STRATEGIC ENERGY ISSUES IN SUNY

Whitepaper by the University Operations Committee
DRAFT Outline

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ENERGY USE IN SUNY

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

- SUNY contains nearly 82,000,000 overall gross sq. ft. in 2756 buildings (2003-04)
- Total energy consumption of approximately 18 Trillion BTUs (2003-04)
- Total peak demand for electricity nearly 160 MW in 2003-04

SUNY utility costs projected to be nearly $205 Million in 2004-05

- Utility costs have increased 61% (nearly $78Million) in past decade
- Utility costs comprise nearly 10% of SUNY Core Operating Budget
- Utility costs comprise up to 50% of campus OTPS expenditures
- Average annual unit cost of natural gas more than tripled in past decade

Growth in utility costs, historically, not recognized in SUNY base budget

- Increased volatility in energy prices makes budget/planning difficult
- Utilities for new buildings increase campus operating costs
- Instructional Technology increases the demand for electricity
- Growth in Student FTE and research generally increases energy demand

Historically, for many campuses, energy conservation not a high priority

- Energy efficiency, historically, not a high priority for new campus buildings and equipment
- Expertise in energy management, historically, not a high priority in facilities administration
- Expertise in energy procurement and risk not generally common among campus business officers

SOME IMPACTS OF DEREGULATION

- ⇨ Increase in energy prices (electricity, natural gas, oil)
  - Regulated prices set by PSC on basis of average annual cost to utility
  - Deregulated prices moving to basis of marginal cost and real-time pricing

- ⇨ Increase in volatility of energy prices
  - Electricity traded as a commodity, allowing for futures, options and hedging strategies
  - Electricity prices under increasing pressure from natural gas pricing and availability

- ⇨ Decrease in reliability of energy systems
  - Long distance transmission affects electric power quality
  - Market-based systems decrease motivation to invest in infrastructure
  - Greater frequency of disruptions in supply of natural gas and electricity
  - Increased installation by end-use customers of on-site electric power generation

- ⇨ Growing markets for alternative energy and energy efficient products
  - Supported by New York State Energy $mart Program and SBC
  - Macroeconomic impacts through new industries and energy service companies
  - Environmental benefits through decreased emissions

- ⇨ Opportunities for mitigating rising costs
  - Energy risk management through new financial instruments
  - Energy procurement through consortia (business, institutions, residential)
  - Energy conservation measures funded through energy performance contracts (in which capital improvements are paid for by future energy savings, at little or no upfront cost to an institution)

GOVERNOR'S EXECUTIVE ORDER #111

On June 10, 2001, Governor George Pataki issued Executive Order #111:
"Directing State Agencies to be More Energy Efficient and Environmentally Aware"

Executive Order #111 establishes mandates for SUNY and all state agencies:

- Energy Efficiency and Energy Conservation in Buildings
  - Requires a 35% reduction in energy consumption by 35% by 2010 (relative to 1990)
  - Applies to all new and existing buildings owned, leased or operated by state agencies
- Renewable Energy
  - Requires that 20% of electric consumption be provided by renewable sources by 2010 (10% by 2005)
  - Eligible sources include wind, solar thermal, photovoltaic, tidal, geothermal, fuel cells, biomass.
- Energy Efficient Equipment
  - Requires the purchase of Energy Star compliant equipment (or highly energy efficient equipment if type of equipment is not Energy Star rated)
- Alternate-Fueled Vehicles
  - Requires that 100% of new light-duty vehicles purchased be alternate-fuel, including hybrid, by 2010 (50% target for 2005)
- Green Building Construction
  - Requires new construction to follow "green building" guidelines set forth in green building tax code and LEED rating system (LEED: "Leadership in Energy and Environment Design") of U.S. Green Building Council

Charge to NYSERDA under Executive Order #111

- ⇨ Coordinating the implementation of Executive Order #111
  Assisting each state agency in the fulfillment of its mandated responsibilities

- ⇨ President of NYSERDA (New York State Energy Research and Development Authority) chairs the Advisory Council on State Energy Efficiency established under Executive Order #111
  Council members include: Chairmen of PSC, LIPA, NYPA, MTA; Director of Division of the Budget, Commissioners of OGS, DEC, DOT; Secretary of State and SUNY Chancellor

Executive Order #111 consistent with Public Policy Goals:

- ⇨ New York State Energy Plan
- ⇨ New York State Greenhouse Gas Action Plan
- ⇨ New York Energy $mart Public Benefits Program
  - Created by Order of the PSC (1996)
  - Supported by the Systems Benefit Charge (SBC)
  - Intended to preserve, within emerging competitive energy markets, public benefits programs previously offered by utilities

