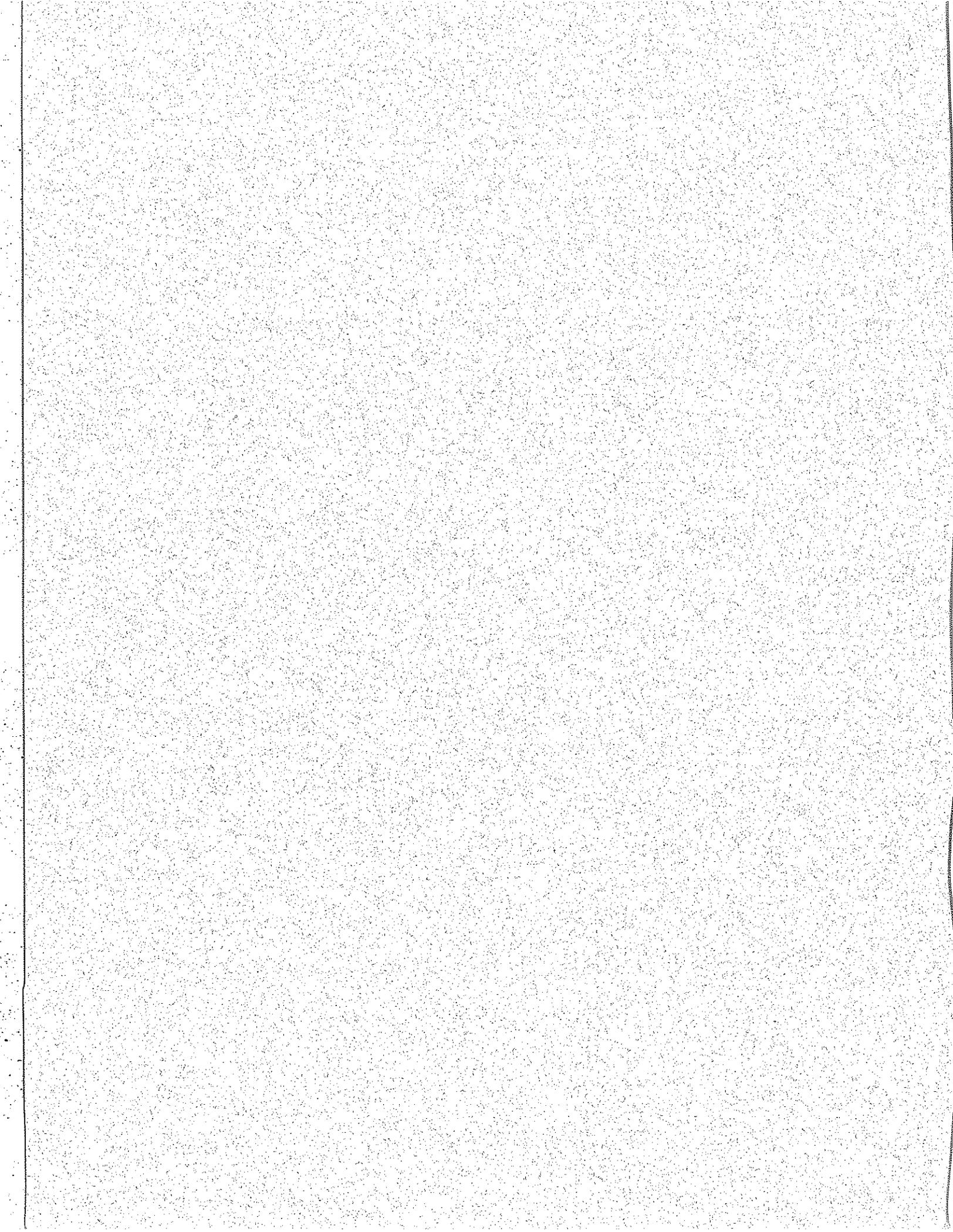


Nebraska Public Buildings Energy Program

Nebraska Public Buildings
Energy Program Task Force Report



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FOREWORD

Because of today's relatively low energy costs, Nebraskans are not as concerned about energy conservation as they have been in the past. They are, however, concerned about those things which energy provides, such as heating, cooling, and lighting for their homes. Public building operators are also concerned about heating, cooling, and lighting for their facilities. Energy efficiency and conservation improvements can lower the cost of public building operations and thereby reduce tax burdens. This report by the Nebraska Energy Office identifies cost-effective, energy efficiency opportunities for state, local, and nonprofit buildings in the state.

