Strategic Energy Management Planning

Preliminary Considerations

and

a Strategic Energy Management Plan Model

Factors to be considered when developing a plan for a medium or large organization

WASTE REDUCTION PARTNERS

dedicated professionals sharing expertise

Land-of-Sky Regional Council
Asheville, North Carolina

2006

Disclaimer

This document is intended to convey information and guidance for identifying opportunities and options for waste reduction. Neither any WRP team member, the Land-of-Sky Regional Council (LOSRC), nor any funding agency shall be held liable for any statements, written or oral, included in this document, nor be held liable for any damages resulting from the document herein. Compliance with environmental and occupational safety and health laws is the sole responsibility of each organization. All legal and regulatory references within this document are intended only for informational purposes and are not to be taken as reliable sources of legal reference. Organizations should contact the appropriate legal and regulatory authorities for current regulatory requirements as well as for interpretation and implementation. All references and vendor materials (when available) mentioned in the report are included in this disclaimer. Mention of a vendor, brand name, or manufacturer does not represent an endorsement by LOSRC, the WRP program, nor any funding agency. Neither the LOSRC, WRP personnel, nor the authors of this report are responsible for practices or procedures implemented by individual organizations. Recommendations are given as options only, and are to be implemented by the organization at its discretion.

This document is sponsored by the State Energy Office, NC Department of Administration, and the U.S. Department of Energy, with State Energy Program funds, in cooperation with Land-of-Sky Regional Council. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of either the State Energy Office, NC Department of Administration, or the U.S. Department of Energy.

This document was prepared by:

Waste Reduction Partners
Land-of-Sky Regional Council
25 Heritage Drive
Asheville, NC 28806
Phone (828) 251-6622 FAX (828) 251-6353
E-Mail: WRP@landofsky.org

In Partnership with North Carolina Division of Pollution Prevention and Environmental Assistance

Table of Contents

Part I

Preliminary Considerations

Part I: Preliminary Considerations

A Beginning

Sizeable organizations should have a strategic energy management plan. The objective of requiring a strategic plan is to ensure that the organization is doing everything that is economically feasible to manage energy consumption to hold down energy and water related expenditures while also having a positive impact on community environmental initiatives. The complexity of a strategic energy plan will vary with organization size and may not be justified unless utility expenses exceed $100,000, annually.

The Strategic Energy Plan

Successful energy management within organizations is usually found to be an integral part of the culture of those organizations and the plan itself may well be included in the organization's overall strategic plan. A written plan of action which is integrated into the organization's operational strategy or that is consistent with a mission statement is superior to an undocumented set of related actions taken by an organization.

The written plan identifies specific objectives or performance goals, courses of action to be taken, and states how performance will be measured. Undocumented energy management actions employed within an organization may lack consistency of purpose and represent a set of short-term tactical actions as opposed to longer-term strategic action. Such tactical actions may require fewer organizational resources to implement but are more easily subject to termination or reversal in the daily allocation of operational resources. Tactical actions are more useful for fine-tuning strategy, but may lack the permanence required to achieve meaningful long-term results.

A written plan that is endorsed by the ultimate authority within an organization has status. The endorsement serves as a directive from top management on goals that it is assigning to the organization. By approving the plan, management has quantified its expectations, established initiatives by which its expectations will be achieved, endorsed the use of resources for achieving those objectives and has indicated how those efforts will be measured to be deemed successful.

A principal advantage of an approved written strategic plan is that it provides tacit administrative approval of the plan. Accordingly, the workforce responsible for plan implementation can focus on getting the work accomplished and reporting progress rather than on seeking out endless administrative approvals at each juncture of the process. More specifically, an approved strategic plan streamlines bureaucratic processes which may characterize some large organizations.

The written plan should consist of at least four primary parts:

1) Specific measurable goals or objectives to be achieved in some related time frame;
2) A listing of the individual initiatives aimed at achieving those objectives;
3) A strategy for measuring the effects of those initiatives;
4) A plan for how those initiatives will be maintained over time. The maintenance aspect is important since it may not be realized by some that additional operational and labor costs above invested costs may be required to maintain many energy management cost savings initiatives.

The Strategic Energy management Plan is a finished product that consists of specific attainable goals in which the organization has determined it will allocate material, financial and human resources to accomplish.

In creating a strategic plan there is a significant measure of preliminary analysis and preparation work that should be accomplished initially. Specific measurable goals that are to be accomplished over an explicit time period requires analysis as well as understanding of any limitations in resources that an organization may face.

The strategic planning process should begin with both an opportunity assessment and an organizational assessment. While the opportunity assessment quantifies potential energy efficiency opportunities that an organization may be capable of taking advantage of, the organizational assessment appraises the capacity of the organization to respond to the strategic plan. Both are equally important so that achievable goals are quantified and assigned through the strategic plan. Strengths, weaknesses, opportunities and in some cases, external challenges, need to be accounted for.

Opportunity Assessment

Bench-marking

To conduct an opportunity assessment you should be familiar with how well you are currently doing relative to your peers. Even the best organizations are not so advanced that they are unable to learn from what others are doing. Bench-marking with similar organizations who have established a strong reputation for having a successful energy management program is a good starting point. In bench-marking a peer, you should be as interested in their organizational commitment to an energy strategy as you are with the measures they have taken to reduce energy costs.

Many organizations use a Key Performance Indicator (KPI) as the unit of measurement for their energy use benchmarking. Examples of KPI include Btu per square foot and utility cost per square foot. Energy use and cost comparisons can be based on other product or service output such as unit of production, occupancy, customers served, hour of operation, etc.

It would be beneficial to obtain answers to the following questions when conducting a bench-marking exercise:

- What has this organization done, or is doing to reduce energy consumption and cost?
- What do they indicate that worked well? What did not work?
- How does the organization measure its achievements relative to base-line consumption and cost?
- How does the organization account for expansion and rising energy consumption and costs in its reports? How does it report “avoided costs” in a way that is understood and appreciated?
- What were the organization’s obstacles in developing an Energy Management Strategy?
- What were the organization’s obstacles to implementing an Energy Management Strategy?
- What are the organization’s obstacles in maintaining initiatives and strategy momentum?
- How far up the administration is the Energy Management Strategy endorsed?
- What material, financial and human resources were required to implement the strategy?
- What level of external assistance was required to implement the strategy?

External Contacts

It may be helpful to contact reputable vendors, utility companies and sales engineering staffs for businesses that specialize in energy management equipment and services. An organization should take care that it is contacting viable firms that are willing to provide information without obligation. Most firms understand the procurement restraints of various organizations and are quite willing to assist by providing valuable information without having unrealistic business expectations.

Preliminary Energy and Water Assessments

This is a good beginning for starting the process of putting opportunities and priorities in perspective. A trained assessor can conduct a site visit to discuss building operating characteristics with the maintenance staff and principal organizational representatives. The assessor will be interested in the age, repair history, preventive maintenance schedules and operational condition of energy and water-using systems, as well as any energy and water consumption and cost data that can be made available for the facilities being reviewed.

