

Report of the SUNY Energy Strategic Planning Task Force

Recommendations for a
University Energy Policy

March 20, 2007

SUNY Energy Strategic Planning Task Force Policy Recommendations

ENERGY TASK FORCE MEMBERSHIP

The SUNY Energy Task Force is composed of recognized energy leaders from State-operated campuses and community colleges. The Task Force sees the State University's energy challenges and opportunities from both a practical financial standpoint and as a societal issue, with SUNY uniquely positioned to leverage its size, research and educational resources to provide solutions that will benefit the University, the people of New York State and the nation.

Raymond Cross,	President, Morrisville, Co-Chair
Cornelius B. Murphy	President, ESF, Co-Chair
Peter Carney	Manager Utilities, Binghamton
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Jerry DeSantis	Associate Vice President for Facilities, Oswego
Maureen Dolan	Chair, University Faculty Senate Operations Committee
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Amy Provanzano	Director Physical Plant, Stony Brook
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SUMMARY OF TASK FORCE RECOMMENDATIONS

MISSION/OBJECTIVE:

SUNY will assume a national leadership role in energy sustainability, education, technology, economics and public policy through a transformational integration of practice, teaching and research.

GOALS:

Conservation/Sustainability

- Establish campus targets for reduction of energy usage such that total University energy usage is 37% lower than 1989-90, as measured by BTUs per square foot (see Appendix A). This goal is two percentage points higher than the goal of Executive Order (E.O.) 111.
- Cap green house gas emissions at current levels and decrease emissions 20% by 2014 (see Appendix D).
- Increase the use of renewable energy purchased or generated on campus to 30% by 2014. This is 10 percentage points greater than the E.O. 111 requirement.
- Increase usage of bio diesel to 10% by 2010. Two years ahead of E.O. 142 requirements.
- Increase usage of bio heating oil (#2 oil) to 10% by 2010. Five percentage points higher and two years earlier than E.O. 142 requirements..
- Develop five new combined heat and power (CHP) projects by 2010 (see Appendix C)
- Design and construct new buildings or rehabilitate existing buildings using Leadership in Energy and Environmental Design (LEED) Silver criteria and life-cycle-cost analysis. Energy systems will be designed to maximize efficiency over the life cycle.

Transformational Opportunities

- Advance SUNY's educational mission in energy and environment
 - Academic Programs--Develop and expand energy-related curriculum and cross-disciplinary academic programs that explore the energy/environment/economics nexus.
 - General Education--Develop curriculum within campus general education programs related to energy and the environment.
 - K-12 Teacher Education--Support campuses with Teacher Education programs to strengthen their offerings in the energy-environment area.
 - Workforce Training--Develop academic programs at the technical level and through Continuing Education programs to meet the needs of energy users, energy service companies, regulators, and public and investor-owned utilities.
 - Raising Awareness--Utilize capabilities of University to educate students, faculty, staff, local community and global community about the nexus between energy and the environment.

SUNY Energy Strategic Planning Task Force Policy Recommendations

- Expand energy-related research to achieve national leadership in the development and use of renewable energy, conservation and the efficient use and conversion of energy.
- Build strategic alliances with public and private sector partners by providing research and analysis to regulators, elected officials, private industry and New York's citizens.

Management and Planning

- Optimize "System-ness" by encouraging and facilitating greater inter-campus communication and cooperation regarding best practices, campus-based initiatives and externally funded projects.
- Procure energy and fuels at the lowest cost, while managing price risk in accordance with a prudent, clearly defined and documented University Risk Management Policy that utilizes financially sound market-based products.
- Take a proactive roll in rate cases before the New York State Public Service Commission and the Federal Energy Regulatory Commission to protect the University's interests.

Introduction

The supply of oil and natural gas is quickly reaching the point where demand will outpace supply. Today, the United States consumes approximately 22 million barrels of oil a day out of a worldwide use of 83 million barrels a day. The rapid industrialization of China and India is increasing the demand for petroleum, while new sources of production are more difficult and expensive to find and develop. A significant shortfall in oil is expected as early as 2010. During the fall of 2005, the United States experienced a temporal shortfall of natural gas and petroleum, which resulted in increases of 30% or more in the cost of transportation fuels, heating fuels, and electricity. Despite this increase in price, in December 2005, daily U.S. consumption of petroleum hit an all time high. An energy future that depends on carbon-based fuels is not sustainable.

The first step toward sustainability is conservation. SUNY must reduce energy use as much as possible. Despite SUNY past energy conservation activities (38.57% reduction since 1973-74), the University must continuously expand its efforts to eliminate energy waste. Efforts to date have been measured on a square footage basis, which is appropriate for a growing institution such as SUNY. However, since the supply of fossil fuel is fixed, SUNY must decrease its use of energy on an absolute scale.

As a significant energy user and the nation's largest comprehensive higher education system, the State University of New York has a unique opportunity to integrate practice, research and education in order to take a national leadership role in energy education, technology, economics and public policy. If we seize the opportunity, SUNY will be the first the first major public university to achieve such a transformational integration.

The SUNY Energy Task Force recommends that the University achieve the following goals:

1. Achieve national leadership in sustainability to:
 - a. Reduce energy use to the lowest level possible. By 2010, reduce energy use in buildings by 37% compared to 1989-90 usage (see Appendix A for individual campus goals). This is two percentage points higher than required by E.O. 111.
 - b. Cap the University's green house gas emissions at current levels, with a goal of decreasing emissions by 20% by 2014 (see Appendix D).
 - c. Increase the use of renewable energy purchased or generated on campus, with a goal of 30% by 2014—10 percentage points greater than the requirements of E.O. 111.
 - d. Increase the use of bio diesel to 10% of total usage by 2010, two years sooner than required by E.O. 142.
 - e. Increase usage of bio heating oil (#2 oil) to 10% by 2010. This is five percentage points higher and two years sooner than required by E.O. 142.
 - f. Develop combined heat and power projects, with a goal of five new projects by 2010.

SUNY Energy Strategic Planning Task Force Policy Recommendations

- g. Design and construct new buildings or rehabilitate existing buildings using Leadership in Energy and Environmental Design (LEED) Silver criteria and life-cycle-cost analysis. Energy systems will be designed to maximize efficiency over the life cycle. Costs will be measured in dollars, energy consumed, and emissions created.
2. Take advantage of transformational opportunities to:
 - a. Advance SUNY's educational mission in energy and the environment
 - b. Expand energy-related research.
 - c. Provide research and analysis to regulators, elected officials, private industry, and to New York's citizens.
 - d. Achieve national leadership in research, development, and use of renewable energy, conservation, and the efficient use and conversion of energy.
 - e. Form partnerships with private and public organizations to reach our goals.
3. Optimize "System-ness" by encouraging and facilitating greater inter-campus communication and cooperation regarding best practices, campus-based initiatives and externally funded projects.
4. Procure energy and fuels at the lowest cost, while managing price risk in accordance with a prudent, clearly defined and documented University Risk Management Policy that utilizes financially sound market-based products.
5. Take a proactive roll in rate cases before the New York State Public Service Commission and the Federal Energy Regulatory Commission to protect the University's interests.

THE UNIVERSITY TODAY

SUNY is one of the largest energy users in New York State.

- The University's State-operated campuses contain more than 90 million overall gross square feet in 2,829 buildings.
- Total annual energy consumption is approximately 11,445.9 trillion BTUs, the equivalent of 67,000 homes.
- Projected 2006-07 utility costs are projected to be nearly \$300 million, comprising approximately 10% of SUNY's core operating budget and, in many cases, 50% of a campus' non-personal service expenditures (see Appendix F).

Until 2005-06, the State budget did not adequately support growth in utility costs.

- Increased volatility in energy prices makes budgeting and planning difficult (see Appendix G).
- Growth in enrollment, increased residence hall electrical usage and the rapid growth in campus research facilities has increased campus operating costs and offset SUNY's conservation accomplishments.

SUNY Energy Strategic Planning Task Force Policy Recommendations

- In gross terms, SUNY's electrical usage grows about 1% to 2% per year; the electrical equivalent of adding a new arts and science college every year (see Appendix H).

For many campuses, energy conservation and management has been a challenge.

- Aging infrastructure and limited capital funds for critical maintenance and physical plant upgrades have increased deferred maintenance.
- The level of energy management expertise varies widely among campus facilities administrators.
- The level of energy procurement expertise varies widely among campus business officers.

Governor's Executive Order 111, Clean and Green Buildings and Vehicles.

- Requires a 35% reduction in energy consumption by 2010 (compared to 1989-90 base year).
- Requires that 10% of electric consumption be provided by renewable sources by 2005, and 20% by 2010. Eligible sources include wind, solar, thermal, photovoltaic, tidal, geothermal, fuel cells and biomass.
- Requires the purchase of Energy Star compliant equipment, if applicable.
- Requires that 50% of new light duty vehicles purchased by 2005 be alternate fueled or hybrid, and 100% by 2010.
- Requires new construction to follow "green building" guidelines set forth in green building tax code and LEED rating system (LEED: "Leadership in Energy and Environmental Design) of the U.S. Green Building Council.

