



Strategic Energy Plan

Sinclair Community College

November 2008

A comprehensive framework and plan for addressing the requirements of House Bill 251 in the efficient management and conservation of energy

Table of Contents

Executive Summary	Page 1
Mission	Page 1
Goal I. Identify continuous long-term reliable supply of energy to Sinclair Community College managed facilities.	
Objective A	Page 2
Identify an adequate and sustainable supply of energy	
Objective B	Page 2
Develop a portfolio of energy, fuel source options, and delivery technologies.	
Objective C	Page 3
Examine and update Business Continuity Plans.	
Objective D	Page 3
Align energy preparedness with homeland security threat levels.	
Objective E	Page 3
Determine emergency preparedness plans to reflect current energy availability and market conditions.	
Goal II. Ensure effective management of energy conversion and end-use.	
Objective A	Page 4
Incorporate conservation measures to reduce the energy needs of Sinclair’s processes.	
Objective B	Page 4
Incorporate energy management techniques to reduce the end-use energy cost of Sinclair’s operations.	
Goal III. Practice environmental stewardship in all Sinclair energy decisions.	
Objective A	Page 5
Utilize energy in ways that consider environmental impact.	
Objective B	Page 6
Structure Sinclair educational programs and activities to reduce consumption and emissions.	
Goal IV. Ensure alignment with governmental objectives as they pertain to Sinclair’s energy decisions.	
Objective A	Page 6
Proposed projects shall be consistent with the objectives of Sinclair Community College and applicable state and federal energy plans.	
Goal V. Develop and maintain a strong energy knowledge base for sound decision-making.	
Objective A	Page 7
Keep current on source, consumption, and energy conversion technologies.	
Objective B	Page 8
Communicate and share energy information.	
Objective C	Page 8
Establish a team that is accountable to ensure the energy plan is implemented and updated on a regular basis.	
Glossary	Page 9

EXECUTIVE SUMMARY

Mission

To implement energy and environmental strategies in alignment with Sinclair Community College objectives that continuously improves facility use and management.

The success of Sinclair Community College programs and objectives is inextricably linked to the quality and functionality of its buildings and facilities. In this light, the energy component plays a vital role in both operations and employee well being.

In recent decades, energy has been fraught with uncertainties and imbalances between supply and demand. Indeed, energy supply disruptions and wild price swings can significantly impact Sinclair Community College's ability to provide quality services to occupants of its managed buildings.

In its leadership role for other Colleges and the region, Sinclair Community College must therefore be vigilant in comprehensively addressing energy planning, monitoring, and marketplace fundamentals. Recognizing the need for sound energy decision-making, the Facilities Management Department of Sinclair Community College has developed a strategic energy plan. In its deliberations, the Department held that safety, reliability, costs, and efficiency, consistent with a clean environment, are paramount in any strategic energy planning process. The Strategic Energy Plan communicates Sinclair Community College energy objectives and aligns with the direction set by energy planning at federal and state government levels.

The Strategic Energy Plan is not intended as merely a mandate to perform specific energy-related tasks, but instead presents a framework for making unique energy decisions such as setting energy policies on reliability and use, making energy efficiency improvements, and encouraging employee participation and innovation. This Strategic Energy Plan is a flexible and adaptable document that focuses on five major goals:

- Long-term reliable energy supply to all Sinclair Community College managed facilities
- Ensure effective management of energy conversion and end-use
- Incorporate environmental stewardship in Sinclair Community College energy decisions
- Ensure alignment with governmental objectives in Sinclair Community College energy decisions
- A strong energy knowledge base for sound energy decision-making

Finally, it is understood that the Strategic Energy Plan serves as a living document to be reviewed and amended as warranted by future conditions.

Goal I

Identify continuous long-term reliable supply of energy to Sinclair Community College managed facilities.

Energy is vital to Sinclair Community College's focus on its mission and the well being of its employees and customers. Reliability demands an adequate supply of energy resources as well as a secure energy system. The College's energy infrastructure must endure volatility and still maintain an adequate supply of energy. A proactive approach to reliability centers on preparing for energy shortages, maintaining adequate operating standards, and responding to changing market trends. A sound decision-making process will focus efforts on lessening the impact of energy shortfalls and decreasing the College's demands for energy.

Objective A. Identify adequate, sustainable and cost efficient supplies of energy.

Strategy 1. Review energy supply, delivery, and distribution methods and make recommendations for efficient operation and reliability.

Sinclair Community College should examine infrastructure, rate tariffs, and future needs for electrical distribution networks, oil, natural gas, and other energy sources and recommend improvements.