Any previous assessments and implementation history should also be noted. How occupants are using energy-consuming systems is also a critical factor. How equipment purchase decisions are made will also be discussed. A report listing potential energy and water efficiency improvements and economic returns that might be possible for a specific site will then be prepared. More detailed audits may be needed once the efficiency potentials have been reviewed and in particular, where significant capital investments require more extensive financial and funding review and professional engineering resources.

The assessment and auditing process provides information that can become energy management initiatives in the strategic plan. The report needs to be organized to anticipate the concerns and goals of key functions in the organization as the Strategic Energy Management Plan is developed:

- Top Management. How do energy and the decisions regarding its use impact overall business performance? What are the options for taking action? What information is needed to assure that energy cost control is underway and sustained and converted to usable progress reports? How will efforts to control energy costs require cooperation across departmental lines? What changes or events must take place in the organization before energy improvements can realistically take place? How should the top manager foster and support the cooperation needed for the organization to truly control its energy costs?
- Finance. What are the costs involved both in using energy and controlling its waste? What accounting reports should relate energy consumption to financial performance?
- Operations Leaders. How can standard operating procedures be amended to minimize wasteful energy practices? How can staff be held accountable for energy-smart behavior?
- Engineering. What capital improvement proposals offer the most potential improvement to reliability, productivity and cost control?

Ideally, the plan should be a rolling, multiple-year plan that is updated and extended on an annual basis with priorities revised as necessary and that gives due recognition to the presence of new opportunities and technologies that may develop. This gives the plan a status of permanence. A static or one-time plan that is never updated or carried forward too often appears to be no more than a passing or temporary initiative. Managing energy in an organization should be treated as a continual strategy that is automatically carried forward in future years and that addresses the organization's long-term ability to remain viable in a competitive environment.

Organization Assessment

While it is important to assess what energy efficiency opportunities are available to the organization, it is just as important to assess the organization's ability to deliver resources and internal skills to the process. Without understanding and planning for realistic organizational limitations, strategic objectives will not likely be attained. A strategic plan needs full endorsement by all within an organization who will exercise authority over certain phases of the plan. Attention to how strategic decisions are implemented within an organization will likely determine whether a viable strategic plan is being created as opposed to putting together an elaborate shopping list. It is important for those who are responsible for making long-term financial commitments to be involved in the strategic energy planning process as well as other functions such as legal, contracting, procurement, accounting, facility operations, maintenance and engineering.

An analysis of the organizations business procedures is very important.

Preparing to Conduct a Successful Energy and Water Assessment

- Who participates in evaluating and implementing changes to operations and what procedures are used to accomplish these changes?
- If operational or capital funds are required, when does the organization begin assembling proposals in anticipation of setting the next year's budget?
- Who are the decision-makers involved in this procedure and what are their criteria for making decisions?
- In what form should recommendations be presented to meet the requirements of the decision-makers?

Good communications at the outset will make the purpose of the energy and water assessment clear to all participants. Otherwise, assessments performed by an "outsider" may be resisted by some individuals.
The physical examination of your facility and energy-related records will require the cooperation of a number of staff. These individuals will not always understand or agree with the assessment process and the recommendations it provides. Some people are comfortable with "the way things have always been done." To some, improvements suggest change, and change implies risk. Some of these individuals will play a role in approving or vetoing recommended energy improvements. Some may feel that an assessment will be interpreted as evidence of poor job performance. There may be barriers to cooperation across department lines that need to be addressed as an issue of team performance. It is not unusual for one department to pay for an improvement, another to invest hours of labor in implementing it and yet another to be credited for the savings generated. Without a team approach that gives value and recognition to the total involvement, successful results are not likely to be achieved.

Managing the Strategic Energy Plan

An organization may be large enough to employ its own engineering and technical resources for project review, project management and quality assurance. However, many organizations are small and have relatively few in-house technical resources. Every organization should determine how to assure the quality of its initiatives and determine how they are to be maintained over time. Even within large organizations, attempting to assign project management tasks to an overworked engineering group can negatively impact the outcome of the strategic energy initiative.

It is usually a mistake to casually assign the energy initiative to an existing employee with the intent of having that employee do two jobs. Neither is assigning the initiative to an employee who seems to have available free time or to the busiest employee within the organization necessarily an effective means for assuring successful energy management. An organization usually gets the level of energy management it deserves. When assigning the energy initiative to an existing employee, the organization may appear to be economizing. However, the organization is more likely signaling a view that the initiative lacks importance, or that it considers the program to be temporary. Positive or negative signaling from management at the onset could be the difference between long-term success and failure.

Some energy managers within organizations may operate independently and may not have full authority in the areas where energy and water are purchased, used and managed. Accordingly, the level of prestige assigned to the energy strategy by top management will dramatically affect the working relationships between the energy manager and key individuals within the organization. Successful energy management is much more than throwing away old technology in favor of new. The effectiveness of the energy manager depends on solid internal working relationships that help steer a large and diverse group of personnel toward a common purpose. Conversely, it takes only one uncommitted stakeholder in the process to scuttle even the best of management strategies.

Although an energy strategy may be completely contracted out in a relatively small organization, consideration should be given to acquiring a full-time internal energy manager. No organization should assume that even the most solid project guarantee from the highest quality energy provider is sufficient to attend to the need for intense project advocacy within the organization itself. The opportunity might also substantiate the financial justification for employing a full-time energy manager.

Notwithstanding the significant project management tasks inherent to most energy management strategies, continued vigilance is necessary if energy savings are to be maintained on a continuing basis. And, just as political, technological and economic changes provide energy efficiency opportunities today, continued advancements warrant permanent monitoring of the environments over time. Many of these issues argue for a full-time energy manager within any organization large enough to have an energy management strategy. It might be preferable to have a slightly underutilized energy manager who can assist with other projects, than to expect an existing employee to accept new duties and continue to be effective in an existing job.

The Basics of Strategy Development

While the plan should not be created in a vacuum, care should be exercised when determining who in the organization will participate in the assessments and development of the energy strategy. Ideally, the organization's energy manager should document meeting proceedings and key decisions as well as to produce all draft and final documents. It is also important that a senior position having ultimate authority over the strategic energy initiative be active in the process, as needed, to clear road-blocks, mediate problems and to refocus group efforts as required. While it is desirable to include all stakeholders in the process, managing group dynamics in a way that achieves optimal results is difficult, but exceedingly important. It may be worthwhile to utilize an experienced facilitator in some cases.

Written Energy Strategic Plan Format

The format of the written energy management strategy can take many forms. It might be presented as a single page bullet list, or as a list in combination with brief written descriptions of the initiatives. The written strategy might also be a comprehensive written plan with detailed descriptions of initiatives, procedures and organizational definitions. The plan should include energy consumption and cost data indices with detailed explanations on how the plan objectives will be measured.

Each organization will have different approaches and formats for a written strategic energy plan. How detailed the road map is may have more to do with how specific the organization feels it needs to delineate its initiatives to ensure success. Most importantly, the format of the report should not become the goal itself, but rather should reveal in clear and concise terms what the objectives of the strategy will be and how that objective will be achieved. The absolute least amount of work required to effectively document the strategy and to provide broad-based approval and certain momentum toward achieving the objective is preferable. In this way, the real work of reducing energy consumption and expenses can begin in earnest.