Funding to Support Implementation Available through Systems Benefit Charge

- ⇨ Fee assessed by Public Service Commission to rate-payers of electric utilities in NYS
- ⇨ Funds administered by NYSERDA through New York State Energy $mart Program
- ⇨ Average Annual SBC funding in NYS: $150 Million per year since 2001
- ⇨ Cumulative SBC funding in NYS: $931 Million for 1998-2006 period
  SBC-funded programs are set to expire in 2006, but will likely be extended by the PSC

SBC (Systems Benefit Charge) Program Areas:

Energy Efficiency (Business, Institutional)

Residential Energy Efficiency

Renewable, Alternative and Indigenous Energy

Low-income Affordability

Consumer Education

Research and Development

Environmental Protection

Benefits of Projects Funded by SBC in NYS 1998-2003):

Reduced annual electric consumption in New York State by 1,000 GWh

Reduced peak electric demand in New York State by 880MW

Created 3,500 jobs per year

Reduced CO_2 emissions by 750,000 tons per year

Reduced NOx emissions by 950 tons per year

Reduced SO_2 emissions by 1,700 tons per year

Annual emissions reductions equivalent to removing 150,000 cars from New York roadways

Current State in SUNY

- Across the System

  University buildings system-wide consume energy at an above-average rate and above-average cost: $2.50 per square foot (approximately 50% above the operating cost of energy efficient buildings)

  Energy costs comprise the second largest expense in SUNY's operating budget (after salaries) Energy expenditures consume up to half the OTPS budget of many campuses.

  Aging campus infrastructures, years of deferred maintenance, and limited funds for capital improvements impact SUNY's ability to meet the ambitious goals of Executive Order #111

- Many campuses lack what NYSERDA terms an energy "champion"

  Although some campuses have a proven record of leadership in energy efficiency and conservation, historically, on many campuses, little priority was attached to energy use and its economic and environmental impacts

  Energy efficiency was often of low priority in building design and construction, campus staffing expertise, and administrative decisions regarding M&O resources

- Recent Initiatives

  System Administration initiatives tend to be supply-side:
  focused on distributed generation, energy procurement and managing energy-price volatility

  Campus-based initiatives tend to be demand-side:
  focused on energy conservation, and energy efficiency in buildings and equipment

Progress towards Goals of Executive Order #111

- ## Energy Efficiency in Buildings (target of 35% target by 2010)

16.38% Total Reduction in Energy Use 2003-2004 compared to base year (1989-90)
14.32% Total Reduction in Energy Use 2002-2003 compared to base year (1989-90)
19.11% Total Reduction in Energy Use 2001-2002 compared to base year (1989-90)

Total annual energy use adjusted for overall gross square feet of all SUNY buildings. However, Energy Use data is not normalized for climate. Due to mild winter in 2001-02, progress towards goal was overstated; some reduction in energy use was attributable to weather-related reduced demand.

Most reductions in energy use to-date are attributable to lighting upgrades in previous decade. Additional reductions require more intensive investment in efficient HVAC systems/operations.

- ## Renewable Energy (10% target for 2005; 20% for 2010)

2.0% of annual electric use from renewable sources in 2003-2004 (22,925 of 1,158,162.1 MWh)
Generated on-site 10,925 MWh (photovoltaics and lake source cooling)
Purchased: 12,000 MWh (wind)
1.4% of annual electric use from renewable sources in 2002-2003 (15,922 of 1,148,086.6 MWh)
Generated on-site: 11,922 MWh (photovoltaics and lake source cooling)
Purchased: 4,000 MWh (wind); hydropower purchase of 27,000MWh not eligible
1.2% of annual electric use from renewable sources in 2001-2002 (10,987.4 of 898,999.6 MWh)
Generated on-site: 187.4 MWh photovoltaics and 10,800 MWh lake source cooling
Hydropower purchase of 26,500 MWh not eligible .

- Alternate-Fueled Vehicles (50% target for 2005; 100% for 2010)

  61% of new light-duty vehicles purchased in 2003-2004 alternate-fueled (13% of entire fleet)
  60% of new light-duty vehicles purchased in 2002-2003 alternate-fueled (12% entire fleet)

- Other Actions Taken

  SUNY's Energy Buying Group saved the University $2.4Million in 2003-2004 by purchasing electricity wholesale from the New York Independent System Operator (NYISO)

  SUNY and NYSERDA convened statewide conference on energy risk management

  SAIC (Science Application International Corporation), consultant to SUNY under five-year project supported by NYSERDA, continues work on comprehensive energy management program for SUNY

  SAIC completed a study of risk for SUNY, recommending that the University utilize specialized financial contracts to protect, or hedge, against risk in price volatility of electricity and natural gas.