It was once thought that in order for our economy to grow, energy use must grow too. Economists and forecasters believed our energy use would double during the 1970s to keep pace with a growing economy. Indeed, most experts believed reductions in energy use could only be achieved by a massive social reordering. However, the oil shortages and accompanying price increases of the 1970s caused Americans to do something the experts thought impossible—they conserved energy—so much, in fact, that although our economy continued to grow, our total energy consumption leveled off in 1979. And in 1980, total energy consumption actually declined. Since 1983, however, total energy consumption has been slowly increasing.

The changes in society which caused the decline in energy use went largely unnoticed. At the University of Nebraska, for example, an energy efficiency program begun in 1979 has lowered the university's energy needs by 25%, saving nearly \$2 million each year. Other public building managers can benefit from the university's experience.

Energy efficiency is an economic opportunity. To capture that opportunity, we must focus on how intelligently we use our energy resources. For example, of every dollar a Nebraskan spends for energy, 20 cents goes to in-state suppliers, while 80 cents flows out of the state without creating a job, or encouraging economic expansion. And Nebraskans spent \$2.6 billion on energy last year. State government alone spent \$24 million. The University spent another \$14 million.

This report identifies a comprehensive range of program options for energy efficiency improvements in public buildings. Implementation of any of the options could help Nebraska reduce energy use and lower energy costs in our public buildings.

I would like to thank the members of the Nebraska Public Buildings Energy Program Task Force for their participation in assisting the Energy Office in the preparation of this report. Their insights into the operation of the public sector provided the information from which these program options were developed. Their work ensured the development of program options which are cost-effective and workable. I would also like to thank the consultants from Technical Development Corporation of Boston and Pacific Energy Associates of Portland for their research throughout the project and for writing the report. Finally, I would like to thank the staff of the Energy Office for coordinating the work of the task force.

Gary Rex,
Director
Nebraska Energy Office

EXECUTIVE SUMMARY

A significant potential exists to save energy in Nebraska's public buildings. Although Nebraska enjoys favorable energy prices compared to the rest of the nation, the Nebraska Public Buildings Energy Program Task Force found that improvements in public buildings to reduce energy use is a sound investment of public dollars.

The task force also found that most public and institutional sectors do not have the resources required to develop and carry out successful energy efficiency programs. The goal of the task force was to identify programs and financing options that would make public buildings more efficient and reduce their operating costs. The task force looked at schools, hospitals, state agencies, state colleges, counties, municipalities, nursing homes, the university, private colleges and technical community colleges.

In each sector, the task force examined:

- the building inventory
- energy consumption and cost patterns
- energy conservation opportunities
- currently available financing resources
- barriers to implementing energy improvements

PROGRAM OPTIONS

The sectors examined by the task force are divided into three groups—state government, local jurisdictions and private nonprofits. In all three areas, the task force found that facilities managers would benefit from additional training in energy management. Therefore, the report identifies an energy management program as a major component for each sector.

STATE GOVERNMENT

State government includes the state agencies, state colleges and the University of Nebraska. The report identifies an energy management program and two financing options:

Energy Team

Cost: \$150,000

Administering Agency: 309 Task Force

Recommended Funding Source: Oil overcharge funds

Expected Savings: \$400,000 annually

Program Description: The Energy Team, consisting of two to three professionals, would assist managers in state agencies and state colleges in managing energy use and cost. The program would standardize energy consumption and cost monitoring, set up education and training programs for facilities managers, perform energy audits and assist in establishing necessary budgeting procedures.

Revolving Loan Fund

Cost: \$5.5 million

Administering Agency: 309 Task Force

Recommended Funding Source: General Fund appropriations

Expected Savings: \$13.7 million over ten years

Program Description: The program would provide financing for major energy improvements in 60-75 large facilities. The loans would be advanced without interest and have a maturity of five years. The energy improvements financed would have a payback of 4.5 years or less so the loan repayments would be made out of energy savings. The loan fund would operate for five years and then agencies would repay their loans directly into the General Fund.