In face of these challenges and requirements, SUNY has made considerable progress in the areas of energy demand-side management and procurement.

- Since the start of SUNY's energy conservation activities, energy use per occupied gross square foot (OGSF) has dropped 38% (2005-06 vs. 1973-74). The cumulative cost avoidance of this reduction is estimated at \$1.14 billion. SUNY's energy use per OGSF since 1989-90 has declined by 16.96%. *Note that E.O. 111 uses 10,000 BTUs/kwh vs. SUNY energy using 3,142 BTUs/kwh, input vs. out put)*
- Since 1992, SUNY has invested over \$100 million dollars in energy conservation since 1992, and currently has over \$121 million in energy conservation projects in design or construction.
- The State University Construction Fund and campus planners have incorporated LEED and life cycle costing in all new construction and rehabilitation to insure that the most efficient equipment and technologies are used in SUNY buildings.
- SUNY has taken advantage of deregulated energy markets to reduce costs. The Energy Buying Group (EBG) procures electricity directly from the wholesale auctions run by the New York Independent System Operator (NYISO), saving participating campuses a total of over \$1 million annually.
- SUNY's natural gas contracts procure gas supply at competitive rates, while allowing campuses to lock in future prices, based on New York Mercantile Exchange (NYMEX) futures contracts

Sustainability

The utilization of non-renewable energy and the lack of prudent energy management can result in significant impacts on the environment. The use of non-renewable energy (oil, natural gas, and coal) contributes to global warming, acid rain, and the serious depletion of natural resources. By not conserving our conventional carbon-based fuels, we are depriving future generations of a resource necessary to produce chemicals, pharmaceuticals, and polymers. Our students will live in a world in which energy is much more expensive and the environment will be altered because of the world's energy use. SUNY's responsibility is to prepare them for this world.

Stewardship and the assumption of responsibility for campus energy consumption with its implications for the environment and the economy of New York State should be a system-wide goal. If we expect to educate responsible citizens and future stewards, they need to be integrated into our mission, participate in our campus renewable energy objectives, and be allowed to monitor our progress.

Viable sustainability is first about using less energy more efficiently, and secondly, about increasing the share that is derived from renewables. Using less fossil fuel energy through conservation, improved energy efficiency, and cogeneration frees up financial resources to fund the premiums that increasing shares of renewables demand.

A holistic approach to physical plant design, operations, curriculum, and research will be used to integrate the academic community under the umbrella of sustainability.

1. Sustainable Academic Initiatives

- a. Sustainability initiatives potentially involve curriculum in environmental studies, natural and social sciences, engineering, architecture, business and management, decision science, economics, life sciences, humanities and teacher education. SUNY will pursue increased external funding for energy-related research, academic initiatives, and sponsored activities consistent with sustainability.
- b. In striving for excellence as a dynamic academic community, and model of energy efficiency and sustainable development, SUNY will achieve an enhanced public image and total quality in its educational mission and operations.

2. Sustainable Development and Business Practices

- a. By educating students, faculty, staff and the community about the environmental and economic impacts of energy usage, and by practicing and promoting sustainable business practices and policies, SUNY will demonstrate national leadership in environmental stewardship and thus serve to provide solutions to complex energy and environmental issues that confront society.
- b. SUNY will seek to determine the sustainable size of the University, by analyzing the economics of growth and energy use in the context of associated

SUNY Energy Strategic Planning Task Force Policy Recommendations

environmental impact. Campuses will integrate into their long-range planning the impact of growth on energy use and cost of operations.

The current energy economy of the United States is not sustainable. As a business enterprise, SUNY must be prepared for the energy future.

1. The University must create a more sustainable energy management system which requires a minimum of between 20% and 30% utilization of renewable energy along with significant energy conservation and efficiency improvements.
2. Executive Orders 111 and 142, the New York State Renewable Portfolio Standard, and the Regional Greenhouse Gas Initiative provide encouragement to move toward a more sustainable energy management system. SUNY should:
 - a. By 2010, reduce energy use to the lowest level possible based on the operational needs with a goal of 37% reduction compared to 1989-90. This is two percentage points higher than required by E.O. 111.
 - b. Move toward a system-wide increase in the use of renewable energy by purchasing significant quantities of green power, and developing on-campus generation of renewable energy in partnership with NYSERDA, NYPA and the USDOE. By 2014 renewable source electricity should make up 30% of University requirements, 10 percentage points higher than required by E.O. 111.
 - c. Increase use of bio diesel to 10% by 2010. Two years ahead of requirements of E.O. 142.
 - d. Increase use of bio heating oil (#2 oil) to 10% by 2010. This is five percentage points higher and two years earlier than required by E.O. 142.
 - e. Seek to promote the advancement of all renewable energy resources, technologies, and systems while prioritizing wind energy because it is emissions-free and most likely to be significantly developed in New York State if purchased.
 - f. Promote combined heat and power (CHP) systems.
3. SUNY should quantify the current energy consumed to educate a student (2004-05 estimated at 65.66 MMBTUs per student per year) and the contribution of that energy consumption to greenhouse gas emissions (tons per student per year). Green house gas emissions should be capped at current levels and reduced 20% by 2014. SUNY students should contribute to this process and should assist in developing campus metrics; this would represent a transformational process.
4. The State University Construction Fund has developed standards associated with the design and construction of Green Building/High Performance Buildings. These standards need to be constantly reviewed to assure that they incorporate and accommodate the latest developments in efficient energy use. The standards must be designed to maximize efficient energy utilization when compared to the proposed building operating plan. Building life cycle analysis needs to be measured in terms of economic costs, energy consumed, and emissions created.

5. It is important to maintain dual fuel capacity where it exists and to encourage the integration of dual fuel capacity where it can be applied.

TRANSFORMATIONAL OPPORTUNITIES

Rising energy costs are consuming an increasing proportion of SUNY's operating budget. These increased costs, in combination with more volatile energy markets, have focused renewed attention on the need to reduce energy consumption and costs. This challenge provides unprecedented opportunities for SUNY to advance to the forefront in energy management, education, and research. SUNY is uniquely positioned to demonstrate regional and national leadership, innovation, excellence, and good citizenship in the way it uses energy resources. As it moves towards improvements in facilities and operations, the University will leverage its energy efficiency initiatives and sustainable business practices into energy-related sponsored activities, public/private partnerships, and cross-disciplinary research and curriculum. The diversity of campus missions and expertise across the system provide an unparalleled resource for addressing the compelling global problems related to energy, including its impact on the environment, health and society.

In meeting this energy challenge, SUNY will harness the energy of its faculty, students and staff to transform the efficiency and health of its buildings and building occupants, while at the same time transforming SUNY's image through academic and community initiatives. These timely opportunities are focused around five thematic areas: Advance SUNY's Educational Mission; Expand Energy-Related Research; Build Strategic Alliances; Enhance Synergies System-wide; and Achieve Leadership through Sustainability.

ADVANCE SUNY'S EDUCATIONAL MISSION IN ENERGY AND THE ENVIRONMENT

Few aspects of life impact citizens, business and society as much as energy. The production and use of energy has a critical effect on the environment, climate, public health, public policy, financial well being, and national security. Decisions made by every individual as well as by institutions and governments contribute to the complex web of energy supply and demand, but few individuals or institutions understand or have studied the convergence of issues related to energy.

As a diverse and dynamic academic community, SUNY will seek to develop and expand energy-related academic programs at the undergraduate, graduate, and technical level, as well as curriculum for general education, continuing education and workforce training.

1. Academic Programs

SUNY campuses will seek to develop and expand energy-related curriculum and cross-disciplinary academic programs that explore the energy/environment/economics nexus. Robust diversity in campus missions will fuel the development of innovative curriculum in programs that include, but are not limited to: engineering, environmental sciences, atmospheric science, health

SUNY Energy Strategic Planning Task Force Policy Recommendations

sciences, business, finance, decision science, behavioral and social sciences, multi-culturalism and ethics. Campuses will be encouraged to pursue additional financial support for the development and expansion of such curriculum from external funding, both public and private sources.

2. General Education

- a. SUNY will encourage campuses to develop curriculum within their general education programs related to energy and the environment. Such curriculum, created by faculty at the campus level, will provide students with a basic understanding of energy technologies and energy economics, in addition to understanding how behavior and personal energy choices have global social, economic, political and environmental consequences. The University will develop an eco-literacy program to ensure that all graduates are intellectually equipped to be responsible citizens living on a planet with biosphere. Individual campuses may choose to emphasize varied content such as the politics of energy, alternate sources of energy, consumer education, or the impacts of energy on health and society.
- b. The SUNY Provost will work with the University Faculty Senate to facilitate discussion, development and approval of such curriculum through existing mechanisms. This energy/environment curriculum could form a new domain or span several existing domains as defined by SUNY.

