task force activities</li> <li>o \$750,000 estimated additional cost on-campus marketing plans, including cost of student "Energy Sustainability Intern" positions at each campus and production of on-campus communications materials;\$25,000 average cost per campus</li> </ul>
<p>Campus Metering Plans. Establish campus metering plan to measure building-specific</p>	<ul style="list-style-type: none"> <li>o January 2008, issue RFP</li> <li>o February 2008, begin survey of building electric</li> </ul>	<ul style="list-style-type: none"> <li>o \$14.8 million capital cost</li> <li>o</li> </ul>

energy use	<ul style="list-style-type: none"> <li>○ meters</li> <li>○ April 2008, design metering system</li> <li>○ June 2008, install metering equipment</li> </ul>	
Energy Management and Budgeting System Upgrade. System Administration (Energy Office) will develop web-based tool to facilitate campus reporting of energy consumption and expenditure data	<ul style="list-style-type: none"> <li>○ December 2007, issue RFP</li> <li>○ February 2008, select vendor</li> <li>○ June 2008, project complete</li> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ \$200,000 one-time cost; \$100,000 recurring license/maintenance costs (System Administration)</li> </ul>
Training and Best Practices. System Administration will establish modalities for ensuring that expertise and best practices are disseminated to all SUNY campuses, and opportunities are created for externally funded projects with multi-campus participation	<ul style="list-style-type: none"> <li>○ Hold annual sustainability conference</li> <li>○ Publish quarterly newsletter on sustainability and best practices</li> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ \$10,000 annual cost</li> <li>○ \$24,000 annual cost</li> <li>○</li> </ul>
<b>Conservation and Sustainability Capital Projects</b>		
Identify and execute energy performance capital projects to increase building efficiency and reduce consumption	<ul style="list-style-type: none"> <li>○ April 2008, start campus audits to identify energy conservation and sustainability projects</li> <li>○ July 2008, review audit results and select measures to be implemented</li> <li>○ August 2008 through February 2009, design of energy conservation projects</li> <li>○ August 2008 through August 2009, start construction/ implementation</li> <li>○ June 2012, construction complete</li> <li>○ NOTE: Currently working with DASNY on pilot program for financing energy performance contracts, which could accelerate certain campus projects in this timeframe</li> </ul>	<ul style="list-style-type: none"> <li>○ \$250 million estimated capital costs financed by savings, includes \$3 million for campus project management costs, which are assumed to be capital-eligible (\$100,000 average per campus—annual cost for 3-year project construction cycle)</li> <li>○</li> </ul>
<b>GOAL #2: Cap Greenhouse gas emissions at current levels and reduce emissions 20% by 2014.</b>		
<b>ACTIONS</b>	<b>TIMELINE</b>	<b>COST</b>
Measure, Cap and Reduce Emissions. System Administration to commission study that will identify methods to measure, cap and reduce greenhouse gas emissions	<ul style="list-style-type: none"> <li>○ April 2008, award University-wide engineering study to identify methods and a strategy to meet reduction goals</li> <li>○ September 2008, complete study and begin detailed planning</li> <li>○ November 2008, identify projects and develop budgets</li> </ul>	<ul style="list-style-type: none"> <li>○ \$150,000 estimated one-time cost of study</li> <li>○ TBD cost of capital projects resulting from study</li> <li>○ Two carbon sequestering projects \$20 million</li> </ul>
<b>GOAL #3: Increase use of renewable electricity (total of purchased and on-site generated) to 30% of total consumption by 2014</b>		