The Opportunity Implementation Process

Each individual plays a part in achieving energy efficiency goals in government or institutional facilities, non-profit, or business organizations. The critical factors are leadership and individual behavior based on awareness of expectations. When leaders engage their organizations in striving for more efficient use of energy resources, the results are improved financial performance, contribution to community clean air objectives and reducing the nation's dependence on foreign energy. In the process, organizational performance improvements evolve that also have an impact on productivity, quality of service to customers and an enhanced work environment.

An individual goes through a series of changes starting with **unawareness** (unconscious of one's behavior that results in ineffectiveness; not aware of problems or opportunities to improve); **discovery** (conscious of one's behavior that results in ineffectiveness; becoming aware of opportunities to improve); **commitment** (consciously putting into practice new behavior or skills and new procedures to solve and avoid problems); **success** (automatically applying new behavior or skills as a standard of daily operations).

A successful energy efficiency program will require each employee to participate in the mainstream of acquiring **knowledge**, engaging in clear **communications**, enthusiastic **involvement** and appropriate **reward**. Once these factors are in place, an effective Opportunity Implementation Process then becomes possible to organize that serves to:

- Thoroughly review all parts of an opportunity.
- Summarize critical data that concern the opportunity or implementation solution.
- Avoid trying to pursue an opportunity that is beyond the control or influence of the team involved.
- Avoiding work on opportunities that are too general, too large or not adequately defined.
- Including the right people from the beginning.
- Planning properly to execute and evaluate the selected solution.
- Avoiding the cost of lost opportunity.

There may be attitude barriers to success that will have to be addressed:

- Ineffective management behavior.
- Conflict of departmental versus total organizational goals.
- Conflict between short and long range opportunities.
- Conflict between daily operations and energy efficiency training requirements.
- Expecting results too fast or too slow.
- Expectations too high or too low.
- "Not invented here" attitude.
- Conclusion that "we are good enough already."
- Language problems.
- Anonymous skepticism.
- Fear of Change.

The Opportunity Implementation Process

Identifying and Selecting the Opportunity
(What energy efficiency opportunities need be implemented?)

Analyzing the Opportunity
(What is preventing implementation?)

Generating Implementation Solutions
(How can the implementation be made?)

Selecting and Planning Solution
(What is the best way to do it?)

Implementing Solution
(Is the plan being followed?)

Evaluating Solution
(What are the results?)

Best Energy Management Practices

- √ Commitment by Top-Level Management
- √ Clearly Defined Energy-Reduction Goals
- √ Communication of the Goals to All Organizational Levels
- √ Assignment of Responsibility and Accountability at the Proper Levels
- √ Tracking of Energy Use
- √ Continuous Identification of All Potential Savings
- √ Adoption of Project Investment Criteria Reflecting Project Risks and Returns
- √ Provision for Recognition and Reward for Achieving the Goals

The Cost of Pursuing Energy Efficiency

NO COST / MAINTENANCE. Numerous improvements in efficiency can be achieved through more effective management of resources and informed employee behavior, such as:

- Turning off lights when not needed.
- Removing unneeded light bulbs.
- Using lower wattage bulbs or more efficient ones.
- Lowering thermostat heating settings.
- Raising thermostat cooling settings.
- Reducing heating and cooling settings during unoccupied hours.
- Turning down heating or cooling somewhat before the end of operating hours.
- Servicing and adjusting HVAC systems on a regular basis.
- Turning off machines and equipment when not in use.
- Making sure all automatic controls are in good working condition and set properly.

INCREMENTAL IMPLEMENTATION. Other efficiency initiatives can be supported with operating and maintenance budgets to be accomplished over an extended period of time. One example is the incremental upgrading of T-12 to T-8 fluorescent lamps and electronic ballasts during spot lamp replacement. Upgrade costs can be spread out over a two-year period and deliver a payback of less than 3.0 years. Similar results can be realized by upgrading one room, section or area at a time.

CAPITAL APPROPRIATIONS. Some efficiency projects must be addressed with capital appropriations that require payback analysis. Although almost every project is unique to a particular application, the initiatives are likely to be worthy investments with attractive paybacks. The cost of lost opportunity or “doing nothing” is also worth considering while taking in to consideration the more comprehensive Life Cycle Cost Analysis. In some cases, a capital project may come under the heading of “NECESSITY” when a critical piece of equipment has reached the end of its useful life and there is no alternative to replacement. Under these circumstances, this should be viewed as an opportunity to upgrade efficiency rather than just replacing outdated technology. When capital funding is not available, managers can also consider performance contractors to finance upgrades.

PAYBACKS. Paybacks may vary according to the scheduled use of a facility, types and configurations of energy consuming systems, climate and regulatory codes. However, projects involving systems or facilities that are exposed to the most hours of daily use are likely to benefit from accelerated and shorter paybacks. More favorable paybacks can also be experienced if similar projects at several different sites can be combined to benefit from competitive contract bidding.

Part II

A Strategic Energy Management Plan Model

A STRATEGIC ENERGY MANEGEMENT PLAN MODEL

(FACTORS TO BE CONSIDERED WHEN DEVELOPING A PLAN FOR MEDIUM AND LARGE ORGANIZATION)

STRATEGIC ENERGY MANAGEMENT PLAN

FOR

(_____)

Name of Organization
Address
Phone Number
E-mail address
Administrator
Position

Date
Annual Review Update

Table of Contents

(suggested – to be developed by organization)

Introduction

(suggested – to be developed by organization)

Memorandum from the ultimate authority within the organization to explain: 1) The need for a Strategic Energy Plan, 2) General comments on what justifies a concerted effort on the part of the entire organization to control energy costs, and 3) An endorsement of the Plan that has been created to develop goals and objectives, to implement the initiatives to achieve the goals and objectives, to measure results and to update the Plan on an annual basis to ensure long-term maintenance of the Plan. **Consideration should be given to requiring the authority's immediate staff to be signatories to the memorandum.**

Definitions of Abbreviations/Acronyms

(suggested " to be developed by organization)

AFUE (Annual Fuel Utilization Efficiency) – Rating applies to gas and oil furnaces and boilers.

AFV – Alternative Fuel Vehicle.

ASHRAE – American Society of Heating, Refrigerating and Air Conditioning Engineers.

Ballast – A device that provides starting voltage and limits the current during normal operation in electrical discharge lamps (such as fluorescent lamps).

Bench-marking – Comparing current energy efficiency with that of a similar organization or a prior period of time within the same organization.

Best Practices – A series of measures that can be established to conform to policy and to implement, maintain and adjust objectives and strategies as required to experience success or perform to specific levels of a given industry standard.

Boiler horsepower – A measure of the maximum rate of heat energy output of a steam generator. One boiler horsepower equals 33,480 Btu/hr output in steam.

BTU (British Thermal Unit) – A unit of heat energy equal to the heat needed to raise the temperature of one pound of water one degree Fahrenheit**.**

Carbon Dioxide (CO^2) – Greenhouse gas related to earth warming.

CAT – Conservation Action Team.

CFL – Compact Fluorescent Light bulbs.

CFM – Cubic Feet per Minute

Day-lighting – The utilization of natural lighting, when available, from windows or ceiling sun-light devices to minimize the use of energy-consuming lighting fixtures.