Nebraska Energy Corporation

Cost: \$13.02 million

Administering Agency: 309 Task Force and Board of Directors

Recommended Funding Source: Proceeds of bond issue

Expected Savings: \$1.6 million annually after six years

Program Description: The program would create a nonprofit corporation to finance energy improvements through revenue bonds. Bonds would be repaid through lease purchase agreements between the corporation and the state agencies. Lease payment funds would come from annual appropriations. However, the program would be structured so the energy savings generated from the projects would cover the cost of the lease payments. The corporation could finance \$8 million worth of projects from a \$13.02 million bond issue. Legislative approval would be required. The state colleges and the university could utilize their facilities corporations in the same manner but at less cost to administer.

LOCAL JURISDICTIONS

Local jurisdictions include cities, counties, K-12 schools and technical community colleges. The report identifies an energy management program and three financing options:

Energy Circuit Rider

Cost: \$400,000 (two-year pilot project)

Administering Agency: Community colleges and Nebraska Energy Office

Recommended Funding Source: Oil overcharge funds

Program Description: Based at community colleges, this program would provide two energy experts who would assist local jurisdictions in energy management, education, training and energy audits. They would also provide technical assistance in financing and developing energy projects. The cost of the Energy Circuit Rider's services would be split between the local jurisdiction and oil overcharge funds. The program is expected to be self-sustaining after two years.

Revolving Loan Fund

Recommended Funding Source: Oil overcharge funds

Program Description: The task force found local officials would take advantage of a low-interest revolving loan fund. This could be set up in a variety of different ways. Some members of the task force recommended using the Nebraska Energy Efficiency School Loan Program as a model.

Bonding Authority

Local jurisdictions could utilize a bond corporation similar to the Nebraska Energy Corporation recommended for state government. Alternatively, local jurisdictions could utilize a bond pool mechanism which would allow local governments to pool together and issue bonds for a specific purpose. Legislative approval would be required.

Increased Funding of the Institutional Conservation Program

Recommended Funding Source: Oil overcharge funds

Program Description: The Institutional Conservation Program (ICP) is a federal program offering grants on a 50-50 matching basis. ICP, as originally designed, can finance energy improvements in local government buildings. However, this portion of the program was never funded by the federal government. The state could increase the amount of funds available through ICP and open the application process to municipal and county governments.

PRIVATE NONPROFITS

This category includes hospitals, nursing homes and private colleges. The report recommends including these institutions in the Energy Circuit Rider Program designed for local jurisdictions to

enhance their energy management skills. They could also participate in a revolving loan fund or the increased funding for ICP. One other option was developed by the task force for the private colleges. It is described below:

Nebraska Educational Facilities Authority (NEFA)

Cost: Paid through bond proceeds

Administering Agency: NEFA and the Nebraska Energy Office

Program Description: NEFA is interested in issuing a dedicated bond pool for energy projects in private colleges. The Nebraska Energy Office would assist in contacting the colleges and assessing the amount and types of projects which would qualify for this kind of financing. Projects would need a payback sufficient to cover the cost of the bonds.

CONCLUSION

Even at today's low energy prices, energy efficiency is a sound investment, costing much less than the development of new energy sources. This report identifies program and financing options to assist public buildings achieve their energy efficiency potential in a cost-effective manner.

INTRODUCTION

The Nebraska Public Buildings Energy Program Task Force was established to identify options and submit recommendations to the Nebraska Energy Office on assisting public and institutional building sectors reduce energy costs in their facilities. The task force is comprised of representatives of municipalities, counties, hospitals, K-12 schools, higher education and state government; legal, financial and engineering professionals familiar with the public sector; and three state senators. The options identified by the task force will reduce the operating costs of public buildings. Reduced operating costs may result in lower taxes or more money available for services.

This report summarizes the task force's findings regarding the need for energy efficiency programs, and their recommendations regarding the kinds of program approaches most likely to be cost-effective.

SUMMARY OF FINDINGS

THE OPPORTUNITY

Nebraska enjoys favorable energy prices compared to the rest of the nation. However, evidence from many sources indicates that capital improvements to reduce energy expenditures in public and nonprofit facilities constitute an excellent investment of public dollars. Many public facilities use enormous amounts of energy. Hospitals, prisons and air conditioned office buildings are among the most energy-intensive buildings.