Strategy 2. Monitor and maintain a procurement strategy to address the dynamic characteristics of the energy marketplace.

Sinclair Community College must keep abreast of domestic and global developments that may affect the energy marketplace to ensure timely delivery and to guard against the threat of interrupted supplies or infrastructure failure. The strategy should address procurement regulations, *green power*, economics, technological innovations, supplier relationships, analysis techniques, reliability, transportation, and any other factors directly related to procurement.

- Secure advice from energy consultants about the energy markets and possible future strategies.
- Consult with local suppliers on supply and pricing.
- Attend local and regional seminars and conferences.

Strategy 3. Determine acceptable risk level of fuel resources.

Make energy choices to maximize supply terms, pricing, and best value decisions. Evaluate the sustainability of various sources such as oil, coal, solar, wind, geothermal, and natural gas.

Objective B. Develop a portfolio of energy, fuel source options, and delivery technologies.

Strategy 1. Examine existing fuel sources and delivery capabilities.

Strategy 2. Identify, examine, and prioritize alternative fuel sources and conversion technologies.

Strategy 3. Continuously evaluate alternative sources of energy (e.g., non-fuel types like wind and solar)

The use of existing, as well as, emerging conversion technologies will provide a diverse portfolio for Sinclair Community College energy needs.

- Explore the opportunity of using geothermal sources(s) for heating and cooling. Engage an engineering firm that has geothermal experiences to study the possibilities for Sinclair.

- Review the one kW wind turbine project for larger application for practical electric generation for Sinclair.
- Explore using off- peak ice storage in a future renovation or new construction project.

Objective C. Examine and update Business Continuity Plans.

Strategy 1. Review Business Continuity Plans to assure that it addresses pertinent energy issues such as loss of supply.

Objective D. Align energy preparedness with homeland security threat levels.

Strategy 1. Align Sinclair energy policies with homeland security directives.

A secure homeland requires close coordination between federal, state, and local governments. The U.S. Department of Homeland Security now includes Federal Emergency Management Agency (FEMA), the Transportation and Security Administration, and the Office of State and Local Government Coordination. The U.S. Department of Homeland Security is developing an Energy Security and Assurance Program. Sinclair Community College will take the necessary measures to ensure its energy policies will align with both state and federal homeland security directives. Form an action team to respond to homeland security issues involving energy and the environment. An action team would develop plans and cooperate with FEMA, utilities, and other pertinent authorities in response to threats and events connected to energy reliability and infrastructure.

Objective E. Develop emergency preparedness plans to reflect current energy availability market conditions.

Strategy 1. Determine the available load which can be curtailed during emergency conditions and establish a plan for orderly shutdown and startup.

Sinclair Community College will explore methods to reduce the impact of curtailments, brownouts, blackouts, and other supply interruptions. Perform load studies with the local utility to take advantage of utility or power pool credits and for cooperation during emergency conditions.

Strategy 2. Establish and review plans for governor-declared and non-declared emergencies.

Sinclair Community College must effectively and timely respond to emergencies declared by the governor and other authorities, or non-declared emergencies in the areas of procurement, weather, utility, and other situations that disrupt reliability and jeopardize safety. Plan for unanticipated events such as natural disasters and work stoppages.

Goal II

Ensure effective management of energy conversion and end-use.

Facilities administrators are challenged daily by budget constraints, aging facilities, rising energy costs, and dynamic energy requirements for operations. Actions that result in reduced life-cycle costs and reduced consumption of energy are encouraged. Examine the methods and processes used throughout Sinclair that affect the following:

- Quantity of energy required
- Management of energy sources and usage
- Direct and indirect costs associated with energy use, delivery, and waste

Objective A. Incorporate conservation measures to reduce the end-use energy needs of Sinclair Community College processes.

Strategy 1. Benchmark the energy consumed by Sinclair Community College managed facilities. Energy consumption will be the basis of BOR Implementation of HB 251 Guidelines.

Strategy 2. Identify significant energy-consuming buildings and develop a plan to communicate the usage history of these buildings to Sinclair Community College stakeholders.

Informed stakeholders will take a more active role in energy goals if the outcome is shared.

Strategy 3. Encourage conservation efforts from all employees in Sinclair Community College managed facilities.

Facilities and operation managers will play a leadership role in reducing the quantity of energy consumed in Sinclair Community College managed buildings and facilities.