Demand – The level at which electricity or natural gas is delivered to users at a given point in time. Electric demand is expressed in kilowatts (kW)

Demand Charge – The sum to be paid by a large electricity consumer for its peak usage level.

EA – Energy Assessment.

ECM – Energy Conservation Measure

EER (Energy Efficiency Ratio) – The ratio of cooling capacity of an air conditioning unit in BTUs per hour to the total electrical input in watts under specified test conditions.

Energy Guide – Label on equipment that refers to energy efficiency rating, the higher the numerical, the more efficient.

ESCO – Energy Service Company.

ESM – Energy Savings Measure.

EMS – Energy Management System.

Fluorescent Lamps – Tubular lamp energized by ballast, more efficient and longer lasting than an incandescent lamp.

Horsepower (electrical horsepower; hp) – A unit for measuring the rate of mechanical energy output. The term is usually applied to engines or electric motors to describe maximum output. 1 hp = 745.7 Watts = 0.746 kW = 2,545 Btu/hr.

HSPF (Heating Seasonal Performance Factor) – Applies to heat pump (heat only) split and single package.

HVAC – Heating, Ventilation & Air Conditioning.

Incandescent Lamp – Common light bulb with filament (short life and inefficient).

IPVL (Integrated Part Load Value) – Applies to electric chiller rating.

kWh (Kilowatt hour) – A measure of energy equivalent to the expenditure of one kilowatt for one hour. For example, 1 kWh will light a 100-watt light bulb for 10 hours. 1 kWh = 3,413 Btu.

kW (Kilowatt) - A measure of electrical power equal to 1,000 Watts. 1 kW = 3,413 Btu/hr = 1.341 horsepower

LED (Light Emitting Diode) – Lighting used in high efficiency EXIT signs and traffic signals.

LEED (Leadership in Energy and Environmental Design**) –** Guidelines for energy-efficient renovation or new construction.

Life Cycle Cost Analysis – Not only is the typical payback on the initial investment considered (cost of implementation versus efficiency savings), but the comparative long-term cost of operation, maintenance, repair time, repair parts, useful life, etc, is analyzed including inflationary factors. The cost of lost opportunity is also considered, if appropriate.

Load Factor - Load factor is the ratio of average demand to maximum. LF = kWh/ (#days) (24) (kW)

Load Management – Any method or device that evens out electric power demand by eliminating uses during peak periods or shifting usage from peak time to off-peak time.

MMBtu – One million British Thermal Units.

Nitrous Oxide – Precursor to ozone.

Occupancy Sensor – A control device that senses the presence of a person in a given space, commonly used to control lighting systems in buildings by extinguishing lighting when space is not occupied.

Performance Contractor – A vendor that contracts to implement energy efficiency improvements to a client's energy consuming equipment, the cost of which is paid for by utility savings over an extended period of time. No capital investment is required.

Rate Schedule – A service agreement showing how the electric bill of a particular type of customer will be calculated by an electric utility company.

RFP (Request for Proposal) – A document that is forwarded to Engineering Service Companies for competitive proposals to accomplish energy savings objectives as outlined by the client. The document is prepared after the results of energy assessments have been analyzed and a summary of objectives have been established.

Set Back – Lowering the heating temperature on a thermostat when a space or building is not occupied. Raising the air conditioning temperature setting when space or building is not occupied.

Steam Conversion Factors (approximations) – 1 pound of steam = 1,000 Btu = .3 kW. 10,000 lbs/hr steam = 300 boiler horsepower.

SEER (Seasonal Energy Efficiency Ratio) – A measurement of how energy efficient a central cooling system can operate over the course of an entire cooling season. This term is most often applied to central air-to-air heat pumps (in the cooling mode) and air conditioners. SEER is expressed as the dividend of the number of Btu of cooling provided over the season divided by the total number of watt-hours the system consumes. Effective January 2006, the minimum for most systems will increase to 13.

SEMP – Strategic Energy Management Plan.

Sulfur Oxide (SOx) – Acid rain and visibility pollutants.

Therm – 100,000 BTUs.

Section 1: Policy, Objectives & Goals

(suggested – to be developed by organization)

Policy (for example)

It is the policy of (_____):

- To assure that the organization can meet its energy needs in a manner that is adequate, reliable, secure and sustainable, assures affordability and improves the organization's economic performance.
- To identify and evaluate on an ongoing basis the organization's energy needs in accordance with principles of cost reduction, usage efficiency, load management alternatives, purchasing practices, renewable resources and fleet management, where applicable.

Objectives (for example)

The Administrator (Energy Manager) with the cooperation of the organization's department heads (key personnel) shall oversee the implementation of the organization's Strategic Energy Management Plan. The Plan shall accomplish the following objectives and requirements:

- To conserve energy resources, save energy and contribute to minimizing air pollution.
- To consider the organization's policies and operations that affect energy use.
- To devise a strategy to take advantage of all reasonable opportunities to reduce energy consumption.
- To include appropriate measures to monitor resources and energy use and the evaluation of measures undertaken.
- To identify education, management and other relevant policy changes that are part of the implementation plan.
- Devise a strategy to encourage more efficient trip planning and to reduce the average fuel consumption of the organization's fleet, where applicable.

(In an organization where there are multiple operating sites, the central authority may establish **Policy and Objectives** that give direction to the development of **Goals and Implementation** at the individual sites).

Goals (for example)

Once base-year statistics are established and energy savings assessments have been completed and analyzed for various sectors of the organization's operations, energy usage costs and goals of cost reductions by sector can be established. If there are four sectors of operation within the organization, opportunities observed may make it logical to establish energy cost reductions goals. For example:

- Sector 1 - 18% (A sector may consist of a given building, department, division etc.)
- Sector 2 - 12%
- Sector 3 - 15%
- Sector 4 – 10%

Section 2: Infrastructure

(suggested – to be developed by organization)

Part 1 – Existing Buildings

Identify the number of structures or sectors that are managed by the organization, the manager that is responsible for each one and develop base line energy consumption statistics that show the percentages of energy use by HVAC, lighting, hot water, food preparation, miscellaneous use and process/equipment, etc, as appropriate.

The following information can help you determine where your most rewarding energy efficiency priorities are that should have been borne out by an energy efficiency and water assessment. These priorities represent controllable and variable overhead expenses that are critical to financial performance and energy efficiency efforts.

Average Estimate of Energy Usage (%)

	Type of Operation				
	Office Building	**School/Education**	**Manufacturing**	**Health Care**	**Retail Store**
HVAC	40	50	35	30	51
Lighting	29	20	28	16	31
Hot Water	9	22	2	26	7
Food Prep.	2	3	0	7	3
Misc. Use	5	3	3	14	4
Process/Equip.	15	2	32	7	4

(Actual usage will vary)

Establish energy efficiency strategies commensurate with opportunities that have been identified and evaluated during an energy and water assessment. These opportunities include a wide range of measures from improving occupant use of energy consuming systems to operating budget low-cost maintenance energy efficiency improvements as well as capital investments in cost-effective energy projects. Specific areas such as Utility Accounting, Office Equipment, New Construction, Vehicle Use and Selection, Lighting, Space Conditioning – HVAC, Chillers, Building Envelope, Electric Motors, Steam and Hot Water Systems, Compressed Air, Miscellaneous Equipment, Energy Management Systems (EMS), etc. should be addressed.