3. K-12 Teacher Education

- a. K-12 curriculum in New York State currently integrates energy/environment themes at specific grade levels. SUNY will identify campuses that have demonstrated excellence in this area within their existing Teacher Education programs.
- b. SUNY will encourage and support other campuses with Teacher Education programs to strengthen their offerings in the energy-environment area. The New York State Energy Research and Development Authority (NYSERDA) could be tapped as a resource, since it offers education materials for K-12 related to energy and the environment.

4. Workforce Training

- a. SUNY will seek to develop academic programs at the technical level and through Continuing Education programs to meet the needs of energy users, energy service companies, regulators, and public and investor-owned utilities. Again, NYSERDA may be used as a resource since it offers educational institutions funding for various training programs—e.g. photo voltaic equipment installation.

5. Raising Awareness

- a. SUNY will utilize all of its capabilities to educate its student body, faculty, staff, local community and global community about the nexus between energy and the environment. Educating the college and broader community about the environmental, public health, and economic impacts of energy usage will have

a lasting benefit by developing a greater sense of environmental stewardship within the citizenry for generations to come.

EXPAND ENERGY-RELATED RESEARCH

SUNY will develop and support applied and advanced research in a wide range of energy-related areas. This research will explore the connection of energy to the environment, health and public policy in order to address challenges facing the global community. This research will include both disciplinary fields in engineering, science, and technology as well as cross-disciplinary approaches to understanding the technological, economic, and societal impacts of energy.

1. Research Clearinghouse
 - a. SUNY will inventory all recent, current, and planned energy-related sponsored research (not limited to projects administered through the Research Foundation).
 - b. SUNY will survey campuses to determine the energy-related expertise of existing faculty and staff, and will identify high-interest and high-needs areas of graduate and undergraduate research.
 - c. Subject to the availability of resources, SUNY will recruit new faculty into high-interest, high-needs areas not met with existing personnel.
 - d. SUNY will create a database of multi-disciplinary expertise and research projects, which will serve as a clearinghouse for marketing and other institutional advancement purposes at campus and system level.
 - e. SUNY will facilitate faculty research and professional development by supporting workshops in grant writing, and by sponsoring or co-sponsoring conferences and symposia related to timely energy-environment issues.

2. Areas of Energy-Related Research
 - a. Recognizing the severity of the problem of global warming, SUNY will develop research programs designed to improve our understanding of climate change and its impacts, especially to develop strategies, technologies, policies, and educational programs to address it.
 - b. SUNY will develop and support applied and advanced energy-related research in areas such as those supported, but not limited to, programs funded through National Science Foundation (NSF), U.S. Department of Energy (USDOE), National Institute of Health (NIH) and the New York State Energy Research and Development Authority (NYSERDA), in addition to research funded by private sources.¹
 - c. Examples of cross-disciplinary areas of research (spanning social, behavioral and natural sciences, business and humanities): the psychology of energy use, ethics

¹ Examples of science/engineering/technology-based areas of research might include the following: biomass, fuel cells, photovoltaics, solar thermal energy (active/passive), power quality and reliability, distributed generation and cogeneration technologies, wind turbines, energy storage strategies (e.g., mechanical or chemical storage of wind or solar energy), pumped storage, alternative fueled vehicles, tidal energy and ocean-thermal energy, geothermal/ground-source heat pumps, analysis of transmission and distribution networks, assessment of energy potential.

and energy choices, the effect of education on energy consumption, energy use in developing nations, energy markets, risk management, impacts of deregulation, energy economics and externalities, quantifying public health and other societal costs of energy use (e.g., impacts on climate, air quality, agriculture, homeland security), quantifying energy and non-energy benefits/costs of energy conservation, metrics for M&V (monitoring and verification) and quality assurance.

3. Student Opportunities

- a. Undergraduate and graduate research in energy-related areas will create new opportunities for SUNY students. Expanded research that spans many disciplines will provide students with funding as research assistants; public/private research partnerships will additionally provide funding for internships.
- b. Energy-related research directed at education and behavior could also provide student opportunities in mentoring, environmental stewardship, creation and staffing of energy/environment kiosks, and community outreach through activities such as energy audits, recycling campaigns, and assistance to low-income residential energy users.

BUILD STRATEGIC ALLIANCES

Public/private partnerships, entrepreneurial ventures and increased collaboration with business and community groups must be part of a broader SUNY strategy aimed at operational efficiency, academic excellence, cutting-edge research, and enhanced public image through responsible energy use and innovative leadership. SUNY will pursue increased outreach to federal, state, and private funding sources, increase collaboration with state agencies, utilities, business, and industry in order to leverage energy efficiency mandates into strategic opportunities for resource development, sponsored activities, and research.

1. Business Collaborations

- a. SUNY will pursue increased collaboration with local and regional businesses, energy service companies, public and investor-owned utilities (e.g., New York Power Authority (NYPA), Long Island Power Authority (LIPA), Local Delivery Companies (LDC), and other organizations at the energy/environment nexus.
- b. Such alliances and partnerships will increase externally funded projects and consolidate SUNY's position as a leader and innovator.
- c. Public/private partnerships will lead to increased opportunities to fund Centers of Excellence, R&D Incubators, energy-related demonstration projects, and academic initiatives and research.

2. Demonstration Projects

- a. SUNY will encourage campuses to pursue increased deployment of environmentally aware demonstration projects and distributed generation (e.g., solar photovoltaics, wind, fuel cells, hydro and cogeneration), and to

SUNY Energy Strategic Planning Task Force Policy Recommendations

recommendations of SUNY's Task Force on Efficiency and Effectiveness, the University's visions and goals will be effectively integrated; best practices related to energy will be promoted, through various avenues including the SUNY website.

1. Optimizing "System-ness"
 - a. SUNY will encourage greater inter-campus communication and cooperation regarding best practices, campus-based initiatives and externally funded projects. Campuses with a record of energy leadership, and with individual faculty and staff having notable expertise and experience, will be encouraged (and receive appropriate support and recognition) for participating in dissemination efforts that help facilitate energy and related initiatives on other campuses.
 - b. System Administration will facilitate knowledge transfer in areas related to energy management, energy economics, and maintenance through sponsorship of workshops and conferences in areas such as supply-side, demand-side and renewable energy strategies.
 - c. SUNY will provide central assistance in technical/financial areas such as group energy procurement, risk management, staff training, grant writing, data collection, and analysis.

2. Intra-Campus Coordination
 - a. SUNY will ask each campus to identify person(s) with energy-related expertise. These experts may be faculty, senior administrators, facilities staff, business officers or other personnel.
 - b. Energy-related issues and decisions involve a number of campus offices including facilities, business affairs, institutional advancement, residential life, research, and academic affairs. Effective energy management requires a comprehensive skill set and clear lines of responsibility; successful energy-related initiatives require concerted internal coordination and communication. SUNY will encourage each campus to establish appropriate organizational structures and mechanisms to ensure that effective coordination of energy use, planning, and budgeting takes place. These structures should also serve as focus for development of a campus' other institutional-related energy initiatives.

3. Green Committee
 - a. Campuses with a "Green Committee" (engaged in campus activities such as recycling, energy conservation awareness, and green building advocacy) are to be commended for their pro-active efforts, and will be encouraged to disseminate and expand their activities beyond the campus.
 - b. Campuses without a green (or energy) committee will be encouraged to establish such a college-wide group, in conjunction with Facilities, Faculty Governance, Student Governance, Residential Life, Alumni Association and other interested parties.

SUNY Energy Strategic Planning Task Force Policy Recommendations

4. Knowledge Transfer/Dissemination
 - a. SUNY will sponsor or co-sponsor energy-related workshops, conferences and symposia, designed to provide timely information, dissemination and training, and to showcase the energy-related achievements of SUNY and its campuses, faculty, staff and students.
 - b. Conference themes would span energy-environmental issues, and may include public health, public policy, climate change, and other educational, technical or environmental topics.
 - c. Co-sponsorship of such events may be sought from agencies and organizations such as NYSERDA, NYPA, DOE, NIH, NYPIRG, and professional associations, as well as from business and community groups. The University Faculty Senate may also be involved in co-sponsoring such events, e.g., through the *Conversations in the Disciplines* program.
5. System Administration should assist campuses to purchase renewable energy if they lack the technical or administrative resources processes to own and operate campus-specific renewable energy systems.
6. Energy utilization and energy management needs to be integrated into System and campus growth plans.
 - a. Other options for growth, including rehabilitation and modifications to existing space, should be considered.
7. Combined heat and power (CHP) projects should be implemented in the future.
 - a. Total energy efficiencies in excess of 80% can be achieved with the CHP concept. The University should set a target to implement five CHP projects in the System by 2010. These projects should use renewable fuels (e.g. biomass, biodiesel, etc) where economically practicable.
 - b. Partners in these CHP projects could include NYPA, NYSERDA and the USDOE.