- No personal or office fans or heaters are allowed except under emergency conditions and approved by the Director of Facilities Management. Non-approved fans and heaters will be disconnected and removed.
- All appliances and equipment for installation must be approved by the Director of Facilities Management and have an energy star label or have the lowest energy consumption for that product if an energy star label is not available for that product category. A label from Facilities Management must be attached to the cord before being energized on a Sinclair power circuit.
- No new incandescent or torch lighting is allowed. Halogen lighting is not allowed due to fire potential. All existing lighting must be approved and labeled by Facilities Management.
- Pool water temperatures typically range from 78°F to 82°F. The American Red Cross recommends a temperature of 78°F for competitive swimming. The energy consumption for each degree rise in temperature will cost 10% to 30% more in energy costs. Set pool water temperature at 80° F.

Strategy 4. Review operational and work processes for possible conservation opportunities.

A review should seek to identify opportunities that may arise from better information, i.e., automated remote metering equipment, use of process controls, and energy management systems. Life cycle cost assessments will be used to determine the benefits of incorporating these enhancements.

- Add sub-metering for building and high energy consuming areas and equipment. All sub-meters will be linked to the existing BAS for automated readings.
- Review boiler and chiller equipment for downsizing opportunities. For example, a small high efficiency boiler in Building 4 for summer to support the reduced load at a lower energy consumption.
- Replace the air handling units in Buildings 1, 2, 3, 5, and 6.
- Test very low flow urinals and toilets for potential use on Campus.

Objective B. Incorporate energy management techniques to reduce the end-use energy cost of General Services operations.

Strategy 1. Review energy use patterns.

Monitoring of utility bills and examination of load profiles, tariff incentives, load factors, energy-use patterns, and rate structures will present opportunities for Sinclair

Community College managed facilities to reduce consumption or shift loads to offpeak periods.

Goal III

Practice environmental stewardship in all Sinclair energy decisions.

Sinclair Community College will demonstrate environmental stewardship through educational initiatives, consideration of environmentally sensitive technologies, and managed energy strategies.

Objective A. Utilize energy in ways that consider environmental impact.

Strategy 1. Create an atmosphere that encourages Sinclair Community College to live and work in an environmentally conscious manner.

While significant advances have occurred to make possible an environmentally friendly lifestyle, further demonstrate the commitment of Sinclair Community College stakeholders to pursue environmentally conscious values.

- Sinclair Community College could procure green power from clean energy sources to improve air quality.
- The temperature set points for Sinclair buildings is 68° F for winter and 74° F for summer. Due to operational characteristics of equipment and systems, the range for these set points is plus or minus 2° F. Under emergency conditions, the Director of Facilities Management may change these set points.

Strategy 2. Examine and consider use of environmentally preferred technologies.

Life-cycle cost analysis clarifies total cost impact and energy source options on activities that result in the consumption of energy commodities. The environmental impact of the resulting consumption will be demonstrated and communicated through analogies that illustrate its magnitude. Stakeholders of Sinclair Community College are more likely to adopt values consistent with these goals if the benefits of such behavior are made relevant to their lives.

- Life-cycle cost analysis shall be provided for all capital projects.

Strategy 3. Use Sinclair Community College training initiatives to provide education in methods to achieve energy efficiency and emission reduction in Sinclair Community College managed facilities.

While emphasis will be placed on the development of new, cleaner energy technologies, the exploitation of existing assets and financial incentives will be identified. Consideration of educational and asset-based projects can be evaluated on life-cycle cost measures.

- Convert waste soy-based cooking oil to biodiesel fuel for use in lawn mowing equipment. Integrate conversion process into the Instructional program.

Strategy 4. Encourage and continuously improve the utilization of energy management strategies and tools.

The effective use of energy management and associated tools will result in significant savings in energy consumption and improvement in environmental quality. Examples of methods consistent with this strategy include the following: energy management control systems, guaranteed energy savings contracting, energy efficient products, use of high-performance green building design, facility efficiency improvements, and off-grid alternate energy systems.

- Demand Control Ventilation was implemented in Building 9, Library, and partially in Building 4, and will be extended to other buildings on the building

automation system. Expected savings are 20% of the building's HVAC operating cost.

- All future installations and retrofits of multi-media will be in rooms with dimmable fluorescents with the lighting control switch(es) mounted on the podium. This can reduce lighting load in a room by 20 percent.
- Changing the lighting outside Buildings 10, 11, and 12, and under the pedestrian bridges from 162 mercury vapor fixture to 70 metal halide fixtures. This would save approximately 375.9 decatherms.

Objective B. Structure Sinclair Community College educational programs and activities to reduce consumption and emissions.

Strategy 1. Establish quality standards for maintaining the efficient consumption of energy.