# STATE UNIVERSITY OF NEW YORK

## 2007 Energy Conservation and Sustainability Implementation Plan

ACTIONS	TIMELINE	COST
<ul style="list-style-type: none"> <li>○ Increase Renewable On-Site Generated Electricity.</li> <li>○ Install photo voltaic arrays on each campus</li> <li>○ Install methane digesters and generators at three campuses</li> <li>○ Install bio-diesel combined heat &amp; power project SUNY Morrisville (4mw)</li> <li>○ Install wind turbines on campuses (10x100 kw)</li> <li>○ Install fuel cells at campuses (5x250 kw)</li> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ For all projects:</li> <li>○ April 2008, begin design</li> <li>○ December 2008, bid projects</li> <li>○ February 2009, award contracts</li> <li>○ December 2012 complete projects</li> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ Photo Voltaic Arrays: \$11.8 million capital cost</li> <li>○ Fuel Cell projects \$10.9 million</li> <li>○ Wind Turbines \$2.6 million</li> <li>○ Geothermal heat pumps for new buildings \$10 million</li> <li>○</li> </ul>
<ul style="list-style-type: none"> <li>○ Increase Purchased Renewable Electricity. Procure renewable electricity to supplement quantity generated on campuses.</li> </ul>	<ul style="list-style-type: none"> <li>○ October 2007, release bid package for renewable electricity credits</li> <li>○ October 2007, open bids and select supplier</li> <li>○ November 2007, buy credits for 2006-07 and 2007-08</li> <li>○ April 2008, bid renewable electricity credits for 2008-09 and 2009-10. For 2009-10, increase quantity of credits to 20% of electricity used</li> </ul>	<ul style="list-style-type: none"> <li>○ 2007-08 costs estimated at \$ 2.1 million</li> <li>○ 2008-09, estimated at \$1,000,000</li> <li>○ Costs for 2009-10 and thereafter market dependent quantity needed doubles</li> <li>○</li> </ul>
<p><b>GOAL #4:</b> <i>Increase use of bio-diesel to 10% of total motor fuel usage by 2008.</i></p>		
ACTIONS	TIMELINE	COST
<ul style="list-style-type: none"> <li>○ Purchase bio-diesel</li> </ul>	<ul style="list-style-type: none"> <li>○ September 2007, begin purchasing</li> </ul>	<ul style="list-style-type: none"> <li>○ 2007-08 costs estimated at \$450,000</li> <li>○ E-85 Tanks and pumps \$3.1 million</li> </ul>
<p><b>GOAL #5:</b> <i>Increase use of bio heating oil to 10% of total #2 Oil usage by 2010.</i></p>		
ACTIONS	TIMELINE	COST
<ul style="list-style-type: none"> <li>○ Purchase bio heating oil</li> </ul>	<ul style="list-style-type: none"> <li>○ October 2007, begin purchasing at 5% usage</li> <li>○ July 2009, being purchasing at 10% usage</li> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ 2007-08 and 2008-09 annual cost estimated at \$320,000</li> <li>○ 2009-10 annual cost estimated at \$520,000</li> </ul>
<p><b>GOAL #6:</b> <i>Develop five new combined heat and power (CHP) projects by 2010.</i></p>		
ACTIONS	TIMELINE	COST
<ul style="list-style-type: none"> <li>○ Campus Evaluation, Design and Construction. System Administration will work with campuses to evaluate sites, technology and fuels for combined heat and power projects. Once sites are selected projects will be designed and constructed.</li> </ul>	<ul style="list-style-type: none"> <li>○ November 2007, conduct survey of campus year-round thermal usage to determine prospects for large and small CHP sites</li> <li>○ January 2008, review survey results and select campuses for projects</li> <li>○ February 2008, begin design of CHP projects</li> </ul>	<ul style="list-style-type: none"> <li>○ Estimated cost of survey, \$125,000</li> <li>○ \$131 million, estimated capital costs for five projects</li> <li>○ Methane Digesters: \$6 million capital cost</li> <li>○ Bio-Diesel CHP: \$9.5 million capital cost</li> </ul>

STATE UNIVERSITY OF NEW YORK  
2007 Energy Conservation and Sustainability Implementation Plan