SUNY will foster the continual development and refinement of policies and best practices related to energy management and conservation efficiencies. In addition to conservation, strategies shall include the appropriate development of onsite resources for the production of energy.

Specific methods in sustaining appropriate management and planning will include:

1. Campus Plans—Written policies, guidelines, and procedures with respect to energy issues for each campus. These plans should include:
 - a. Identification of one individual at the campus who is responsible for administering the guidelines, policies, and procedures.
 - b. Identification of appropriate level of financial and personnel resources to be dedicated to energy management and conservation.
 - c. Specification of energy use management and measurement, along with goals for reduction including temperature policies and equipment run-time policies.

SUNY Energy Strategic Planning Task Force Policy Recommendations

- d. Capital planning strategies to be utilized to achieve long-term increases in energy efficiency, security, and reduction of environmental impacts.
 - e. Management plans for emergency response to energy disruption.
 - f. Management plans for power load shedding.
 - g. Executive Orders 111 and 142 compliance plans.
 - h. Annual reports to the campus leadership, the Chancellor and SUNY Board of Trustees on energy management and sustainability efforts.
 - i. Report on academic programs and initiatives that have been added by campuses pursuant to the goals of the University's overall Strategic Energy Management and Planning Policy, including energy-related curriculum, sponsored research and student opportunities.
 - j. Efforts undertaken to link enrollment planning and academic planning with facilities planning and energy use, to meet the goals of the policy.
2. Capital planning strategies need to be developed to achieve long-term increases in energy efficiency, security, and reduction of environmental impacts.
 3. Campus Measurement—Campuses will be required to provide some fundamental data-reporting to System administration.
 - a. Monthly energy consumption and unit cost reporting for the Energy Management and Budgeting System (EMBS).
 - b. Annual Report of performance of energy programs and projects.
 - c. Executive Orders 111 and 142 compliance.
 4. The information will be disseminated back to the campuses in a form that will organize system-wide data into logical subdivisions that will enable campuses to conduct comparative analysis and benchmarking.
 - a. Energy and greenhouse gas emissions on a square foot and per student basis.
 - b. Energy costs by campus and commodity including average unit costs and costs per square foot.
 - c. Historical energy usage by campus (10-year trend).
 - d. Best energy management practices as reported by campuses.
 - e. Changes at SUNY that affect energy use: enrollment, sponsored research, economic development, and increased health care services.

Procurement and Risk Management

SUNY is the second largest energy consumer in New York State with approximately \$300 million in combined utility costs. As such, SUNY has the potential to capitalize on its size, geographic diversity (as relates to electricity and natural gas costs), and credit worthiness to better manage its response to escalating and volatile energy costs. While conservation and greater energy independence must continue to be fundamental to the University's energy strategies, two areas where SUNY can leverage its size and diversity are: procurement and risk management. Included in this last category are any on-campus production capabilities that may exist.

SUNY Energy Strategic Planning Task Force Policy Recommendations

Procurement

Among the most significant challenges that SUNY faces is managing energy costs in volatile energy markets. To meet this challenge SUNY needs to develop contracts and procurement systems that allow it to participate in energy markets. SUNY should:

1. Work with New York State's control agencies (i.e., State Comptroller, Attorney General and Division of the Budget) to develop standardized energy contracts that meet the State approval process and are compatible with common energy market practices for all energy products. If legislative changes are required, SUNY will seek such changes.
2. Explore long-term wind energy or green power purchases as financial hedges to minimize price volatility.
3. Explore development/ownership of generation resources as the most effective long-term hedges against escalating energy prices.

Risk Management

The current budgetary process requires SUNY to make predictions regarding energy prices eighteen months in the future. These predictions are built into the annual utility budget for each campus. The problem is that the New York energy market is a deregulated one that is based upon hourly "spot" pricing. This deregulated market can be characterized as an extremely volatile and unpredictable one (see Appendices I & J) in which previously established market patterns are easily inverted. With this kind of volatility it is impossible for SUNY to accurately predict and manage energy costs, or achieve budget certainty, without the use of well-established, responsible risk management strategies. Only by adopting these risk management tools and strategies will SUNY be able to achieve energy budget certainty within an acceptable, pre-established variance. SUNY should:

1. Develop and implement a risk management policy that is clearly documented with strong oversight and controls. This policy must be approved and supported across the institution.
2. Formulate and implement a risk management strategy to actively control and stabilize the institution's exposure to the extreme risks inherent in the energy market. Participation in this risk management strategy should be mandatory and include all State-Operated campuses within the SUNY system.
 - a. Additional internal or consulting service resources will be required to administer such a program, but would constitute a fractional percentage of the University's current expenditures on electricity, natural gas, and oil.

Regulation and Incentives

Regulation

1. The State University will take a proactive role in rate cases before the New York State Public Service Commission (NYSPSC) and Federal Energy Regulatory Commission (FERC), to protect its interests, such that:
 - a. Costs for transmission and distribution of natural gas and electricity are fairly distributed by rate classes based on cost of services.
 - b. Regulated utilities profits do not exceed allowed rates of return.
 - c. Standby rates for electricity or gas service do not adversely affect the University's ability to burn alternate fuels or generate electricity or utilize combined heat and power cogeneration systems on campus.
 - d. Regulated utilities meet reliability and maintenance standards.
 - e. Rate structures are modified so that utility companies are once again provided with financial incentives to promote conservation and efficiency.
2. SUNY needs to continue and expand its proactive role in the governance of the New York Independent System Operator (NYISO), such that:
 - a. Electricity costs to consumers are kept as low as possible while still maintaining reliability.
 - b. Costs of energy, ancillary services, and capacity are accurately accounted for and accurately charged to buyers and sellers.
 - c. Reserve margins are maintained to meet regional requirements and costs are allocated regionally based on those needs.
3. SUNY should provide input to the Governor, the Legislature, and regulatory bodies on:
 - a. The need for Systems Benefit Charges to be maintained at the current level or increased, and continue to be available in an open, flexible and competitive fashion for energy conservation projects.
 - b. Energy issues that affect the cost of energy to SUNY and all New Yorkers.
 - c. The mix of electrical generation sources in New York State.
 - d. Environmental issues such as the Green House Gas Initiative.
 - e. Electrical transmission needs.
 - f. Renewable energy technologies.

Incentives

1. SUNY should apply for additional funding from State entities (NYSERDA, LIPA, NYPA, Empire State Development), Federal entities (DOE and EPRI) and private foundations for:
 - a. Grants to off set the costs of energy conservation projects.
 - b. Grants for research into new energy sources, more energy efficient products, and improved delivery systems.
 - c. Grants to improve energy and environmental education.