Individual buildings and equipment will be maintained in a manner that effectively reduces energy consumption per square foot of conditioned space, per unit of production or per other unit as applicable.

- Purchase an infrared camera to inspect building systems for thermal losses.

Strategy 2. Introduce energy efficient concepts in all aspects of Sinclair Community College facility operations.

Sinclair Community College employees and stakeholders should be made aware of the environmental impact of facility utilization and scheduling. This strategy aims to heighten the importance of efficient use of energy resources.

- Explore the advantages/disadvantages of a four day work week.
- Consider consolidating operations to shut down buildings to improve utilization and reduce energy consumption.
- Reduce the carbon dioxide emissions from vehicles by expanding regional sites and distance learning. Expect approximately 140 grams per kilometer reduction.

Strategy 3. Develop training programs such as Pollution Prevention and Energy Efficiency, incorporating results of energy audits.

Strategy 4. Communicate results of energy audits and implementation of energy and emission reduction methods.

Goal IV

Ensure alignment with governmental objectives as they pertain to Sinclair's energy decisions.

Sinclair Community College should align with government objectives and policies to ensure realization of its own plan objectives.

Objective A. Proposed projects shall be consistent with the objectives of Sinclair Community College and applicable to governmental energy plans.

Strategy 1. Capital projects and requests will align with energy procurement, conversion, end-use, and conservation strategies.

Building projects create a new or modified end-use of energy. As such, these projects should align with the energy plan.

- Incorporate daylighting strategies in new projects to use daylight and photocells to control lighting levels.
- Review all capital projects and equipment to ensure that efficient use of energy is incorporated in the specifications.

Strategy 2. Seek funding for energy-related capital improvements and upgrades through the use of Performance Contracts under Title I, Chapter 156 of the Ohio Revised Code.

The State of Ohio provides detailed documents that outline the scope of projects completed by energy services companies (ESCO) that can be funded through guaranteed energy savings or performance contracts.

Strategy 3. Explore grants, awards, and other funding sources that seek to encourage energy-related projects.

Sinclair Community College administrators should seek and apply for grants, awards, and other funding for energy-related projects.

Strategy 4. Self-funded energy-related projects shall follow standard Sinclair Community College procedures.

Outcomes should be shared for the benefit of the Sinclair Community College community.

Strategy 5. Leadership in Energy & Environmental Design (LEED) Certification.

Where LEED Certification is desired, Sinclair Community College managed facilities should be designed and operated in a manner consistent with LEED requirements.

- All new building construction will be LEED certified at the silver or, preferably, the gold level.
- All building renovation construction will conform to, not certified, to the LEED silver level.

Goal V

Develop and maintain a strong energy knowledge base for sound decision-making.

Current trends in the energy marketplace can greatly influence procurement, conversion, and end-use decisions. Sinclair Community College facilities administrators and decision makers should have easy access to the most up-to-date energy information and research that is available.

Objective A. Keep current on source, consumption, and energy conversion technologies.

Strategy 1. Research new technologies and stay abreast of developments in energy.

Sinclair Community College facilities administrators and decision-makers should be aware of developments in new energy technologies and their practical applications.

Strategy 2. Encourage Sinclair Community College senior management attendance at energy-related educational seminars, conferences, and workshops.

Use educational opportunities to broaden knowledge of current and future technologies that can be factored into decisions on procurement, conversion, and end use.

Strategy 3. Promote energy-industry relationships and associations with trade organizations.

Cordial working relationships with the energy industry enhance informed Sinclair decision-making and implementation of energy management strategies.

Objective B. Communicate and share energy information.

Strategy 1. Integrate energy information into Sinclair Community College facilities educational programs.

Identify and develop methods to disseminate energy information to all Sinclair employees occupying Sinclair Community College managed facilities.

Strategy 2. Leadership in Energy & Environmental Design (LEED) Certification Awareness.

Sinclair Community College facilities administrators should be made aware of the responsibilities of operation regarding LEED Certification. Where certification is issued, the employees should operate Sinclair Community College managed facilities in accordance with the LEED requirements.

Objective C. Establish a team that is accountable to ensure the energy plan is implemented and updated on a regular basis.