<b>GOAL #7:</b> <i>Design new buildings and rehab existing ones in accordance with the Leadership in Energy and Environmental Design (LEED) silver rating or higher.</i>		
<b>ACTIONS</b>	<b>TIMELINE</b>	<b>COST</b>
<ul style="list-style-type: none"> <li>o Work with State University Construction Fund and DASNY to incorporate sustainability in SUNY educational facilities and residence hall projects</li> </ul>	<ul style="list-style-type: none"> <li>o June 2007, review design manual instructions for consultant architects and engineers</li> <li>o November 2007, publish any needed changes to design manuals to ensure LEED Silver standard</li> <li>o NOTE: SUNY is currently working with the Governor's Office, DASNY and DOB on a "Green Buildings" capital program that would fund the gap between status quo design standards and LEED Silver.</li> </ul>	<ul style="list-style-type: none"> <li>o Achieving LEED Silver standards for construction is estimated to add up to a 5% cost premium to projects. Currently, there are \$1.4 billion of educational facilities projects in design and \$264 million of residence hall facilities in design. The estimated LEED Silver premium for these projects would be \$83 million.</li> </ul>
<b>GOAL #8:</b> <i>Procure energy and fuel at competitive prices while managing price risk in accordance with a prudent, clearly defined, and documented University Risk Management Policy that utilizes financially sound market-based products.</i>		
<b>ACTIONS</b>	<b>TIMELINE</b>	<b>COST</b>
<ul style="list-style-type: none"> <li>o Continue centralized bidding of natural gas supplies</li> <li>o Continue to support wholesale electricity purchases from NYS ISO by SUNY Energy Buying Group</li> <li>o Begin risk management planning</li> <li>o</li> </ul>	<ul style="list-style-type: none"> <li>o November 2007, form Risk Management Committee</li> <li>o December 2007, release RFP for Risk Management Services</li> <li>o December 2007, establish Risk Management Policy</li> <li>o January 2008, award Risk Management contract</li> <li>o</li> <li>o</li> </ul>	<ul style="list-style-type: none"> <li>o \$100,000, annual operating cost of gas procurement currently supported by recharges to participating campuses</li> <li>o \$250,000, annual operating cost of wholesale electricity procurement currently supported by recharges to participating campuses.</li> <li>o First-year costs of Risk Management Services estimated to be \$500,000 (primarily consulting).</li> </ul>
<b>GOAL #9:</b> <i>Take a proactive role in rate cases before the New York State Public Service Commission and the Federal Energy Regulatory Commission to protect the University's interests.</i>		
<ul style="list-style-type: none"> <li>o Continue membership in Multiple Intervenors</li> </ul>	<ul style="list-style-type: none"> <li>o</li> </ul>	<ul style="list-style-type: none"> <li>o Annual costs \$100,000 currently supported by recharges to beneficiary campuses</li> </ul>

## C. Draft Carbon Management Plan ...

1. *Green committee suggestions in a comprehensive carbon project matrix*
  - Ranking ideas and projects
  - Discussion and exercise
    - *Visualize the mission*
    - *Goals should be achievable ... not punishment*
    - *Align projects to goals and mission*
2. *Sample carbon reduction ratio computation*
  - React to carbon reduction ratio computation
  - Assigning intangible values to priority mix
  - What wins the day ...
  - Incorporated PDF's ...

1 Scope 1 suggestions

Project #	Detailed Description of Project <i>Scope, Planning, Resource, Timeline Issues</i>	SF Impact	Energy Impact			Capital Cost	Cost Savings	Cost Simple ROI	MTCDE Removed	Carbon Reduction Ratio (CRR)	Priority
			Units	Reduction	Reduction per SF						
1.1	Revise HVAC coil circulating pump controls (75 pumps) ... Lower shut off 10 degrees sooner than current set-point ... Add outdoor air temperature relay to shut off pumps at 45 degrees	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1	Revise Sports-Center and Field-House fan and temperature controls ... Cut back to run fans every other day except for events ... Trend reports indicate successful temperature and fan-ops reductions	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1	Lower domestic water heater temperatures ... Reduce from 145 to 125 degrees	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1	Revise HVAC comfort zones ... 74-76 summer ... 68-70 winter	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1	Install solar heating for domestic hot water use and radiant heating	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	1.00	#DIV/0!	
1.1	Replace toilet water fixtures with energy and water conserving models	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1	Replace sink proximity faucets with self-charging pipe-flow-turbine power supply	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.4	Conceive and implement green printing / paper reduction program ... Print double-sided ... Decrease margins ... Avoided printing whenever possible ... Use PC-based schooling when possible ... Use online tools, blogs, digital books, digital class aide, online assignments, online reporting, online grading, to eliminate all unnecessary paper use ... Eliminate all mass printing ... Eliminate/reduce number of personal printers ... Utilize multifunction machines ... Standardize to minimize multiple printer cartridges ... Go to green ink cartridges	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.4	Investigate and implement green painting program ... Inventory all paint products ... Properly dispose of all toxic, hazardous, and high-VOC products	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.4	Conceive and implement green product purchasing program ... Research and list green rated products ... Apply for "Model Community" and "Earth Flag" status ... Use all-recycled content paper products	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Totals						\$ -	\$ -	#DIV/0!	1.00	#DIV/0!	
Current Utility Cost						\$ -					
% Utility Cost Reduction								#DIV/0!			