SUNY Energy Strategic Planning Task Force
Policy Recommendations

Appendix A

**State University of New York
Comparison of Base Year (1989/90) to Goal for 2010**

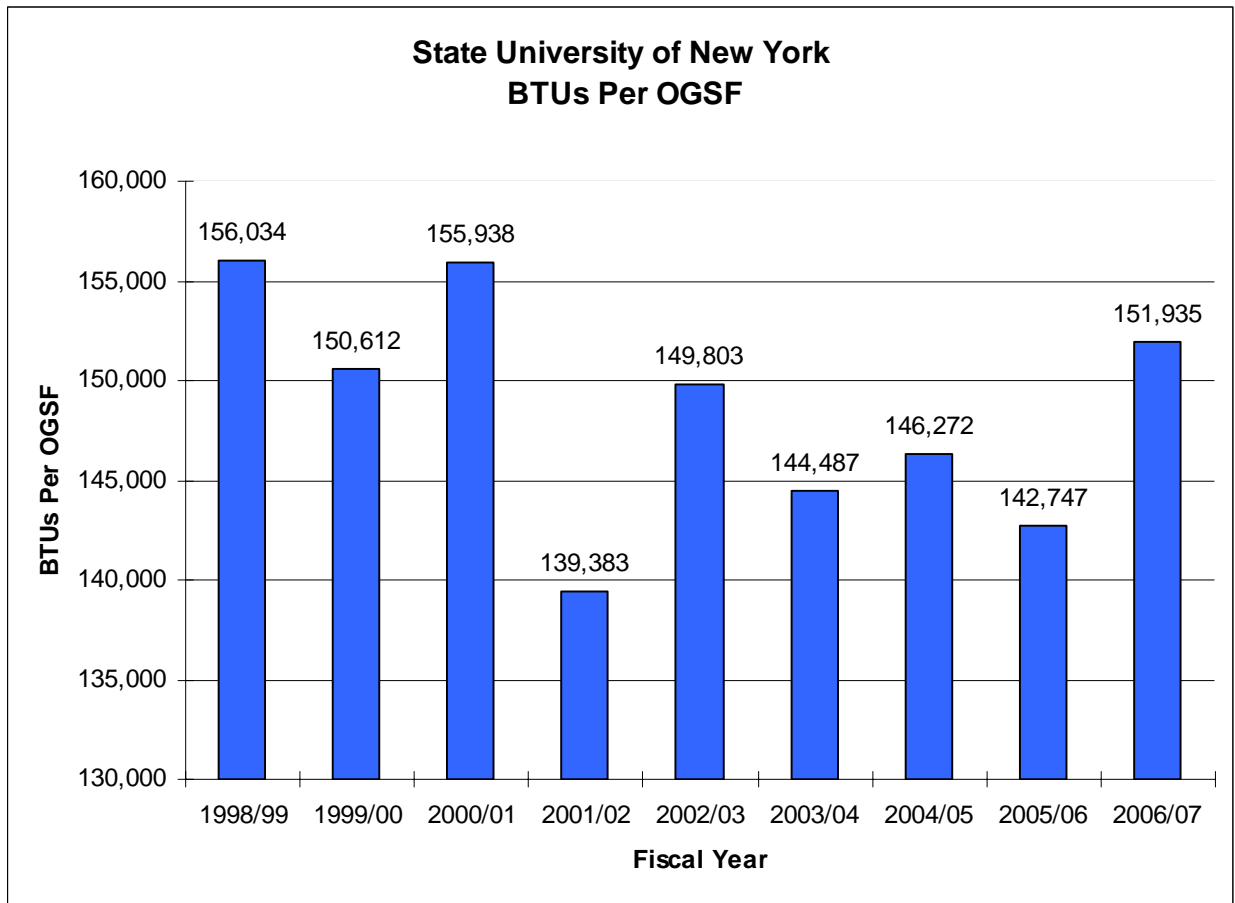
Campus	Baseline 1989/90 10000 BTUs/OGSF	Current 2005/06 10000 BTUs/OGSF	See Note Below % Difference 05/06 vs. 89/90	Goal to Meet a 37% Reduction by 2010
Albany	246,827	233,453	-5.42%	31.58%
Binghamton	220,981	179,650	-18.70%	18.30%
Buffalo South/Main	207,806	195,882	-5.74%	31.26%
Buffalo North/Amh	345,338	284,220	-17.70%	19.30%
Stony Brook	445,156	228,785	-48.61%	0.00%
Brooklyn HSC	560,124	421,057	-24.83%	12.17%
Syracuse HSC	380,880	434,380	14.05%	51.05%
Brockport	174,218	166,604	-4.37%	32.63%
Buffalo	245,535	189,847	-22.68%	14.32%
Cortland	220,753	167,828	-23.97%	13.03%
Fredonia	235,584	214,761	-8.84%	28.16%
Geneseo	170,978	155,278	-9.18%	27.82%
New Paltz	174,213	186,906	7.29%	44.29%
Old Westbury	199,931	202,661	1.37%	38.37%
Oneonta	179,187	169,470	-5.42%	31.58%
Oswego	181,558	188,306	3.72%	40.72%
Plattsburgh	254,412	263,164	3.44%	40.44%
Potsdam	184,098	202,275	9.87%	46.87%
Purchase	232,971	203,927	-12.47%	24.53%
Utica/Rome	224,345	150,105	-33.09%	3.91%
Alfred	177,789	157,696	-11.30%	25.70%
Canton	214,926	225,100	4.73%	41.73%
Cobleskill	249,684	194,554	-22.08%	14.92%
Delhi	250,776	186,198	-25.75%	11.25%
Farmingdale	180,233	150,962	-16.24%	20.76%
Morrisville	154,647	139,797	-9.60%	27.40%
Cornell	271,353	234,327	-13.64%	23.36%
Geneva	313,816	249,352	-20.54%	16.46%
Alfred Ceramics	198,397	229,536	15.69%	52.69%
Forestry	223,379	168,065	-24.76%	12.24%
Maritime	141,264	140,305	-0.68%	36.32%
Sys. Admin.	254,984	227,297	-10.86%	26.14%
Optometry*	193,277	182,317	-5.67%	31.33%
University Avg.	264,302	219,469.7	-16.96%	20.04%

Note: A negative number reflects a decrease in usage from 1989/90 baseline.

A positive number reflects an increase in usage from 1989/90 baseline.