Glossary

Blackouts	Lack of electrical power on an electrical system because of failure on that system.
Brownouts	A reduction or cutback in electric power, especially as a result of a shortage, a mechanical failure, or over-use by consumers.
British Thermal Unit	(BTU) A standard unit for measuring the quantity of heat needed to raise the temperature of 1 pound of water by 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit.
Building Automation System (BAS)	A computerized system of controlling building systems for optimizing operational efficiencies.
Cogeneration	The simultaneous production of electric power and thermal energy from the same fuel, as in burning natural gas, coal, oil, or wood to generate electricity and using waste heat produced to create steam for an industrial process.
Conservation	The act or process of reducing resource requirement or consumption. In the energy industry, conservation usually refers specifically to energy conservation, but it can also refer broadly to conservation of any resource used in energy production and delivery.
Curtailment	The voluntary reduction of energy use to alleviate strains on supply and delivery systems.
Decatherm	1,000,000 BTU's.
Demand-side Management (DSM)	The use of processes and equipment to reduce electric customers' use of electricity or to shift use The use of processes and equipment to reduce electric customers' use of electricity or to shift use away from periods of high electrical demand. DSM is an alternative to building additional generating units.
Demand Control Ventilation	Demand Control Ventilation (DCV) is a method of controlling the ventilation in a space based on the actual occupancy using carbon dioxide sensors.
Deregulation	The process of removing regulations or other barriers that may restrict an industry.
Distributed Generation	Small, modular electricity generators sited close to the customer load can enable utilities to defer or eliminate costly investments in transmission and distribution (T&D) system upgrades and provides customers with better quality, more reliable energy supplies, and a cleaner environment.
Electrical Distribution Networks	The local wires, transformers, substations, and other equipment used to deliver electricity to end-use consumers from the high-voltage transmission lines.
Electrical Grid	The layout of an electrical distribution system. The network of wires and equipment over which electricity travels from supplier to customer.
Energy Service Company (ESCO)	A business that contracts with customers to install energy-efficient and other demand-side management measures in facilities.
Energy Utilization Index (EUI)	The number of BTUs of energy used annually per square foot of conditioned space; the ratio of total BTUs consumed to total square feet of conditioned space.
FEMA	Federal Emergency Management Agency (FEMA) is an agency attached to the U.S. Department of Homeland Security that is tasked with planning for, responding to, recovering from, and mitigating against disasters.
Fuel Cells	A fuel cell is a high-efficiency electrochemical energy conversion device, which can generate electricity and produce heat with the help of catalysts.

Green Building	Buildings that are built using methods that minimize the environmental impact. Includes buildings that have been certified by LEED or others that use recognized eco-building approaches, as well as local suppliers.
Green Power	Green Power is a term used to describe electricity produced by sources that are less harmful to the environment than fossil fuels. While there is no strict definition of Green Power, generally renewable sources such as solar, wind power, geothermal biomass, and small hydroelectric are considered to be Green Power sources.
Homeland Security	A newly created federal department charged with analyzing intelligence information, countering threats to the nation, and coordinating the national response to present and future emergencies.
LEED (Leadership in Energy & Environmental Design)	LEED is a voluntary national standard for green buildings developed by the U.S. Green Building Council for high performance, sustainable buildings. LEED standards are currently available for (1) new construction and major renovations, (2) operation of existing buildings, and (3) interior projects for commercial buildings.
Life Cycle Cost	A method of calculating the total cost of ownership over the life span of an asset. Considerations of greatest importance in determining where life-cycle cost analysis should be used are (1) energy intensiveness, (2) efficiency, (3) investment cost, and (4) long life.
Load Factor	The ratio of the average load over a designated period of time to the peak load occurring during that period.
Load Profile/Load Shape	Used in planning and demand-side management that refers to the distribution of energy requirements over time. Derived from the practice of plotting energy requirements on a chart or graph, which produces a graph whose curve usually has a distinctive shape. When distribution of energy requirements is changed, the shape of the graph also changes, so the redistribution of demand or load is referred to as changing the load shape.
Off-Peak	Period of relatively low system demand. These periods often occur in daily, weekly, and seasonal patterns; these off-peak periods differ for each individual electric utility.
On-Peak	Periods of relatively high system demand. These periods often occur in daily, weekly, and seasonal patterns; these on-peak periods differ for each individual electric utility.
Power Grid	The network of transmission lines that link generating plants in a region with local distribution networks to help maximize service reliability.
Power Pool	An arrangement between two or more electrically interconnected utilities to coordinate operation, planning, or maintenance of their generating and transmission facilities to obtain the most reliable and economic operation of the combined systems.
Tariff	A published volume of rate schedules and general terms and conditions under which a product or service will be supplied.
Therm	100,000 BTU's.

References and Sources

1. Commonwealth of Pennsylvania's Department of General Services' Facilities Strategic Energy Plan, August 23, 2004.
2. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.
3. Ohio Department of Development, Office of Energy Efficiency.