  Green Building Design Guidelines published by University at Buffalo, with assistance and support from SUCF, DASNY, NYSERDA, Steven Winter Associates, New Civic Work & Phoenix Design (150-page publication can be downloaded at http://wings.buffalo.edu/ubgreen/guidelines.html)

  Total of $9,641,442 in funding from NYSERDA to support energy efficiency projects in SUNY
  Total of 52 projects supported by NYSERDA through SBC Incentives (1998-2004)
  - 49 projects at 21 state-operated SUNY campuses
  - 2 projects at System Administration
  - 1 project for State University Construction Fund

Program Areas of SUNY Projects Receiving SBC Incentives from NYSERDA

Cogeneration/Distributed Generation	4 projects	Total Incentive: $1,397,054
Commercial/Industrial	7 projects	Total Incentive: $3,948,074
Advanced Monitoring	3 projects	Total Incentive: $87,000
New Construction	10 projects	Total Incentive: $1,945,382
Peak Load Reduction	5 projects	Total Incentive: $153,663
Smart Equipment Choice	7 projects	Total Incentive: $59,646
State EnVest	6 projects	Total Incentive: $870,000
Technical Assistance	10 projects	Total Incentive: $1,180,624

Summary Analysis of SUNY Projects Receiving NYSERDA Support (1998-2004):

Total NYSERDA support received:	$9,641,442	(equivalent to 1.4% of total SBC funds available)
Total Energy Cost Savings (annual):	$18,417,690	through NYSERDA-supported projects in SUNY
Total SUNY Cost-Share:	$70,904,282	(includes $55,532,479 for campus capital improvements financed through energy performance contracts)
Net SUNY Cost-Share:	$15,371,803*	

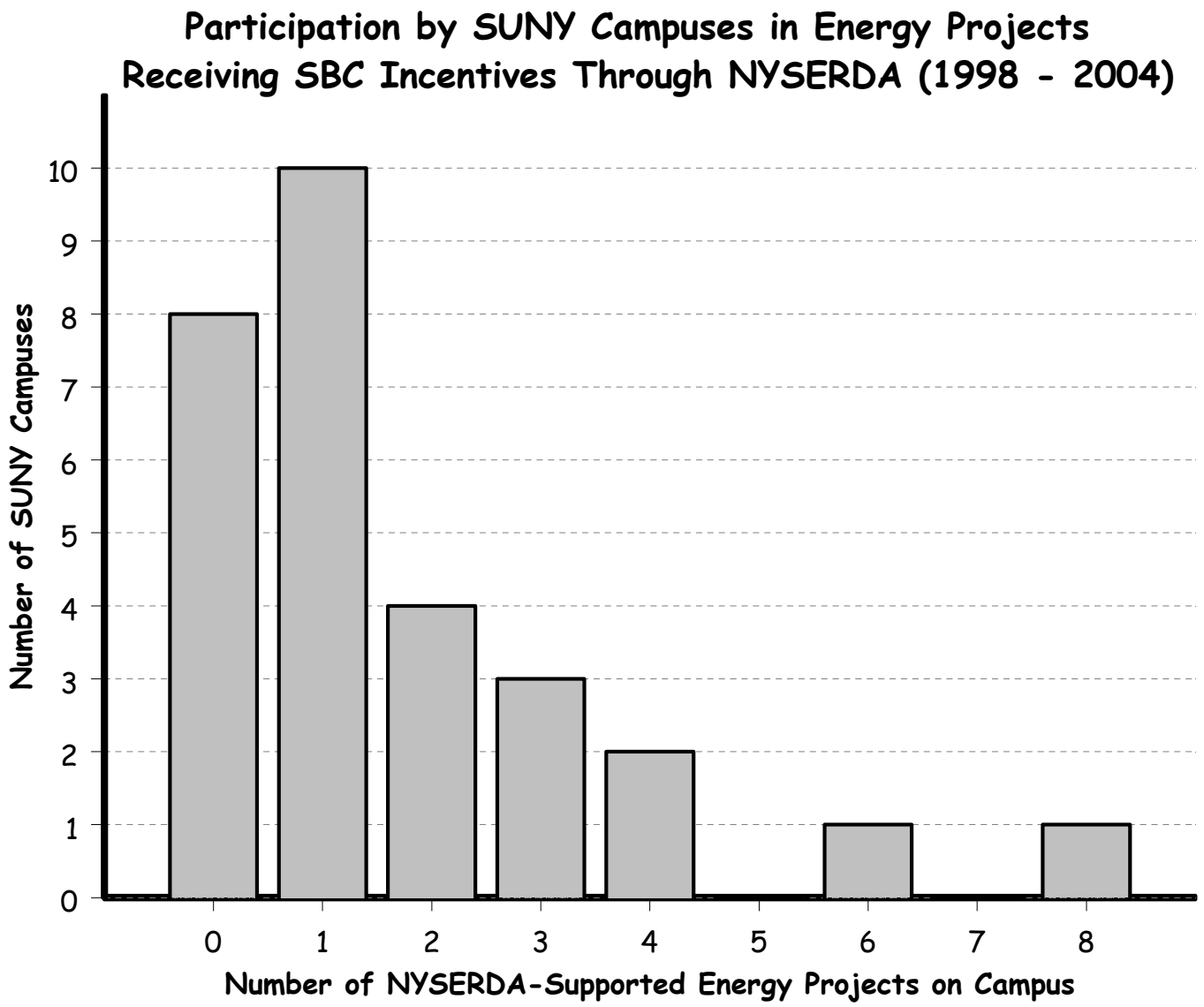
* Savings of $1.20 per year for every SUNY dollar spent on NYSERDA-supported energy projects listed above.