*Optometry - used baseline of 2003/04; in rental building until 2001/02

Appendix B



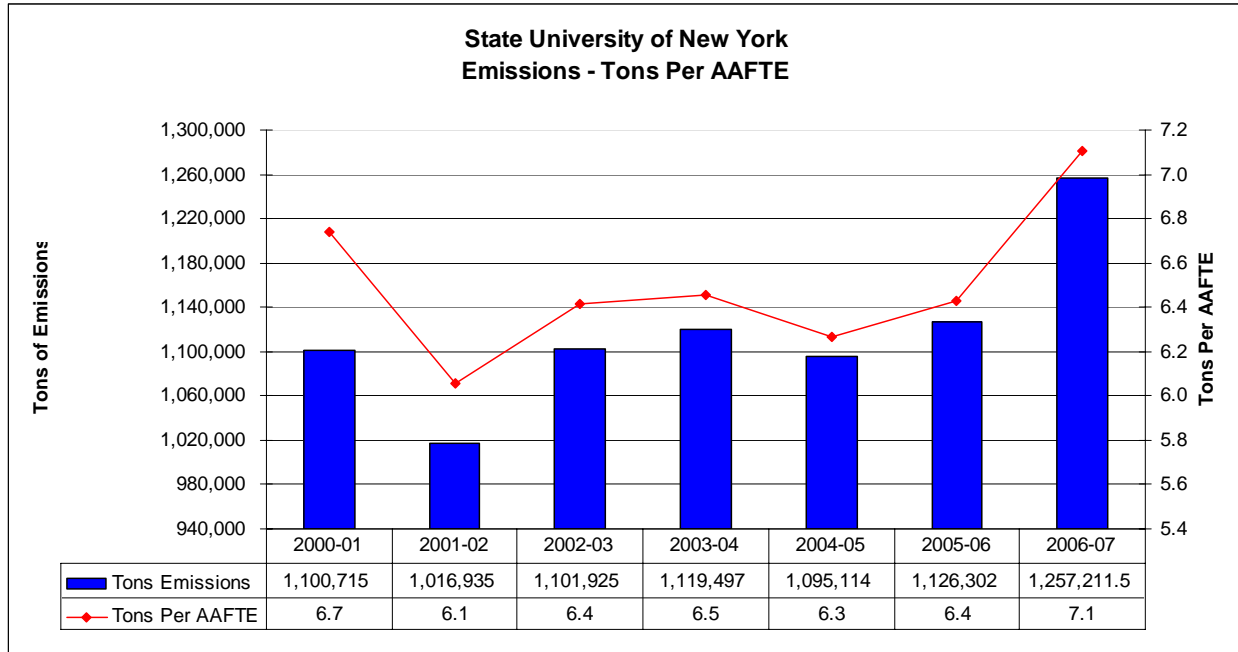
Data for 2006/07 is estimated

Appendix C

Existing and Projected
Combined Heat and Power Projects

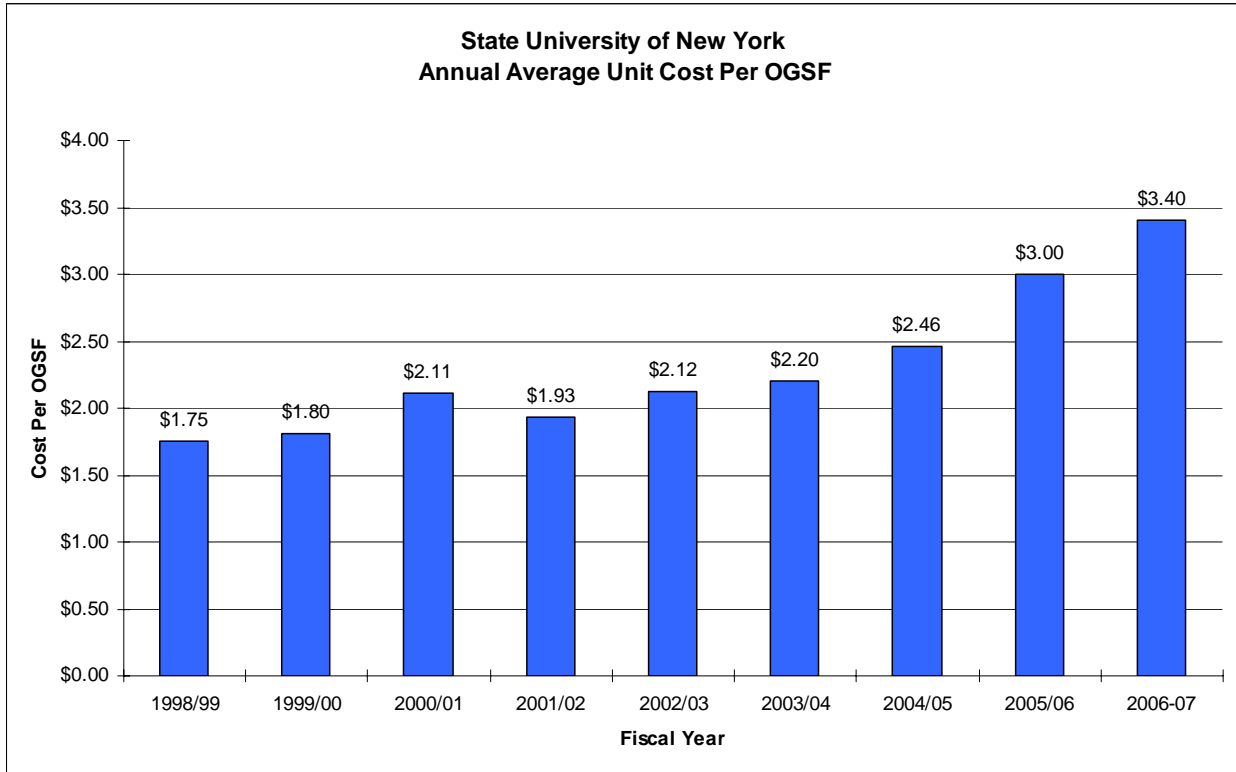
<u>Campus</u>	<u>Capacity</u>	<u>Status</u>
Stony Brook	40 MW	Operational
Old Westbury (Summer, 2006)	1.9 MW	Operational
Potsdam	3.5 MW	Design
Binghamton	5-8 MW	Design