Most public facilities were constructed prior to the era of high energy prices. Thus, the original designs are not energy efficient. In addition, energy prices are not uniformly low across the state or among different facilities. Many smaller government units are paying prices as high as 6 cents to 8 cents per kilowatt hour for electricity. Gas prices as high as \$4.50 per thousand cubic feet are by no means uncommon. These kinds of energy prices would provide a healthy margin of return on investments in energy efficiency improvements in energy-intensive buildings in Nebraska.

Comprehensive engineering studies of schools and hospitals carried out under federal programs indicate that energy costs can be reduced substantially in these buildings. The audits show that

the costs of the greater portion of these projects can be recovered through energy savings over a period of five years or less.

The University of Nebraska provides a prime example of the kinds of benefits that a systematic and consistent program of maintenance and well-targeted capital investments can achieve. The university initiated an aggressive energy management program in 1979, employing a two-person staff in the central facilities administration. This staff supervised the development of an energy and cost monitoring program, operation and maintenance routines throughout the university system and a program of capital investments financed through a variety of sources. Through these efforts, the university has reduced energy consumption per square foot of occupied space by 25-30 percent. The value of these energy savings at today's prices is nearly \$2 million per year.

A review of energy management programs in Nebraska and other states indicates that three components are essential to success:

Management

Facility administrators must be held accountable for energy consumption and costs in the buildings they manage. They must also have access to the specialized technical services and training required to mount a successful energy management and capital investment program.

Financial Resources

Capital improvements to reduce energy costs represent an investment with measurable returns to the facility. In order to make these investments, however, the funds must be available in appropriate amounts and at reasonable costs. Moreover, management and monitoring functions must be securely funded over the life of the capital improvements in order to realize their full financial value.

Leadership

Managers of public and nonprofit organizations face many demands for their time and for the financial resources available to them. Inevitably, these demands outstrip the resources. The leaders of these organizations — elected officials and appointed executives — must therefore, identify energy cost reductions as a priority if management and financial resources are to be applied to this set of opportunities.

THE PROBLEM

Most public sector and nonprofit organizations do not have the management resources required to develop and carry out successful energy efficiency programs. Many of Nebraska's cities, counties, school districts, hospitals and nursing homes are simply too small to bear the costs of appropriate staff. Other, larger organizations, such as the major property-managing agencies of state government, were unable to develop energy management capabilities under the fiscally austere conditions of the past few years. Thus, throughout the public and nonprofit sectors, new initiatives are needed to strengthen the energy management capabilities of the constituent organizations, or to provide such services directly.

The availability of capital funding for energy improvements varies from sector to sector within the group of institutions examined by the task force. Public schools, for example, have access to grant and no-interest loan programs to finance energy efficiency improvements. Furthermore, the Legislature created the Task Force for Building Renewal to administer appropriations for capital improvements to improve energy efficiency in state buildings, among other purposes. However, this program has received very little funding in relation to the requests from operating agencies for appropriations. Other jurisdictions are not eligible for such programs.

Almost every government jurisdiction can borrow through a variety of mechanisms to finance capital improvements. However, because these jurisdictions generally do not have the technical capability to identify and evaluate energy conservation investment opportunities, they seldom make use of these debt financing resources.

Elected officials and nonprofit executives are generally unaware of the potential benefits of investments in energy efficiency. Moreover, they have many demands on their time and on the resources at their command. Facilities management simply is not a high priority. Each of the programs recommended in this report contains a marketing component to educate decision-makers to the benefits and the practicabilities of achieving energy efficiencies.

ORGANIZATION OF THE REPORT

The organizations examined by the task force were originally divided into four sectors:

- **State agencies**
- **University of Nebraska and state colleges**
- **K-12 schools, counties, municipalities and community colleges**
- **Private colleges, hospitals and nursing homes**

As the task force's work evolved, these four sectors were consolidated into two groups. The first consists of the state agencies, the University of Nebraska and the State College System. The second consists of the local jurisdictions and nonprofits.