Participation by SUNY Campuses* in Energy Projects Receiving SBC Incentives through NYSERDA (1998-2004)

Number of Energy Projects Supported on a Campus	Number of SUNY Campuses	Percentage of SUNY Campuses
0	8	27.6%
1	10	34.5%
2	4	13.8%
3	3	10.3%
4	2	6.9%
5	0	0.0%
6	1	3.4%
7	0	0.0%
8	1	0.0%

* NYSERDA provided data for state-operated SUNY campuses receiving SBC Incentives for energy projects. There are 29 state-operated SUNY campuses; data for statutory colleges is not included.

The average number of funded projects per campus is 1.7, with average funding of $39.7K per project. Seventeen projects received over $100K in support, with 4 projects receiving $1Million or more in support.


Participation by SUNY Campuses in Energy Projects
Receiving SBC Incentives Through NYSERDA (1998 - 2004)
Number of SUNY Campuses
0
1
2
3
4
5
6
7
8
9
10
0
1
2
3
4
5
6
7
8
Number of NYSERDA-Supported Energy Projects on Campus

Details of SAIC Project for System Administration

"Comprehensive Energy Management Program for the State University of New York"

Total Project Budget: $1,090,603 over five years (8909 labor hours)
NYSERDA support to SUNY: $500,000 (under Technical Assistance)

Summary of Project Tasks:

1. Review current practice of energy cost monitoring and spending for energy reduction initiatives. Evaluate prior and proposed investment in energy efficiency, renewables, DG and demand-response .

2. Provide assistance in reviewing current electric and natural gas pricing contracts, advise SUNY on future contract negotiations and ways to improve the process order to protect against risk in price volatility.

3. Develop a strategy for incorporating the use of renewable resources at SUNY facilities. Review available federal, state, utility, energy marketer, NYSERDA and NYISO grant and financial incentive programs specific to the adoption of efficiency and renewable energy technologies.

4. Evaluate the potential for SUNY institutions to take advantage of advanced internet automated metering. Demonstration pilot program for one or more SUNY facilities to trial a metering/load monitoring solution.

5. Work with SUNY energy procurement and management personnel to identify applicable grants, rebate and other forms of financing for energy equipment and energy saving opportunities. Provide assistance in developing and writing proposals. Review SUCF capital plans to identify incentive opportunities.

6. Identify a representative number of potential CHP projects for the SUNY system, and evaluate alternative technologies, implementation approaches and financing including SUNY capital budgeting and ESCO/EPC.

Desired State in SUNY

Meeting or Exceeding the Goals of Executive Order #111

- ⇨ SUNY becomes a recognized leader in New York State in energy efficiency, renewable energy and green buildings - meeting or exceeding mandates of Executive Order #111

- ⇨ Measured improvements in energy efficiency, achieving a reduction in University energy consumption of at least 35% by 2010 (measured on the basis of total energy consumed per square foot, relative to 1989-1990).