Appendix D



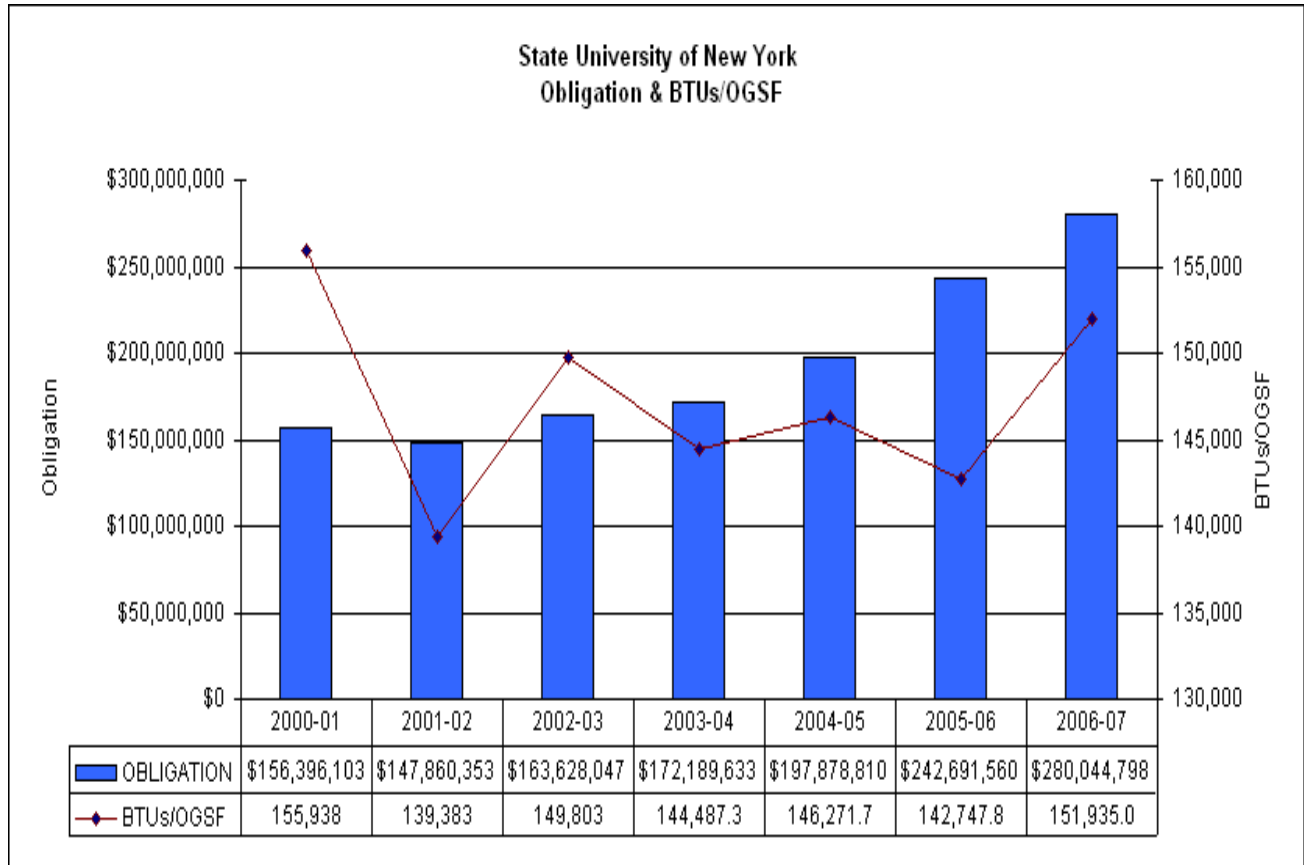
Data for 2006/07 is estimated

Appendix E



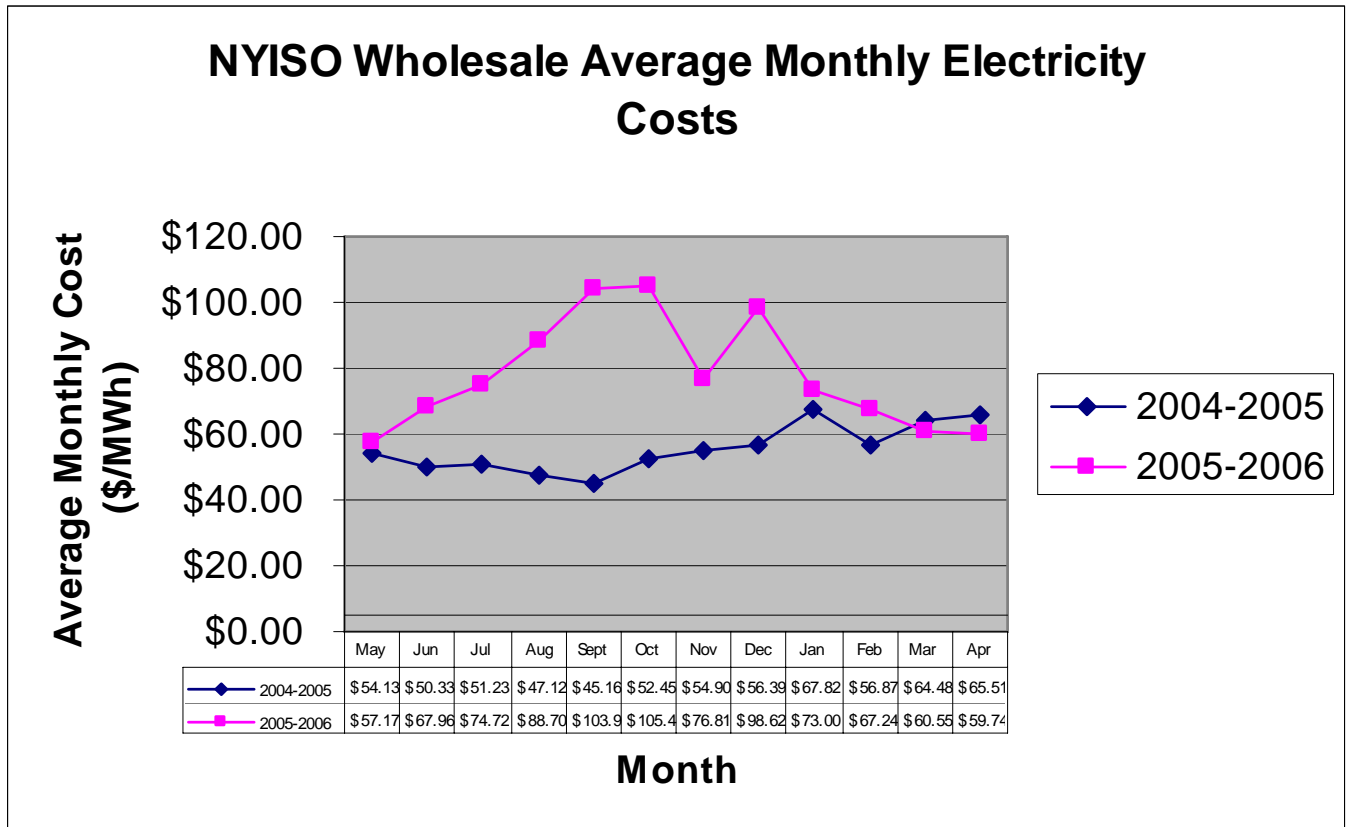
Data for 2006/07 is estimated

Appendix F

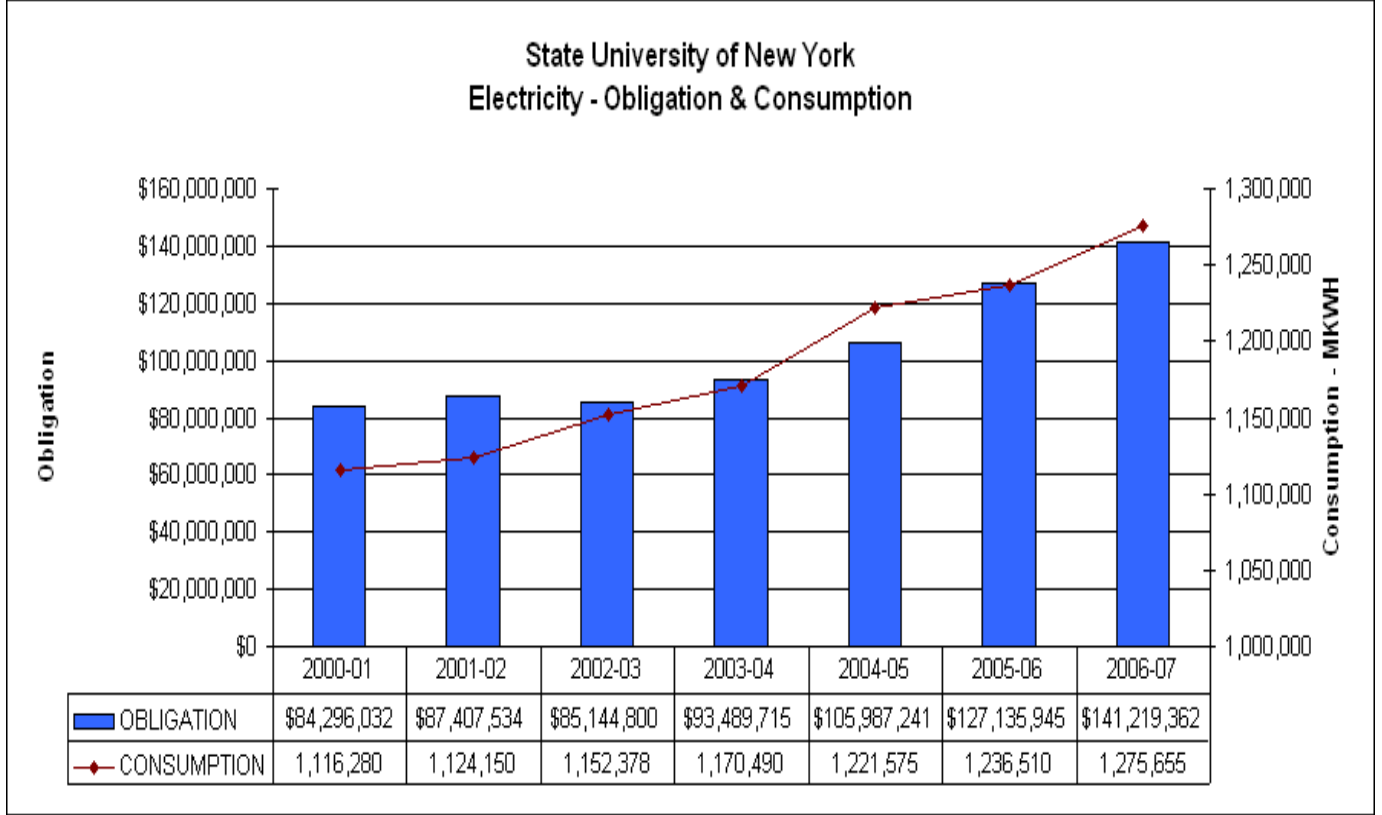


Data for 2006/07 is estimated

Appendix G

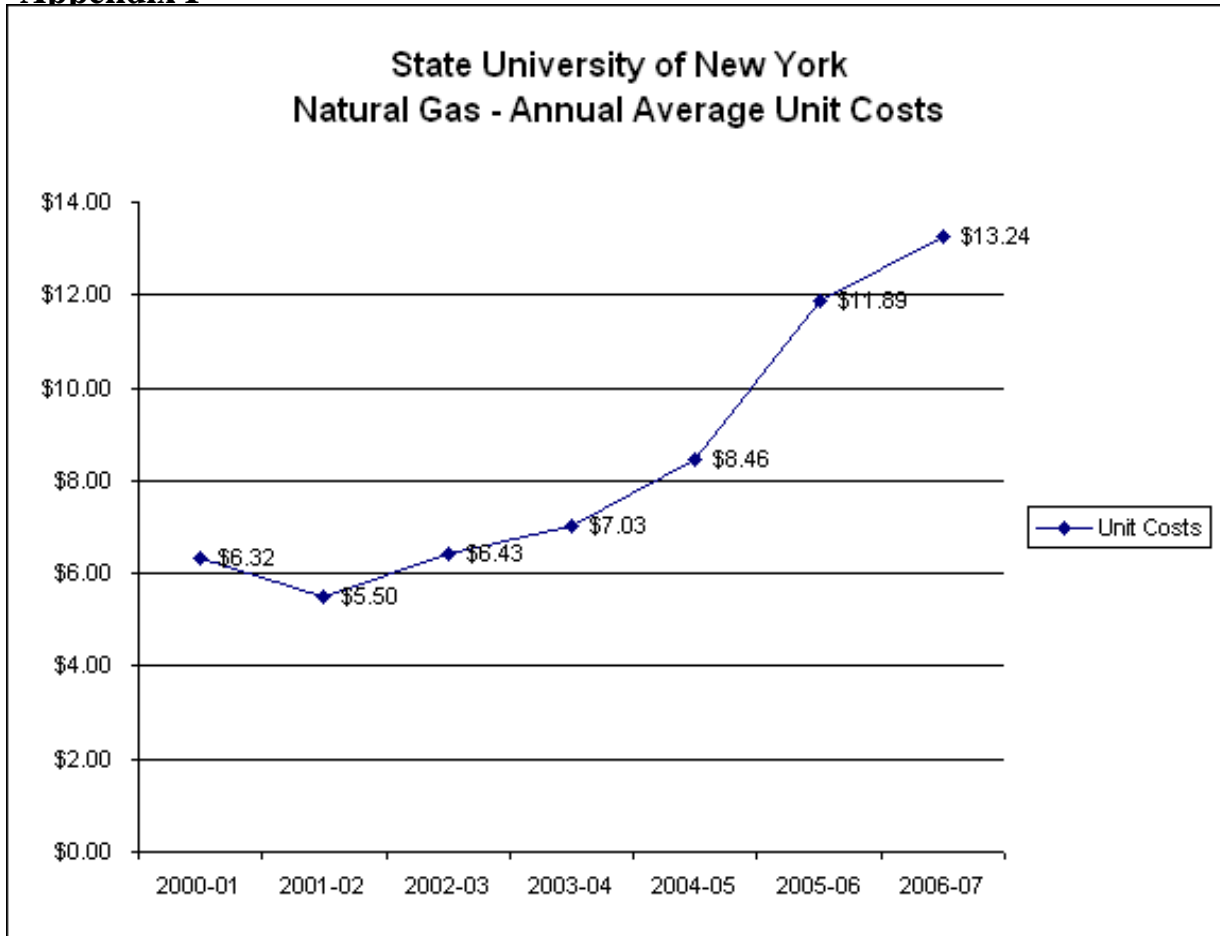


Appendix H



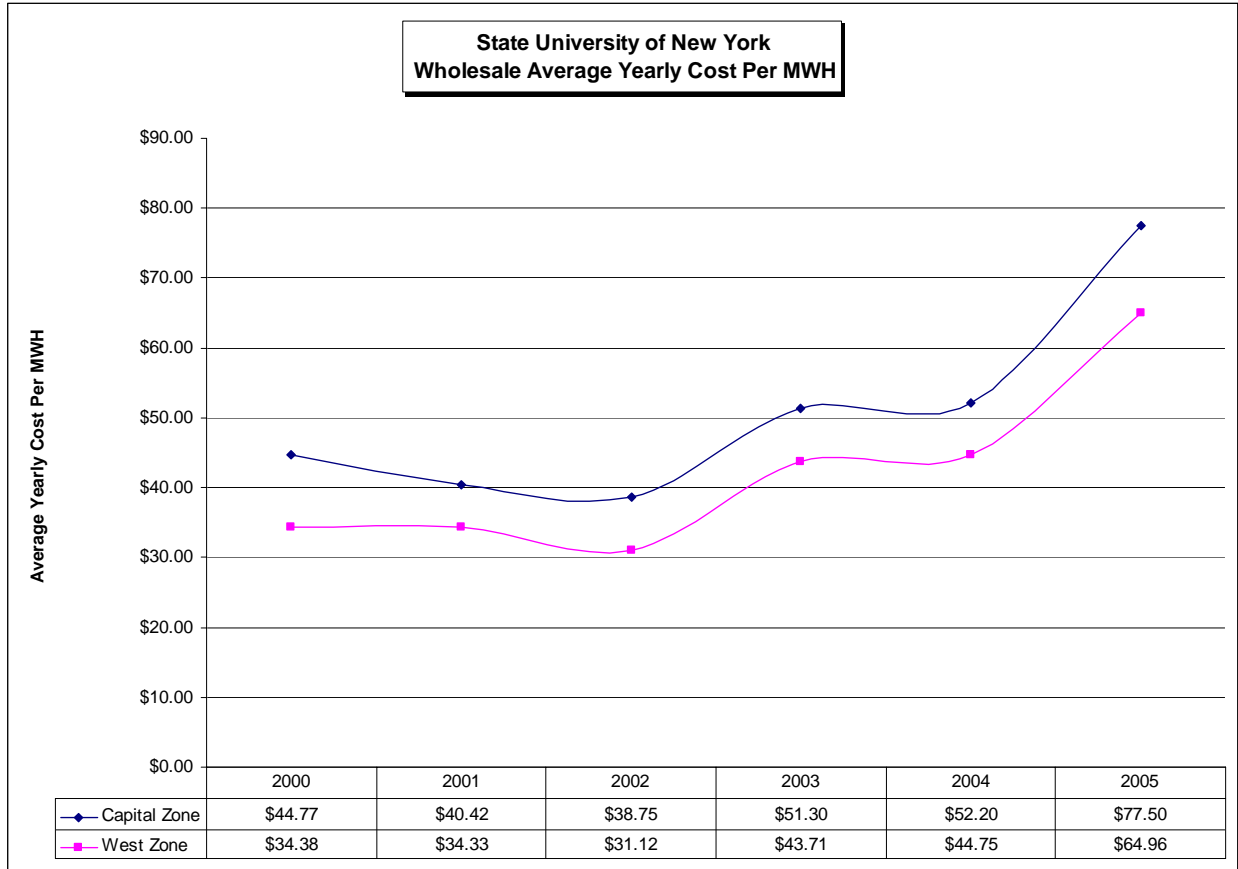
Data for 2006/07 is estimated

Appendix I



Data for 2006/07 is estimated

Appendix J



Appendix K

Peer Comparisons

There are a number of colleges and university systems throughout the U.S. and Canada that are developing sustainability strategies to meet the environmental and energy challenges of the 21st century. The following is a synopsis of various efforts that have been taken by a mix of public and private higher education institutions throughout North America.

Comprehensive Sustainability

New Jersey Higher Education Partnership for Sustainability (NJHEPS) ²

The New Jersey Higher Education Partnership for Sustainability is a collaborative effort of forty-two public and private higher education institutions to address climate change including the use of renewable resources. The college presidents of all the higher education facilities within the state have signed on to the New Jersey Sustainability Greenhouse Gas Action Plan. The plan involves the following steps:

- Energy reports and action plans for reducing emissions and costs for presentation to college decision makers
- Appointment of sustainability coordinators from facilities and faculty to implement the plan
- *High Performance Campus Design Handbook*, guidelines for green design
- The Building Energy Audit and Technical Assistance Initiative, a database providing baseline building energy information for use for benchmarking and goal setting in the entire sector
- Establishment of emissions and energy reduction targets at each campus
- The Renewable Energy and Global Warming Curriculum Module, a Web-based problem-solving product
- Implementation of emissions and energy reductions at multiple campuses through energy-efficiency improvements and renewable energy investments

NJHEPS acts as the coordinating mechanism for the colleges and universities and fosters sharing of information, presentation of educational material, and publication of technical information.

Comprehensive Energy Planning

University of California at Merced ³

As the newest campus, currently under construction in the University of California system, UC Merced is incorporating sustainable principles into its comprehensive plan. This plan includes high performance building, water conservation, recycling and transportation. All Merced's building will meet or exceed

² *The Business Case for Renewable Energy: A Guide for Colleges and Universities*
Andrea Putnam and Michael Philips, APPA, NACUBO, and SCUP, 2006

³ *New Energy for Campuses: Energy-Saving Policies for Colleges and Universities*
Satya Rhodes-Conway and Brian Su of The Apollo Alliance
Billy Parish of Energy Action

SUNY Energy Strategic Planning Task Force Policy Recommendations

LEED Silver standard and will incorporate recycling in construction and ongoing waste minimalization. Transportation planning promotes intermodal travel and storm water will provide irrigation. The campus planning process calls for increasingly stringent efficiency measures as the campus grows. Merced's comprehensive approach can be a model for campuses undergoing major renovations, additions, and long-term planning.

Clean Power on Campus

University of Iowa ⁴