Use-Habit Improvements

There are a multitude of individual behavior factors related to energy consumption that should be addressed and established as routine procedure. If addressed effectively, instant no-cost savings can be achieved. Each individual in the organization plays a significant role in achieving energy efficiency goals. The critical factors are leadership and individual behavior based on awareness of expectations. There are numerous no-cost factors that should be spelled out in detail in the Strategic Energy Management Plan to assure that each member of the organization is following practices to support energy efficiency goals.

Management, Operation and Maintenance Improvements

Once a building becomes operational, the process of upkeep begins. All too often this factor is not given adequate attention and is under-funded causing various systems that serve the occupants to become increasingly inefficient and ineffective. A number of issues should be addressed and included, if applicable, as the Strategic Energy Management Plan is organized.

The following questions can be transformed into statements of action, where appropriate:

Utility Accounting

- Will energy usage and cost data be tracked monthly and distributed to all major users?
- Will data be monitored to question and pursue remedies for unusual variations from the norm?
- Will benchmarking be used to determine performance goals?
- Will facilities with high costs be highlighted to prompt the implementation of cost reduction measures?
- Will energy costs and program performance be included in monthly business reviews?
- Will measures be taken to discover billing errors and recover incorrect charges?
- Will measures be taken to ensure that electric rate structures are understood?
- Will measures be taken to understand the economics of both use (kWh) and demand (kW)?
- Will rates be reviewed annually with power suppliers to ensure the most favorable rate?
- If power usage is changed, will the impact on rates also be reviewed?

Office Equipment

- Will computers, monitors, printers, copiers and other office equipment be turned off/or set for "sleep mode" when not in use?
- Will Energy Star equipment be specified for new purchases?

New Construction

- When expanding or constructing a new building, will full consideration be given to LEED certified or a "High Performance" designed or constructed facility that addresses building orientation, design, layout, lighting, equipment and control selections that result in maximum energy efficiency?

Lighting

- Will lights be turned off when rooms or areas are not occupied?
- Will lighting systems be wired so that lights throughout a large area do not have to be on when activity is taking place in only a small section of the area?
- Will task lighting be used to allow background lighting to be reduced?
- Will energy conservation stickers be placed on light switches?
- Will occupancy sensors be considered that can automatically turn off unused lights in meeting rooms, offices, etc.?
- Will incandescent lamps be replaced with compact fluorescent lamps?
- Will a lighting level and layout audit be conducted to ensure that appropriate illumination is specified according to area use?
- Will T-12, fluorescent lamps be replaced with T-8 lamps with electronic ballasts?
- Will measures be taken to remove unnecessary lights or de-lamp fixtures in over-lighted areas?
- Will old ballasts be upgraded when lamps are replaced?
- Will high-bay fluorescent fixtures be considered to replace metal halide fixtures in gyms, warehouses, etc.? (more efficient and no restart time)
- Will Light Emitting Diode (LED) lighting fixtures be used in EXIT signs?
- Will unnecessary lighting in snack and beverage machines be removed?
- Will the housekeeping and security staff be advised to keep lights turned off in unoccupied areas?
- Where possible, will housekeeping duties be scheduled during daylight or operating hours?
- Will consideration be given to the use of an Energy Management System to control the efficient use of lighting?

Special Note on Energy Management Systems (EMS)

EMS automatically monitors and controls HVAC, lighting and equipment to conserve energy, maintaining function and providing occupant comfort. EMS can accomplish the following and more:

- Control lighting systems by the hour and dim for decreased demand during daylight hours.
- Optimize HVAC operations based on environmental conditions and changing uses.
- Turn off or set back HVAC during non-working hours.
- Deactivate water heating systems when not in use.
- Activate and monitor security systems.
- Control peak loads to reduce power demand factors.

External Lighting and Traffic Signals

- Will exterior light photo cells/timers be kept in good working order?
- Will the use of decorative lighting be minimized or unneeded exterior lighting be discontinued?
- Will external lighting be converted to the most efficient fixtures available? (for example, replacing mercury vapor with high pressure sodium)
- If applicable, will signal heads on traffic signals be converted to LED technology?

Space Conditioning - HVAC

- Will you maintain a service contract agreement to provide for regular safety and efficiency maintenance to the systems?
- When replacing an inoperative system, will this be taken as an opportunity to upgrade efficiency as opposed to installing an in-kind replacement?
- What energy efficiency heating and cooling thermostat set-point policy will be established and maintained?
- Will the installation of programmable thermostats be considered?
- Will thermostats be regularly calibrated?
- Will thermostats be made tamper-proof?
- Will safety rules be enforced to prohibit the use of personal heating and cooling devices?
- Will cooling and heating controls be setback when weather conditions permit?
- Will cooling and heating controls be setback when facility is not occupied?
- Will off-hour meetings be scheduled in locations that do not require HVAC to be operating in an otherwise unoccupied facility?
- Will housekeeping be scheduled to minimize the use of space conditioning?
- Will air filters be inspected on a regular basis and cleaned or replaced when necessary?
- Will surfaces on cooling coils, heat exchangers and condensing units be cleaned on a regular basis?
- Will exhaust fans be turned off along with the HVAC systems when a space is unoccupied?
- Will conditioned air from air-handling units be adjusted and balanced to match the volume of space conditioning requirements?
- Will measures be taken to ensure that supply and return ducts are not blocked in spaces served?
- Will return ducts be reviewed to ensure that the air handling systems are providing even and balanced flow of conditioned air into and out of spaces served?
- Will direct conditioning of unoccupied areas (corridors, stairwell, storage rooms, etc.) be minimized by turning off fan coil units and unit heaters, or by closing supply air diffusers?
- Will outside air dampers be controlled to close when conditioned space is unoccupied?
- If economizers are present in the HVAC system, will they be modulated to take advantage of free cooling when outside temperatures is below 65°F?
- If cooling towers are in use, will water meters be installed to record make-up water usage (losses due to blow-down, evaporation and drift) that should result in sewer charge credits?

Chillers

- Will heat exchange surfaces be cleaned on a regular basis?
- Will refrigerant filters be changed per manufacturer's specifications?
- If a cooling tower is used in conjunction with the chiller, will the water be treated adequately to prevent biological fouling of the system?
- Will chillers be serviced by a qualified technician on a regular basis to optimize operating efficiency under various environmental and load conditions?

Building Envelope

- Will weather stripping on windows and doors be well-maintained?
- Will blinds and shades be adjusted to take advantage of daylight and to utilize or avoid the impact of solar heating?
- Will thermal windows be installed to minimize heating and cooling losses?
- Will operable windows be opened for ventilation during mild weather conditions?
- Will window air conditioners be covered during the heating season?
- Will the possible improvement of building insulation, particularly the roof area be pursued?
- When replacing roofing material, will reflective, light-colored material be specified?
- Will flexible windbreaks or interior doors be considered for loading areas?