The state-owned facilities are managed by a relatively small number of decision-makers managing a large number of facilities. With some variations, these organizations are subject to the state legislative budgeting and purchasing system. The second group is managed by a large number of geographically dispersed decision-makers, each responsible for a relatively small number of facilities. With some notable exceptions, these smaller organizations have more restricted access than the state organizations to staff and financial resources.

In developing its recommendations, the task force attempted to identify management and financial assistance programs appropriate to these two groups. The results of the work of the task force is described in the body of the report. Each section begins with a profile of the sector. This includes an inventory of facilities, opportunities for energy improvements and access to existing programs and financing resources. Program options are then described for each building sector. Details include recommendations for staffing and institutional setting and estimated first year costs.

STATE GOVERNMENT FACILITIES

State Agencies • University of Nebraska
State College System

INTRODUCTION

The inventory of state agency buildings represents the largest pool of unexploited energy efficiency opportunities among public and nonprofit institutional buildings in Nebraska. That inventory includes 88 buildings over 20,000 square feet. Many of these buildings — air conditioned office towers, 24-hour residential facilities and hospitals — are very energy-intensive and are likely to offer numerous opportunities for cost-effective investments in energy efficiency. State agencies have not established the management apparatus needed to identify and exploit these opportunities. Nor has the Legislature funded, to any great extent, the energy efficiency projects that have been identified. Budget requests for capital projects to improve energy efficiency have regularly been turned down at either the executive or legislative level. Renovation funds from the Task Force For Building Renewal (309 Task Force) are vastly inadequate for the backlog of cost-effective projects.

These opportunities and challenges indicate the need for a two-part approach that incorporates programmatic and financing options:

Energy Management Program

The Energy Management Program is a centralized program to provide energy management expertise to state agencies and the state colleges.

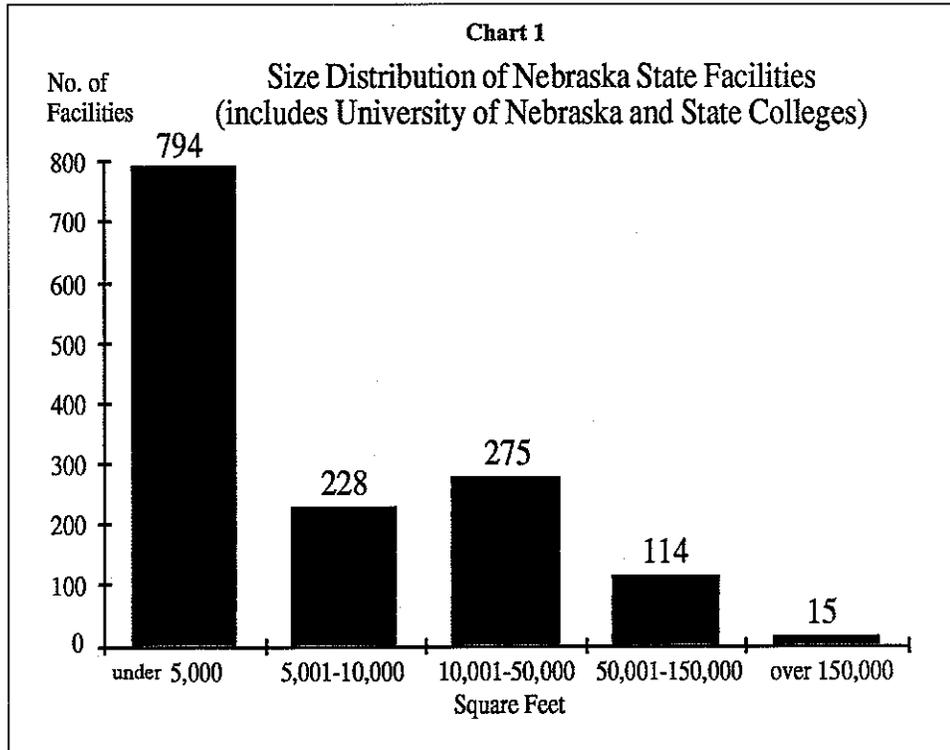
Financing Program Options

- A revolving loan fund capitalized by appropriations to finance the capital and engineering costs of major energy projects.
- A private nonprofit authority created by the Legislature to issue revenue bonds to finance energy efficiency projects in state agencies.