- ⇨ Increased purchase of renewable energy, and increased installation of on-site generation from renewable sources (such as wind, photovoltaic, geothermal, fuel cells, and sustainably managed biomass), with these sources providing at least 10% of the University's electric consumption by 2005, and 20% by 2010.

- ⇨ Compliance with the green building requirements for new construction and major building rehab, with implementation throughout the system of the Green Building Design Guidelines published by the University at Buffalo.

- ⇨ System-wide initiatives, undertaken in pursuit of Executive Order #111 and in support of the New York State Energy Plan and the Regional Greenhouse Gas Initiative, advance SUNY to the national forefront of efficiency and innovation in responsible energy use and sustainable business practices.

Improved Facilities and Operations

Axiom: "The least expensive unit of energy is the unit that you don't use."

- ⇨ Increased investment in HVAC and other needed infrastructure improvements, resulting in improved University facilities that are energy efficient, and which promote the comfort, health and productivity of building occupants (i.e., students, faculty and staff).

- ⇨ Increased use of external/alternative funding (e.g., energy performance contracts) for HVAC and other energy-related projects, to offset the use of SUNY capital funds, thus freeing up limited capital resources for programmatic needs (plant adaptation) and other facilities improvements. Future annual energy savings are guaranteed under an EPC, and finance capital improvements at little or no upfront cost to the institution.

- ⇨ Reductions in the rate of growth of annual utilities expenditures, freeing up OTPS resources for other purposes and institutional priorities.

- ⇨ Continued expansion of SUNY's energy buying group, and exploration of other regional consortia for more economical energy procurement.

- ⇨ Increased application of risk management strategies for mitigating the growing volatility of energy prices.

- ⇨ Improved collection by campuses of detailed energy-use data, with such data ideally normalized for climate to facilitate meaningful analysis.

- ⇨ Integrated approach to the planning, design, construction and commissioning of equipment and systems, and improved maintenance practices and M&V techniques (monitoring and verification), as part of a holistic approach to energy management and operational efficiency.

Strategic Alliances and Resource Development

- ⇨ Increased outreach to federal, state and private funding sources, and increased collaboration with state agencies, utilities, business and industry, to leverage energy efficiency mandates into strategic opportunities for resource development, sponsored activities and research.

- ⇨ Increased outreach to NYSERDA (New York State Energy Research and Development Authority) in planning and analysis, including support in the development of a collaborative energy strategy among SUNY System Administration, the State University Construction Fund, the Dormitory Authority and NYSERDA - consistent with and in support of the New York State Energy Plan and Regional Greenhouse Gas Initiative.

- ⇨ Aggressive pursuit of funds available through NYSERDA statutory programs and time-sensitive "Systems Benefit Charge" programs administered by NYSERDA, for technical assistance, R&D, training, education, energy efficient equipment, alternative fuel vehicles, distributed generation and renewable energy projects, and energy-related capital projects through NYSERDA-facilitated energy performance contracts.

- ⇨ Increased deployment of "environmentally aware" distributed generation (e.g., solar photovoltaics, wind, fuel cells and cogeneration), and growth in entrepreneurial energy-related ventures that produce campus-based revenue streams, wherever possible, leveraging energy initiatives with incentives from NYSERDA, NYPA, LIPA, utilities and other external funding sources.

- ⇨ Ongoing communication between System Administration and campuses in facilitating progress towards goals of Executive Order #111, with central assistance provided in areas such as group energy procurement, risk management strategies, staff training, data collection and analysis, and pursuit of external funds.

- ⇨ Increased inter-campus communication and collaboration, including dissemination of guidelines, strategies and results by SUNY campuses that serve as green energy models and Centers of Excellence.

Leadership in Sustainability

an Opportunity exists: Physical Plant = Living Laboratory

- ⇨ Integration of energy efficiency, conservation and green building design/construction with operational efficiency, institutional advancement, community outreach, faculty research and multi-disciplinary curriculum education with student opportunities/internships, all under the umbrella of "sustainability".

- ⇨ Increased external funding for energy-related research, and increased development of energy-related academic initiatives and sponsored activities that span many disciplines, noting that sustainability initiatives potentially involve natural and social sciences, engineering, environmental studies, business, economics, management science, decision science, comparative humanities, public policy and teacher education.

- ⇨ Recognition of SUNY's leadership, both regionally and nationally, as a dynamic academic community and a model of energy efficiency, renewable energy and sustainable development, contributing to an enhanced public image and achieving "Total Quality" in facilities, operations, research, education and community service.