Electric Motors

- Will a motor management policy be established that mandates the use of "premium" efficiency motors? Establish rewind versus new motor replacement policy?
- Will repairs shops be required to maintain the efficiency of motors when they are rewound?
- Will motor air vents be cleaned on a regular basis and areas adjacent to motors maintained to be uncluttered and well ventilated?
- Will heavy-duty replacement bearings be used when conducting maintenance?
- Will cogged belts be used in belt-driven applications or when replacing worn v-belts?
- Will electric motors be selected to avoid power inefficiency and over-capacity?

Steam and Hot Water Systems

- Will boilers and burner units be inspected and maintained by a qualified technician on a regular basis to achieve maximum efficiency and safety?
- Will the most cost-effective fuel be used?
- Will steam traps be inspected and maintained on a regular basis?
- Will there be a leak repair program maintained to deal with steam and condensate lines and valves?
- Will steam lines, hot water storage tanks, heat exchangers and piping be well-insulated?
- Will hot water temperatures be set at the minimum required?
- Will hot water distribution pumps be turned off during periods of non-usage?
- Will low flow showerheads, faucet aerators, flow restrictors and low-flush toilets be specified?

Compressed Air

- Will a regular inspection for leaks and necessary repairs be conducted on a regular basis?
- Will systems be turned off when the compressed air is not in use?
- Will air intakes for the compressors be vented to the outside to provide a cooler source of supply air?
- Will system be operated at the minimum required pressure?
- Will system-wide pressure settings at point of use be maintained at the lowest possible operating levels?

Miscellaneous Equipment

- Will miscellaneous equipment be turned off wherever possible?
- Will refrigeration units in drinking fountains be set no lower than 60°F?
- Will non-essential refrigerated vending machines and refrigeration/ice machines be taken out of use?
- Will electrically-heated defrost cycles on refrigerated walk-in boxes be minimized and scheduled for off-peak energy consumption hours (night)?
- Will automatic controls be adjusted (temperature, speed, and other settings) to minimize energy use but accomplish the task?

(Depending on the configuration or use of a given facility or operation, energy efficiency opportunities will differ. The above list is not all inclusive)

Part 2 – New Construction and Major Renovations

New construction presents the opportunity to create a "state of the art" energy efficient building at the beginning of its service life and should be addressed as policy in the Strategic Energy Management Plan. To that end, new construction should be highly energy efficient and incorporate all practical and cost effective energy efficiency measures and systems.

Major renovations of buildings should also strive to meet this goal to the greatest extent possible. It should be understood that opportunities to meet new construction standards may be limited by inherent design deficiencies of existing buildings.

New construction and renovation should be exposed to the following steps:

- Planning and Design
- Construction and Commissioning
- Facility Operation and Maintenance
- Occupant Training and Usage Procedures
- Monitoring of Energy usage and Procedure Adjustment

Planning and Design: The owner, Occupant, Consulting Architect and Engineers and other specialty consultants should address location, solar orientation, day lighting, cooling and shading, envelope system and testing, plumbing, mechanical and electrical systems, renewable energy and budgeting and policy.

Construction and Commissioning: The building should be constructed in accordance with approved documents. Upon completion, the building envelope and associated systems should be commissioned to guarantee that all systems are functioning as planned and to ensure optimum energy efficiency performance.

Operation and Maintenance: The staff of the building responsible for janitorial housekeeping and the operation and maintenance of the building systems should be trained on all aspects of the building to ensure ongoing optimum energy efficiency performance.

Occupant Training & Usage Procedures: The occupants of the building should be trained in how the building is designed to function and what usage procedures will be required of the occupants to optimize comfort and energy efficiency.

Monitoring of Energy Usage and Procedure Adjustments: It is desirable for a new building to have an Energy Management System (EMS). This makes it possible to remotely and automatically monitor and control HVAC, lighting and equipment to conserve energy, maintain function and provide occupant comfort. The system should be used to limit peak electrical demand on key equipment to avoid high demand charges and penalties. The more elaborate systems can monitor safety alarm sensors, the disposition of critical equipment as well as the status of facility security.

Section 3: Purchasing *(suggested – to be developed by organization)*

The purchasing function can play a major role in supporting the Strategic Energy Management Plan. Particular emphasis should be placed on:

- Identifying reputable energy efficiency engineering firms, contractors and service providers.
- Identifying reliable sources of components, systems and services that are willing to maintain inventories of cost-effective items in support of energy efficiency objectives.
- Ensuring that purchase orders and contracts reflect energy efficiency policy established by the organization.
- Ensuring that in-house supplies support established energy efficiency strategies.
- Identifying certified vendors who will provide recycling and disposal services.
- Researching sources of new energy efficiency technology.
- Identifying recycling markets for profitable disposal of solid waste material and avoidance of landfill tipping fees.

Section 4: Transportation *(suggested – to be developed by organization)*

If the organization owns or leases vehicles, the following issues should be considered when establishing policy:

- Is the correct size and type of vehicle being used for the job?
- Are timely and consistent maintenance schedules being maintained?
- When renting vehicles, are the most fuel-efficient selected?
- When purchasing a vehicle, are fuel mileage and emission levels considered?
- Have alternative fuel vehicles (AFV) been considered?
- Are employees given incentives for car pooling or usage of mass transit?
- Is video or on-line conferencing utilized to minimize long-distance traveling?
- Are local trips planned to combine as many objectives as possible?
- If a fleet of vehicles is involved, will policy be established and enforced to ensure proper accountability and efficient use of vehicles?

Section 5: Implementation and Education *(suggested – to be developed by organization)*

It is recommended that a departmental or sectional Implementation and Training Plan become part of the Strategic Energy Management Plan (SEMP) itself. Once the SEMP has been completed, working toward achieving the established goal becomes the real work and involves the entire organization, most of which has not been involved in the details of creating the SEMP. Implementation is a formidable task and success is dependent upon a number of factors including the role that the Energy Manager will play. Consider addressing the following action items in this section of the plan:

- Clearly communicating to all levels within the organization, department or sector why the need to improve energy efficiency is justified and necessary. If previous initiatives have been attempted, explain how the new plan will take precedence over past programs. It is recommended that the highest levels of authority be involved to give the SEMP the status that it deserves.
- Organizing training sessions to familiarize each employee with energy efficiency policy, procedures, initiatives and implementation plans that have been established and how they will be expected to participate. (Inclusion in new employee orientation should also be considered).
- Organizing workshops (internal/external) to qualify facility technicians to maintain energy efficient operations and maintenance procedures.
- Conspicuously displaying Energy Conservation posters throughout the facility.
- Defining the energy efficiency goals and implementation timing that have been established.
- Assigning responsibility and accountability at the proper levels.
- Organizing Conservation Action Teams (CAT) to provide leadership and increase the success of the SEMP.
- Explaining how progress will be documented and communicated.
- Defining what resources will be available to pursue goals.
- Explaining what external assistance may be involved.
- Explaining what investment criteria such as dollar value and payback will be required to approve and implement a capital project.
- Providing for recognition and rewards for achieving interim and long-range goals, team competition, etc.