The University of Iowa is shifting its energy sources from coal to biomass. The UI power facility, which supplies 100% of campus heat and 30% of campus electricity, historically operated on coal. Recently, the plant has added oat hulls to its fuel mix. Each year, oat hulls replace between 25,000 and 30,000 tons of coal, saving the school over \$500,000 in fuel costs. The switch has resulted in large reductions of NOX, SOX, CO2, particulate matter, and volatile organic compounds. These environmental improvements allow UI to sell emissions offsets on the Chicago Climate Exchange.

Efficient Generation through Combined Heat and Power (CHP)

University of North Carolina – Chapel Hill ⁵

UNC-Chapel Hill's CHP plant provides the campus with one-third of the electricity and 100% of all its heating needs. The plant utilizes the latest technologies to reduce the emissions and the thousands of tons of fly ash produced annually are reused for sewage treatment and structural fill. The facility has won multiple awards from the U.S. EPA.

Buying Renewable Power

California State University System (CSU) ⁶

CSU has committed to meeting 20% of its energy demand with renewable power by 2010. CSU will begin by purchasing 34,000 Mwh worth of Renewable Energy Credits (RECs) from 86% wind and 14% landfill gas. The CSU system plans to reduce demand by 15% by 2010 and to complete 50 MW of self-generation capacity. This capacity will include clean technologies such as solar and CHP. All told, the CSU policies will avoid 80,000 tons of CO2 release by 2010 and will reduce emissions by 17% below their 2004 levels.

Efficiency

University of Michigan ⁷

Over a six year period, the University of Michigan completed energy efficiency projects in 123 campus buildings. The measures included lighting upgrades, efficient appliance procurement, adjustments to

⁴ *Ibid*

⁵ *Ibid*

⁶ *Ibid*

⁷ *Ibid*

SUNY Energy Strategic Planning Task Force Policy Recommendations

mechanical systems, and environmental control systems. The University expects \$9.7 million in annual savings from these efforts.

Operations

University of Vermont ⁸

The University of Vermont uses a centralized environmental control system to operate many of its large buildings. The system adjusts both lighting and temperature for periods of high and low occupancy. This ensures consistent efficiency by removing the possibility of human error. Buildings that are not integrated into the central control system have been retrofitted with programmable thermostats that adjust temperature during low occupancy periods.

Purchasing Policies

Duke University ⁹

Duke University includes heating and cooling systems under its procurement policies, giving preference to state of the art efficiency technology, as well as calling for Energy Star compliant equipment whenever possible.

Improving Mass Transit

Cornell University ¹⁰

Cornell University implemented a package of incentives and disincentives to manage growing campus traffic. Higher parking fees were coupled with a redrawn parking system which favors carpooling. The University also worked with surrounding municipalities to integrate their transit systems for more efficiency. Faculty, staff, and students who forego a parking pass can have unlimited use of public transport anywhere within Tompkins County. These efforts have saved the University 417,000 gallons of fuel and 10,000,000 vehicle miles traveled each year. Over 12 years, Cornell's transportation system has saved over \$36 million in construction, infrastructure maintenance, and transportation costs.

Clean Energy Funds

Harvard University ¹¹

Harvard University established a revolving loan fund to finance clean energy projects on campus. Total average rate of return for all projects was 27.9%. These projects have achieved considerable savings (FY 2003 = \$550,000, FY 2004 = \$820,000).

⁸ *Ibid*

⁹ *Ibid*

¹⁰ *Ibid*

¹¹ *Ibid*