Note: The Sustainable Buildings Industry Council (SBIC) recognizes institutional achievements in sustainability, with annually awards in areas of "Sustainable Design Curriculum", "Sustainable Buildings" (Schools, Small Commercial, Residential) and "Sustainable Policy Initiatives".

Conclusion and Recommendations

Governor Pataki's Executive Order #111, enacted in June 2001, describes clear and compelling goals for energy efficiency, renewable energy and green building design/construction in SUNY and state buildings. Compliance with year 2005 and 2010 energy targets requires immediate, comprehensive and integrated planning and action by the University.

A successful energy strategy requires aggressive pursuit of government and private funds, and improved collaboration with state and Federal agencies, business and industry.

Beyond the considerable challenges of planning, implementation and funding, the new mandates for energy efficiency provide a unique opportunity for the University to demonstrate leadership, innovation and good citizenship in the way it consumes energy resources.

As it moves towards energy efficiency and associated improvements in operations, facilities and infrastructure, the University can leverage its energy-efficiency initiatives into additional research grants and energy-related sponsored activities which span many disciplines.

Across the system, energy-related issues span the offices of capital facilities, business and finance, operations, institutional advancement, economic development, research and academic affairs; internal coordination is a challenge equal to that of institutional leadership.

Draft Recommendations:

1) Strategic Energy Plan for the University

SUNY should expand current planning efforts to include a system-wide energy task force [or strategic planning committee] established by the Chancellor in consultation with the University Faculty Senate.

Membership would include appropriate persons from System Administration, and faculty representatives from a broad range of energy and related areas of expertise, recommended by the President of the University Faculty Senate. In addition to System and faculty representatives, the energy task force [or committee] would also ideally include representation from NYSERDA, DASNY and the Student Assembly.

The energy task force [or committee] shall be charged with the development of a formal Strategic Energy Plan for the University, consistent with the NYS Energy Plan and Regional Greenhouse Gas Initiative.

2) Optimizing Systemness: Communication and Dissemination

The Chancellor should encourage greater inter-campus communication and cooperation regarding successful campus-based energy initiatives and externally funded projects.

System Administration should facilitate dissemination and knowledge transfer, through increased sponsorship of workshops and conferences on supply-side, demand-side and renewable energy strategies.

Campuses with a record of energy leadership, and individual faculty/staff with appropriate expertise and experience, should be encouraged (and receive appropriate support and recognition) for participating in dissemination efforts that help facilitate energy initiatives on other campuses.

3) External Funding

System Administration, SUNY campuses and faculty should aggressively pursue external funding through the SBC programs administered by NYSERDA These considerable funds (averaging $150Million per year) are set to expire in 2006, but will likely be extended by the PSC for an additional five years.

4) Campus Energy Office

The Chancellor should urge each campus to establish a Campus Energy Office (where one does not already exist), in order to attach greater visibility and priority to energy as a strategic issue in SUNY and the state. The need for such an Office has already been cited by NYSERDA, especially for institutions pursuing comprehensive energy efficiency and renewable energy initiatives.

The Campus Energy Officer (with specific expertise in an appropriate area such as energy management, energy analysis, engineering and/or green building design), would presumably be an energy “champion” and serve to direct energy planning and analysis, project development, and internal and external coordination.

Since “energy” is multi-disciplinary, and energy initiatives can suffer from a lack of definitive lines of responsibility and decision making, it is known that those SUNY campuses with a strong record of energy leadership have a Campus Energy Officer as the primary contact.

Campus-based expertise is needed in data analysis, writing technical proposals, securing alternative funding, providing professional-caliber energy management and procurement in deregulated markets, and interfacing with NYSERDA, other state agencies and utilities.

5) Campus Energy Committee

The University Faculty Senate and the Chancellor should recommend that each campus establish a college-wide Energy Committee, in consultation with campus faculty governance.

Recognizing that energy overlaps many functional areas in SUNY, this committee should have broad representation to include facilities management, administration, professional staff, faculty, students and appropriate business and community representatives.

The committee should develop formal campus energy-use policies, consistent with the mandates of Governor's Executive Order #111 and any existing system-wide policies, including but not limited to policies on: heating and cooling indoor-temperature settings and setbacks, purchase and use of equipment and technology, recycling, water conservation, energy-awareness.

Note: The University at Buffalo has an active and successful energy committee and various related subcommittees, however, the UB energy committee appears to be strictly administrative and does not include representation of teaching or research faculty.

These recommendations are respectfully submitted to the University Faculty Senate for their consideration.