Make Commitment

↓

Assess Performance & Set Goals

↓

Create Strategic Energy Management Plan

↓

IMPLEMENT PLAN

↓

Evaluate Progress

↓

Recognize Achievements

↓

Reevaluate, Revise & Recommit

Appendix A: Resources

(suggested – to be developed by organization)

EPA – Energy Star – www.energystar.gov

U.S. Department of Energy – Energy Efficiency www.energy.gov/efficiency/index.html

State Energy Office, N.C. Department of Administration

N.C. Green – www.sustainablenc.org

N.C. Division of Pollution Prevention and Environmental Assistance – www.p2pays.org

Federal Energy Management Program – www.eere.energy.gov/femp

The Motor Resource Center – www.motorresourcecenter.net

The Office of Industrial Technology Clearinghouse
1-800-862-2086
clearinghouse@ee.doe.gov
www.oit.doe.gov/clearinghouse

Motor Analysis and System Efficiency – http://mm3.energy.wsu.edu/mmplus/default.cfm

Waste Reduction Partners – www.landofsky.org/wrp

Bench-marking Resources:

- Rebuild America – www.rebuild.org
- Energy Star Program/EPA – www.energystar.gov
- Association of Physical Plant Administrators – www.appa.org
- Cooperative Research Network – www.crn.org
- Energy Information Administrative/DOE – www.eia.doe.gov

Energy Company Rate Updates:

- www.dukepower.com/ncsbus/understand/nc_rates.asp
- www.progress_energy.com/aboutenergy/rates/nctariffs.asp

Appendix B: Environmental Savings

Power Plant Emission Reduction
Conserving 1,000 kWh will:

- Reduce 1.1 tons CO^2 (greenhouse gases)
- Reduce 5.31 lbs of nitrous oxides (precursor to ozone)
- Reduce 9.07 lbs of sulfur oxides, Sox (acid rain and visibility pollutants)

Passenger Car Emission Equivalent
4,500 kWh/year = carbon dioxide emissions from one vehicle.

Forest Equivalents
3,310 kWh/year = carbon dioxide removed by one acre of forest.

Appendix C: Conversion Factors

Fuel Oil = 140,000 BTU/gallon

Coal = 14,000 BTU/Pound

Natural Gas = 1,000 BTU/ cubic foot

1 therm = 100,000 BTU

1 kilowatt kW = 1.341 horsepower (hp)

1 horsepower (hp) = 0.746 kilowatt (kW)

1 kilowatt-hour (kWh) = 3,412 BTU

1 ton of cooling power – 12,000 BTU/hour

Appendix D: Energy and Water Benchmarks

(Recent 12-month period – to be developed by organization)

Site/Sector/Dept.	Area (Square Feet)	Electricity (kWh)	Fuel Oil (Therms)	Propane (Therms)	Total Energy Costs $	Water ($)	Cost $/ Square Foot	Water (Gallons)

Once the above information is established, it may be worthwhile to prepare and analyze a table for each site/sector/ department to document the percentage of energy consumed for each service such as HVAC, lighting, hot water, food preparation, process/equipment, miscellaneous, for example, to give emphasis to priorities and opportunities. A starting point will have been established to begin measuring the results of SEMP implementation.

Appendix E: Explanation of Power Company Services

(Coops should be contacted directly to review services that they provide)

Duke Energy Electric Rates - North Carolina

Listed below, you will find brief descriptions and copies of Duke Energy Carolinas' currently available rate schedules for non-residential customers.

At Duke Energy, we are available to your business 24 hours a day to assist with questions regarding your service, rate schedule, or billing. If you have questions about the application of electric rates for your organization, please call 1-877-DUKESBC (385-3722).

Website: www.dukepower.com/ncsbus/understand/nc_rates.asp

Non-Residential Services

Schedule G

Schedule G is available to any non-residential organization (such as retail stores, professional offices, restaurants, schools, etc). Approximately 80% of Duke Energy Carolinas' small organization customers are on Schedule G.

Billing demand for Schedule G is calculated as the largest of the following:

1. The maximum, integrated 30-minute demand in the previous 12 months' bills including the current bill. This is typically known as a demand "ratchet."
2. 50% of your Contract Demand. When you apply for service, you and Duke Energy come to an agreement on the maximum electrical demand that could be expected from your business. This reserves capacity for you on the Duke Energy system and allows us to properly size the equipment necessary to serve your business. This agreed-to maximum expected demand is your Contract Demand.

Schedule GA

Similar to Schedule G, Schedule GA also requires your heating and cooling systems to be supplied electrically, where all the electric usage is through a single meter. Service under Schedule GA results in lower average annual prices than Schedule G because Schedule GA has a lower demand ratchet and lower rates that apply in the winter months. Approximately 13% of Duke Energy Carolinas' small organization customers are on Schedule GA.

Billing demand for Schedule GA is calculated as the largest of the following:

1. The maximum, integrated 30-minute demand in the current month's bill.
2. 50% of the maximum, integrated 30-minute demand in the previous 12 months' bills including the current bill. This would be a 50% demand "ratchet."
3. 50% of your Contract Demand. When you apply for service, you and Duke Energy come to an agreement on the maximum electrical demand that could be expected from your business. This reserves capacity for you on the Duke Energy system and allows us to properly size the equipment necessary to serve your organization. This agreed-to maximum expected demand is your Contract Demand.
4. 15 kW

If you are currently on the Schedule G rate but meet the conditions of Schedule GA, you will probably save money by switching to the GA rate.

Industrial Service – Schedule I

Schedule I is an industrial service schedule available to businesses classified as "manufacturing industries" by the Standard Industrial Classification (SIC) Manual (published by the Federal Government) – provided that more than 50% of the electric usage is for manufacturing processes. Approximately 3% of Duke Energy Carolinas' small business customers are on Schedule I.

The billing demand for this schedule varies depending on how the heating and air conditioning systems are supplied. For customers whose heating and air conditioning are supplied electrically where all the electric usage is through a single meter, billing demand is calculated as the largest of the following:

1. The maximum, integrated 30-minute demand in the current month's bill.
2. 50% of the maximum, integrated 30-minute demand in the previous 12 months' bills including the current bill.
3. 50% of your Contract Demand. When you apply for service, you and Duke Energy come to an agreement on the maximum electrical demand that could be expected from your business. This reserves capacity for you on the Duke Energy system and allows us to properly size the equipment necessary to serve your business. This agreed-to maximum expected demand is your Contract Demand.
4. 15 kW

For all other customers under Schedule I, billing demand is calculated as the largest of the following:

1. The maximum, integrated 30-minute demand in the previous 12 months' bills including the current bill.
2. 50% of your Contract Demand.
3. 30 kW

Time-of-Use Rates

Schedule OPT
Schedule OPT (Time-of-Use) is available to any business customer. To encourage a shift of electrical usage from "on-peak" to "off-peak" hours, charges on this schedule vary according to the time of day, day of week, and season in which energy is used. On-peak and off-peak hours are defined as follows for the summer and winter periods:

Summer
June 1 to September 30
Monday to Friday
1 p.m. to 9 p.m.

Winter
October 1 to May 31
Monday to Friday
6 a.m. to 1 p.m.

