CHAPTER 7

NEW CONSTRUCTION

The Planning Process

The most cost-effective time to impact energy, water and other resource use is during the planning process for a new facility or major remodel. Although your role may be limited in the area of new construction, you can make an impact.

Many things that can be done at the time of design are not cost-effective later and are lost opportunities if not addressed during design and construction. Orientation of the building to best utilize solar energy, use of passive and active solar heating, maximum use of daylighting and use of earth berms are all examples of energy design elements that will not be cost-effective after the facility is built.

APPENDIX A
Technical Information

RESOURCE DISK R
nw_chkst.doc: RCM checklist for new construction, a tool to help you provide guidance during the planning process.

Meet with the capital programs division within your organization to discuss having input into new facility planning. You should also bring to the process resource conservation management concerns such as on-site recycling centers and compost bins, separation of building water from water used for irrigation (separate meters), etc. A checklist is provided on the Resource Disk that will help you provide resource conservation management input to the capital programs planning process.

APPENDIX A
Helpful Contacts

Technological advances such as new lighting technology, gray water reuse systems and ozone water treatment of swimming pools may have a place in your new facility. Contact the experts for the latest advice on new technology. Review the technical resources listed in the appendix. Many vendors will come to your facility to demonstrate their products. Make sure to get several references to confirm their claims. Coordinate with your in-house architect or engineer to invite them to sit in on any vendor presentations. Evaluate which options are most appropriate for your project.

As an organization concerned with resource conservation and the environment, consider developing specifications that could be used for any new facility project. Again, check with some of the technical resources listed in the appendix. Some may have efficient product specifications already developed which you can use.

In Washington State there is a requirement to perform life cycle cost analyses on new or major remodels of all publicly owned or leased facilities that are 25,000 square feet or more. This requirement is based in law: Revised Code of Washington (RCW) 39.35 and the Washington Administrative Code (WAC) 180-27-075.

A guidebook, Energy Life Cycle Cost Analysis (ELCCA), Guidelines for Public Agencies, is available from Washington State, Department of General Administration, Division of Engineering and Architecture. For school facilities, the Superintendent of Public Instruction may refer to this report as the Energy Conservation Report.

APPENDIX A
Helpful Contacts

Although not required in other states, this is an excellent resource and is available to anyone. As the resource efficiency expert, you may get involved in the selection of the energy systems. The ELCCA Guidelines present a process that can be used to select systems based on their life cycle cost; not just first cost. Costs for energy, maintenance, equipment replacement, and inflation, as well as first cost, are all considered in the ELCCA.

The report generated by the ELCCA process can be used as a decision tool for the owner in the selection of energy using systems. The report is usually prepared by an engineer hired by the design team.

See the **Helpful Contacts** section of the Appendix for a contact regarding the ELCCA Guidelines.

Commissioning

Commissioning is a systematic process that ensures, through documented verification, that all building systems perform interactively according to the documented design intent and the owners' operational needs. It begins in the design phase, lasts at least one year after project close-out and includes the training of operating staff.

Commissioning results in fewer callbacks, long-term tenant satisfaction, lower energy bills, avoided equipment replacement costs and an improved profit margin for building owners.

Commissioning occasionally is confused with testing, adjusting and balancing (TAB), which measures building air and water flows. Commissioning encompasses a much broader scope of work. It involves functional testing to determine how well mechanical and electrical systems work together. Functional tests of equipment and systems also help determine whether the equipment meets operational goals or whether it needs to be adjusted to increase efficiency and effectiveness.

APPENDIX A
Audits/Surveys

RESOURCE DISK R
com_chks.doc:
Commissioning checklist.

As the Resource Conservation Manager, you may want to be involved to some degree in the commissioning of a new building. Areas affecting energy and water would be of particular interest. On the Resource Disk there is a commissioning checklist that you can use to check items that will impact energy and water use.

For more detailed information on building commissioning, visit the Oregon Office of Energy's commissioning site on the internet at **http://www.cbs.state.or.us/external/ooe/cons/bldgcx.htm.** Two publications are available for download at this site:

- A 44-page booklet, Commissioning for Better Buildings in Oregon, explains the benefits of commissioning, how to select and manage a commissioning agent, the role of operation and maintenance staff, and how to develop a maintenance plan for the building.
- The Commissioning Tool Kit is a comprehensive guide through the commissioning process: selecting a commissioning agent, drafting contracts, developing and carrying out commissioning plans, and managing commissioning agents and contractors. Included are sample RFPs for design and commissioning agent services, model commissioning specifications, model commissioning plans for the design and construction phases, checklists for contractors who are responsible for verifying equipment operation, procedures for testing and documenting selected equipment, procedures for commissioning tune-ups of existing equipment, tips for project managers on managing the commissioning process and a directory of firms providing commissioning services.

Energy Management Control Systems

Most likely, an energy management control system (EMCS) will be installed in any new facility. Plan to attend any training classes offered to the maintenance and operations staff. Consider video taping the sessions to provide orientation and training for new staff. An EMCS is a powerful tool in the effort to save energy. In some cases, it can also provide historical monitoring functions. This can be useful when attempting to diagnose problems such as a demand spike on an electric bill.

To provide historical monitoring or "trend logs" of equipment performance or space temperature measurements, the EMCS needs to be programmed. For example, you could program the EMCS to give you temperature readings every minute in a particular room. Because an EMCS typically has a maximum number of trend points, it would save only a few days worth of information. If you reprogrammed that to every 10 minutes, you may be able to get a trend log of a whole month. You could also trend the "on" and "off" cycles of equipment.

Many EMCSs also have electric demand shedding capabilities. This is typically accomplished in two ways: 1) by prioritizing loads (e.g. an electric domestic hot water tank could be shed first when the predetermined maximum load is reached), and 2) by duty cycling equipment (e.g. turning HVAC equipment on for only a few minutes over a one-hour period. This "on" period is rotated from one piece of equipment to another.)

Refer to **Chapter 3** for information on demand and other utility charges.

If a facility has a high demand charge (some are greater than $6/kW/month), different load-shedding strategies can provide substantial savings. Reducing the demand by 20 kW each month, at the rate stated above, would provide an annual savings of $1,440. If this could be done at 20 facilities the annual savings from demand shedding alone would be $28,880!

Think Long Term

Proper training and other commissioning efforts are often minimized or eliminated in an effort to save construction costs, time or both. This way of thinking is a formula for disaster for the maintenance and operations staff. New construction can be an excellent opportunity for the Resource Conservation Manager to enhance the process.