PROFILE OF STATE GOVERNMENT FACILITIES

THE BUILDING INVENTORY

State agencies occupy some 909 buildings with 12 million square feet. Chart 1 shows over half of these are smaller than 5,000 square feet.



Of state facilities 10,000 square feet or larger, 171 buildings are occupied by the state agencies. Administrative responsibility for state buildings over 10,000 square feet is shown in Table 1 on the following page.

Table 1
Administrative Responsibility for Nebraska State Facilities by Size

Administrative Unit	10,000-20,000 Sq.Ft.	20,000-49,000 Sq.Ft.	50,000+ Sq.Ft.
Law Enforcement			1
Historical Society	1		2
Agriculture	1	3	2
Roads	7	1	3
Corrections	17	9	8
Education	5	9	
Public Institutions	16	22	12
State Colleges	9	30	28
University	67	61	81
Social Services	3	1	
Military	26	10	
Labor	1	2	
Economic Development		1	
Game and Parks	6	2	
TOTAL	159	151	137

TYPICAL ENERGY SAVING OPPORTUNITIES

Buildings under 5,000 square feet are likely to contain relatively simple heating and cooling systems. Most energy saving opportunities would lie in increasing insulation, improved manual control of the heating systems and improved maintenance.

Buildings over 10,000 square feet are likely to have fairly complex heating and cooling systems and offer a broader variety of energy saving opportunities. Including the colleges and the university, there are 15 state building campuses which are heated by central boiler plants which offer additional energy saving opportunities.

ENERGY CONSUMPTION AND COST PATTERNS

There is virtually no centrally available data on energy consumption in state agency buildings. Between 1978 and 1983, the Nebraska Energy Office undertook walk-through audits of over 900 buildings including the university and state college facilities. The task force consultants inspected a number of these audits and found that they are out-of-date and inconclusive as to the energy saving opportunities available in the buildings.

The best information available to the task force on energy consumption in state facilities comes from internal records kept by the Department of Public Institutions (DPI) on six of its campus facilities. This data is presented in Tables 2 and 3. It is clear from these tables that energy consumption, costs and unit costs vary a great deal from one facility to another. For example, energy consumption per square foot varies from 148,000 BTUs (British Thermal Units) to 293,000 BTUs. For public care facilities in Nebraska, a

level of 160,000-180,000 is considered moderately efficient. Energy costs per square foot vary from \$0.55 to \$1.42.

Table 2
Department of Public Institutions Facilities
Energy Use and Costs, Fiscal Year 1986-1987

Facility	Size (Sq.Ft.)	Fuel		Electric		Total Cost	BTU/ Sq. Ft.	Cost/ Sq. Ft.
		Heating Value (mmBTU)*	Cost (\$)	Use (kwh)*	Cost (\$)			
Beatrice	548,024	97,994	253,006	7,820,890	103,151	356,157	227,506	\$0.65
Hastings	526,458	71,294	245,413	4,606,679	61,683	307,096	165,277	0.58
Lincoln	411,163	43,500	106,181	5,106,464	120,214	226,395	148,172	0.55
Norfolk	320,612	60,992	198,807	3,034,439	60,625	259,432	220,655	0.81
Grand Island	242,355	35,829	110,914	2,298,050	115,347	226,261	180,189	0.93
Omaha	111,600	28,050	93,348	1,379,614	65,056	158,404	293,524	\$1.42

* mmBTU is 1 million BTUs. One Barrel of residual fuel oil has a heating value of 6.29 million BTUs.
 * kwh is kilowatt hour.

Table 3
Department of Public Institutions Facilities
Variation in Unit Energy Costs, Fiscal Year 1986-1987

Facility	Electricity Cost/kwh*	Fuel Cost/mmBTU*
Beatrice	\$.0132	\$2.58
Hastings	.0134	3.44
Lincoln	.0235	2.44
Norfolk	.0200	3.26
Grand Island	.0502	3.10
Omaha	.0471	3.33

As Compared to:

All Nebraska Commercial (1985) \$0.0582 \$4.27

* mmBTU is 1 million BTUs. One barrel of residual fuel oil has a heating value of 6.29 million BTUs.
 * kwh is kilowatt hour.