Approximately 4% of Duke Energy Carolinas' small organization customers are on Schedule OPT. For customers under this schedule, billing demand is calculated as the largest of the following:

1. The maximum, integrated 30-minute demand during the applicable summer or winter on-peak hours for the current bill.
2. 50% of your Contract Demand. When you apply for service, you and Duke Energy come to an agreement on the maximum electrical demand that could be expected from your business. This reserves capacity for you on the Duke Energy system and allows Duke Energy to properly size the equipment necessary to serve your business. This agreed-to maximum expected demand is your Contract Demand.
3. 15 kW

Generally if your business operates during hours outside the typical workday of 8:00 AM to 5:00 PM, five days a week, you may benefit from the OPT rate. Examples of cases in which this would be beneficial are businesses that are open six or seven days a week, such as convenience stores and retail businesses. Businesses with significant energy usage on weekends or during late evening hours, such as the lighting for car lots or recreational businesses like bowling alleys, could also benefit. However, OPT is not likely to be advantageous to customers using less than 2500 kilowatt-hours (kWh) per month.

Progress Energy Carolinas Electric Rates - North Carolina

Non-Residential Services

Progress Energy Carolinas offers a variety of rate options for North Carolina nonresidential customers. It is your responsibility to choose and qualify for the rate that best suits your needs. Progress Energy Carolinas will, however, be glad to provide you with information to help you make an informed decision. If you have any questions about our General Service Rate Schedules, or if you need assistance in comparing available rate and rider options, please contact our Commercial and Industrial Services Team toll-free at 1.888.326.3344. Complete rate schedules are available on our Web site at progress-energy.com or upon request.

Website: www.progress-energy.com/aboutenergy/rates/nctariffs.asp

Small General Service Rate
This rate is for nonresidential customers with loads less than 30 kilowatts (kW). Monthly bills are based on a customer charge and kilowatt-hour (kWh) charges. The rate is available for a minimum of one year. Whenever the monthly registered demand equals or exceeds 35 kW in two or more of the preceding 12 months or equals or exceeds 50 kW, the Small General Service Rate is no longer available.

Medium General Service Rate
This rate is for nonresidential customers with loads from 30 to 1,000 kW. Monthly bills are based on a customer charge, a kW demand charge and a kWh charge. The bill may be adjusted when the monthly power factor is less than 85 percent. This rate is available for a minimum of one year.

Large General Service Rate
This rate is for nonresidential customers with loads of 1,000 kW or more. Monthly bills are based on a customer charge, the kW demand (with a minimum of 1,000 kW) and the total kWh used. A discount on the kW demand and kWh charges is available if the customer owns the step-down transformation facilities that Progress Energy Carolinas would normally provide for service and meets certain other requirements. The bill is adjusted when the monthly power factor is less than 85 percent. This rate is available for a minimum of one year.

Seasonal or Intermittent Service Rate
Customers with contract demands of 30 kW or greater and energy needs which vary greatly from month to month may apply for this rate. The customer's kW demand for at least two consecutive months must be less than 30 percent of the contract demand or the maximum demand registered in the 12 previous months.

Time-of-Use (TOU) Rates
Progress Energy Carolinas' optional TOU rates may benefit customers who can use a significant portion of their electrical usage during off-peak hours. Monthly bills are based on a customer charge, on-peak and off-peak kW demand charges and on-peak and off-peak kWh energy charges. The kW and kWh charges are lower during off-peak hours. Daily on-peak and off-peak hours differ from summer to non-summer periods. All weekends and eight holidays each year are designated as off-peak periods. These rates are all available for a minimum of one year. Bills under these rates may be adjusted when the power factor is less than 85 percent.

- The Small General Service Time-of-Use Rate is available to nonresidential customers with loads under 1,000 kW.
- The Large General Service Time-of-Use Rate is available to customers with loads of 1,000 kW or more; this rate offers a discount on kW demand and kWh charges if the customer owns the step-down transformation facilities that Progress Energy Carolinas would normally provide for service and meets certain other requirements.
- The All-Energy Time-of-Use Church Service Rate is available to church customers with loads of 30 kW or greater and less than 1,000 kW. Monthly bills are based on a customer charge, an on-peak kWh charge and an off-peak kWh charge.
- The Small General Service Thermal Energy Storage (TES) Rate is a TOU rate available to nonresidential customers with thermal storage equipment used for space conditioning with a total electrical load under 1,000 kW. Thermal storage equipment uses water, ice or other storage media in place of electrical space conditioning equipment such as boilers, chillers, pumps or fans.

Curtailable Load Rider
Curtailable Load Rider CL provides customers a credit on their monthly bills if they contract to reduce their load to mutually agreed levels upon request by Progress Energy Carolinas.

Dispatch Power and Incremental Power Service Riders
Large General Service and Large General Service Time-of-Use customers may apply for either of these riders if the customer can increase usage above normal levels at times during Progress Energy Carolinas' low production cost periods and if other conditions are met. Charges are lower to the customer during these periods.

Transition Rider
Small General Service Time-of-Use and Medium General Service customers whose load growth necessitates migration to the Large General Service Rate or Large General Service Time-of-Use Rate may qualify for this rider.

Premier Power Service Rider
This rider is available to customers with a need for an alternate supply of electric service in the event normal electric supply is interrupted. Progress Energy Carolinas will provide on-site generation between 50 and 8,000 kW under the terms of the rider.

Standby and Supplementary Service Rider
Rider SS is available for nonresidential customers who install generators for other than emergency use. Under this rider, Progress Energy Carolinas provides back-up service to supplement the customer's generators.

Cogeneration and Small Power Producer Rate
Customers who install generation equipment and produce power for sale to Progress Energy Carolinas may apply for this rate if they meet the requirements of the Federal Energy Regulatory Commission's Order No. 70 under Docket No. RM 79-54. This rate provides for a monthly seller charge based on generation capacity and energy and capacity credits based upon the time of generation.

Highly Fluctuating or Intermittent Load Rider
This rider is for any customer who operates welding equipment, x-ray apparatus, elevator motors or any other equipment which produces highly fluctuating or intermittent electrical loads.

Area Lighting Service
Progress Energy Carolinas offers lighting for outdoor areas, private streets and private driveways. This lighting uses mercury vapor, sodium vapor or metal halide units installed on Progress Energy Carolinas poles. Each type of fixture carries a different monthly charge. To receive area lighting service, customers must contract for a number of years, depending upon the type of installation.

Economic Development Rider
This rider offers discounts over five years on the demand charges for new loads over 1,000 kW when stipulated employment and investment conditions are satisfied. The contract period for the new load is five years.

Economic Redevelopment Rider
This rider offers discounts for 12 months for new loads over 500 kW installed at an existing unoccupied or dormant premise when stipulated dormancy, employment, and investment conditions are satisfied. The contract period is five years.

Green Power and Renewable Energy Riders
Progress Energy Carolinas offers two voluntary green power or renewable energy riders in conjunction with the state-wide NC Green Power Program to any customer who desires to pay a premium above their current month's bill for one or more blocks of electricity generated from renewable energy. 1. Rider GP provides for purchases of electricity from a mix of select new renewable resources including solar, wind, methane from biomass, and certain small hydro. Minimum purchase is one 100-kWh block each month. 2. Rider REN provides for purchases of electricity from a wider array of types of renewable generators, including both new and existing resources. Minimum purchase is one hundred 100-kWh blocks each month.