**2 Scope 2 suggestions**

Project #	Detailed Description of Project <i>Scope, Planning, Resource, Timeline Issues</i>	SF Impact	Energy Impact			Capital Cost	Cost Savings	Cost Simple ROI	MTCDE Removed	Carbon Reduction Ratio (CRR)	Priority
			Units	Reduction	Reduction per SF						
2.1	Revise fan controls to shut down non-essential fans ... Eliminate fan operations in routinely unoccupied and vacant spaces, such as Performing Arts Area and Team Locker Rooms	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Develop and install campus load shedding program ... Automatically cut-off load circuits or shut down equipment based upon cooling-heating limits ... Utilize existing BAS ... Shed (reduce or cut back) loads for prescribed periods	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Conceive and deploy lighting load reduction program / low-light and off-lighting programs ... Turn off lights in unoccupied rooms ... Turn off display and decorative lighting ... Install motion sensors and circuits to automatically turn off lighting in unoccupied spaces ... Review big venue lighting control logic and switch accessibility ... Install sky lights ... Replace exit and warning sign lamps with LED technology	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Install proximity sensors on hand-driers	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Conceive and implement a campus plug-load management program ... Shut off computers, printers, monitors when not in use Purchase only energy efficient computers and peripherals ... Utilize load management plug-strips for older equipment to draw down to sleep / off ... Begin to replace older "hot-draw" equipment ... Consult a systems and equipment expert	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Conceive and implement solar power system ... Utilize \$10,000 BP grant funds	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Re-lamp Field House light fixtures ... Utilize halogen lamps	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
2.1	Conceive and deploy sub-metering to provide more accurate facility management and reduction strategies ... Break-out large venues: Sports-Center, Field-House, Pool, Forum	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Totals						\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Current Utility Cost						\$ -					
% Utility Cost Reduction							#DIV/0!				

**3 Scope 3 suggestions**

Project #	Detailed Description of Project <i>Scope, Planning, Resource, Timeline Issues</i>	SF Impact	Energy Impact			Capital Cost	Cost Savings	Cost Simple ROI	MTCDE Removed	Carbon Reduction Ratio (CRR)	Priority
			Units	Reduction	Reduction per SF						
3.1	Develop personal use recycle / re-use drives ... Shoes, CD's, used electronics, clothes ... Common area bins	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.1	Create on-campus composting	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.1	Develop and implement a continuous recycling improvement and compliance program ... Require that all vendors provide recyclable containers, crates, boxes, pails, etc ... Roll-out custodial continuous assessment and compliance ... Assess best locations with point-of-use volume checks ... Devise high-level commitment program and incentives policy ... Develop dual stream trash and recycling ... Validate waste stream recyclable break-out ... Improve recycling education / awareness ... Improve student impacts ... Reinforce non-littering policy ... Reduce Styrofoam and similar products use in cafeteria and other areas	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.2	Consider permeability/rainwater runoff footprint ... Install rain gardens ... Increase square footage of green roof ... Consider use of permeable paving surfaces	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.2	Reshape campus into community model of sustainable grounds management ... Re-design with native species ... Utilize perennial species ... Annual grounds review with a master arborist ... Treat turf-area as biomass laboratory ... Vastly improve storm-water run-off management ... Consider negative grade islands in paved areas ... Replace trees with hardier native species, rethink planting and maintenance strategy ... Employ more robust landscape training and maintenance improvements	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.3	Conceive and implement a bicycle rack utilization program ... Add more bike racks ... What will encourage greater bike use ... Where should racks be installed ... Can racks be integrated with other site improvements	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.3	Create on-campus biodiesel plant to fuel district vehicles	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.3	Conceive and implement a parking pressure reduction program ... Offer incentives to car-pooling students ... Offer incentives to non-car users	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.3	Explore alternative modes of transportation for students, faculty and staff ... shuttles to and from train station ... add transportation costs to employee Flex	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
3.3	Explore alternatives for District vehicles ... fleet of four security vehicles ... fleet of six 15 passenger vans ... fleet of four leased 60 passenger busses ... fleet of four District trucks	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Totals						\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Current Utility Cost						\$ -					
% Utility Cost Reduction								#DIV/0!			