Similarly, the data show large variations in the unit cost of energy at the different facilities. Beatrice State Developmental Center, which has the largest energy consumption, receives much of its power from the Western Area Power Administration, and has rates of \$0.0132/kwh (kilowatt hour) for electricity and \$2.58/mmBTU (one million British Thermal Units) for gas. However, prices ranged as high as \$0.05/kwh and \$3.44/mmBTU at other facilities. These higher prices contain enough margin to repay the costs of energy savings improvements.

ENERGY CONSERVATION OPPORTUNITIES

As mentioned above, there are no recent comprehensive audits of state facilities. Thus, to estimate the potential costs and benefits of

energy projects in state facilities, the task force consultants applied the results of energy audits of similar Nebraska buildings to the data on the six DPI facilities.

The consultants chose very conservative assumptions which almost certainly under-estimate the net benefits of potential projects to the state. These assumptions are as follows:

- Electric and thermal energy consumption can both be reduced by ten percent through a combination of capital and operating improvements.
- Payback calculations were factored to reflect differences in price between the prevailing rates and those paid by government facilities.
- Using a compilation of results of energy audits on Nebraska buildings prepared by Maniktala Associates, the engineering consultant to the task force, it was determined that the improvements needed to reduce consumption by ten percent would need a payback of three years if energy savings were valued at prevailing commercial prices. As Table 4 demonstrates, these prices are considerably higher than those paid by state facilities.
- If state government borrowed to finance capital improvements, it could do so at a 15 year maturity at an interest rate of ten percent. This is considerably higher than the current yield of highly-rated municipal debt at comparable maturities.

Table 4 shows the results of these estimations. Paybacks on capital improvements range from 3.8 years to 7.4 years. The longer paybacks are, of course, associated with lower energy prices. If the projects were financed under the terms described above, all would produce positive cash flows to the state.

Table 4
Department of Public Institutions Facilities
Estimates of Cost Effectiveness in Energy Improvements

Facility	Annual Fuel Savings	Annual Electric Savings	Total Savings	Project Costs	Payback Period (years)	Net Annual Cash if Financed
Beatrice	\$25,300	\$10,315	\$35,615	\$262,126	7.36	\$1,152
Hastings	24,541	6,168	30,709	171,754	5.59	8,128
Lincoln	10,618	12,021	22,639	131,283	5.80	5,379
Norfolk	19,881	6,062	25,943	131,042	5.05	8,714
Grand Island	11,091	11,535	22,626	85,951	3.80	11,326
Omaha	9,335	6,506	15,841	60,028	3.78	7,949

- Assumptions:
- Improvements to lighting and HVAC (Heating, Ventilating and Air Conditioning) systems reduce electric and fuel computation by ten percent.
 - Improvements pay back in three years at average Nebraska energy prices. For comparison to government facility energy prices, see Table 2.
 - Financing available for 15 years at ten percent.

CURRENTLY AVAILABLE PROJECT FINANCING RESOURCES

Appropriations for Capital Projects

State agencies may submit major capital projects as separate line items in their capital budget requests. Alternatively, the agencies may seek funding for renovation projects through the 309 Task Force.

Interviews with facilities' officials of several state agencies that operate substantial properties reveal that capital budget requests for energy-related improvements have fared very poorly, as have requests for engineering studies to support such projects.

Furthermore, funds available through the 309 Task Force are extremely limited in relation to the level of requests. Agency requests in FY 87/88 totalled \$20.8 million. Of these, energy efficiency project requests amounted to \$9.8 million. By contrast, the entire 309 appropriation in FY 86/87 was \$2.46 million.

Bonding Authority, External Sources of Financing and Other Borrowing

Nebraska's Constitution prohibits direct obligation of the credit of the state for amounts over \$100,000. Therefore, state agencies cannot incur debt by bonding or through lease purchase or installment purchase agreements. Under special circumstances and for very specific objects, the state has borrowed from the public. For example, the state has purchased computers through lease purchase agreements with payments subject to appropriations. The new

Data Processing Center was financed through revenue bonds issued by a State Facilities Corporation established specifically for that purpose. The task force members found, however, that it is financially and politically infeasible to use these or similar mechanisms for energy conservation projects.

Performance Contracting

Performance contracting as a method of financing involves a negotiated payment stream out of energy savings. It is generally the most expensive type of financing because a third party, the energy service company (ESCO), is putting up the capital and assuming many of the risks of the project. Typically, ESCOs expect a 20 percent rate of return on investment after taxes.