**4 Scope 4 suggestions**

Project #	Detailed Description of Project <i>Scope, Planning, Resource, Timeline Issues</i>	SF Impact	Energy Impact			Capital Cost	Cost Savings	Cost Simple ROI	MTCDE Removed	Carbon Reduction Ratio (CRR)	Priority
			Units	Reduction	Reduction per SF						
4	Continue toward LEED certification	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Create curriculum & training ... Divisions should connect curricula with sustainability issues ... Provide staff development & training about sustainable practices ... Train FMP's on recycling	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Research partners, sources, and grants to fund projects	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Create a green coordinator position to oversee and organize efforts	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Improve student and faculty environmental education, awareness, policy, and action programs	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Provide greater context of carbon footprint and comparisons to other schools ... Help in determining course of actions for carbon reductions	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Develop and implement a consistent community involvement approach to environmental and energy use matters ... Utilize video orientation for freshman ... Utilize more out-side professionals in community forums related to environmental issues	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Conceive, publish, and implement SHS Community Member green commitments ... lifelong learning about the environment, conservation of natural resources, and reducing energy use ... protecting the environment during personal and professional activities ... Incorporate readings and activities related to green initiatives into curriculum and instruction to fullest extent possible	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Develop and implement 5-year energy risk management plan ... Cap 2013 consumption at 2008 levels	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
4	Develop and implement energy emergency preparedness ... Mitigate risks to volatile or steeply rising energy costs ... Building energy impacts / reactions ... Transportation impacts / reactions ... Emergency budget adjustments	-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Totals						\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Current Utility Cost						\$ -					

**Ex Reduce energy consumption in buildings by xx% by year xxxx with Scope 1 actions**

Project #	Detailed Description of Project <i>Scope, Planning, Resource, Timeline Issues</i>	SF Impact	Energy Impact			Capital Cost	Cost Savings	Cost Simple ROI	MTCDE Removed	Carbon Reduction Ratio (CRR)	Priority
			Units	Reduction	Reduction per SF						
1.1.1		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.2		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.3		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.4		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.5		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.6		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.7		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.8		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.9		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
1.1.10		-	0	-	#DIV/0!	\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Totals						\$ -	\$ -	#DIV/0!	-	#DIV/0!	
Current Utility Cost						\$ -					
% Utility Cost Reduction						#DIV/0!					

**General Notes**

1. All projects assumed to be completed within 1 year. If project is multi-year improvement, the ROI should reflect this additional timeframe to complete.
2. All figures noted are based upon estimates / projections.
3. Carbon reduction ratio is MTCDE removed divided by ROI. The result naturally rates high-impact CDE reductions above others, accounting for the vagaries utility level emissions factors.
- 4.
- 5.



## ***D. Next Steps ...***

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### *1. Additional project potentials and details*

- What additional information must be gathered

### *2. Research assignments ... homework*

- Management, administrative, academic goals and projects

### *3. Performing a facility audit*

- Essential to long-term capital and planning
- Context for environmental and management objectives

### *4. Next steps and expectations*

- Complete facility audit or provisional figures
- Incorporate audit or provisional findings into matrix
- Incorporate academic and management findings into matrix
- Final draft plan presentation
- Obtain additional stakeholder inputs
- Revise, finalize, approve, publish, and implement