The task force recommends that performance contracting not be considered as a financing option for capital energy efficiency projects in state facilities. In their opinion, corroborated by the consultants to the project, the cost of managing performance contracts outweighs the potential for savings. Also, the fact that many Nebraska state facilities have one master meter may prevent determining energy savings on buildings unless extensive and costly submetering was installed.

BARRIERS TO IMPLEMENTING ENERGY PROJECTS

Lack of Staff

Administrators at state agencies feel that they do not have the staff necessary to oversee a systematic approach to developing and implementing energy improvements.

Lack of Budget Incentive

Facilities administrators at state agencies report that they have little incentive to initiate and manage energy efficiency projects because they have no assurance that the agency will be able to "keep" any monetary savings that result. In other words, reductions in utility expenditures may simply be reflected in reductions of subsequent agency budgets.

Mismatch of Energy Consumption Records with Managerial Units

Many state buildings are located at facilities served by central heating plants and electric utility meters. At these facilities there is no submetering of buildings. Thus, there is no opportunity to monitor energy savings from specific improvements installed in individual buildings. Similarly, there are a number of instances in which facilities operated by one agency are heated and cooled by

plants operated by another agency. The State Capitol is a prime example. It is operated by the Department of Administrative Services, and its thermal energy is supplied by the university boiler plant. The purchase of this energy is compensated by interagency transfers based on an allocation formula. Efforts to save energy in the Capitol would result in a loss of revenue to the university.

Due, in part, to these conditions, officials report that there have been very few energy projects that take a comprehensive approach to a building or complex of buildings, either for maintenance or capital improvements. This situation is reflected by the size and nature of project requests to the 309 Task Force. Most of the energy requests in the recent round of funding were for isolated projects which would be pieces of a more comprehensive, building-oriented approach. The median amount of the requests was less than \$10,000. Given that there are buildings over 20,000 square feet in the state's inventory, this low figure suggests that energy-oriented capital programs have not been undertaken systematically.

PROGRAM AND FINANCING OPTIONS

THE ENERGY TEAM

Overview

The Energy Team would be set up as a program of the 309 Task Force designed to assist the managers of state agency and state college facilities in managing energy use and costs. This program could serve as the administrative foundation for any kind of project financing effort targeted to state facilities. The program consists of the following components:

- **Identification of Facility Energy Managers** The first essential step in any energy cost reduction effort is to identify the persons who will be responsible for controlling energy costs in individual facilities and complexes. The Energy Team will ensure that each major facility has an identified energy manager. The remaining functions of the Energy Team serves to support the facility energy managers and monitor their results.
- **Energy Monitoring System** This system will standardize energy consumption and cost monitoring and analysis procedures. Reports comparing energy use and costs for individual facilities will be provided to facilities' managers and agency administrators.

Facilities' managers will be held accountable for achieving mutually agreed-upon energy efficiency goals.

- **Education and Training** Facility energy managers will be trained in the proper use of the energy monitoring system and in operation and maintenance procedures that will save energy.
- **Technical Energy Audits** Audits provide guidance and support for larger capital investments by the agencies including detailed technical audits and assistance in applying for access to financing. Audits will be performed by professional engineers under contract to the Energy Team.
- **Management Budget Incentive** The program would establish an administrative budget procedure to allow state agencies to retain some portion of the energy costs saved as a result of their efforts. The Energy Team will direct the efforts to develop a mechanism to structure the incentive and measure energy savings.

Facilities and Projects Targeted

State agency and state college facilities will be served by the Energy Team. The university currently has an excellent program in place. Comprehensive energy efficiency improvements at facilities will be targeted. Training of facilities' personnel will include identification and implementation of low cost energy conservation opportunities, as well as higher cost capital improvement projects to increase energy efficiency.

Program Operations

Staffing

The most appropriate administrative body for the Energy Team is the 309 Task Force which already performs services in support of energy efficiency capital improvements. Given the magnitude of the 309 Task Force's current agenda, it is probable that the Energy Team will require its own staff in order to be effective. Some of the Energy Team staff may be reassigned from other agencies. The consensus from interviews with a number of energy management offices in other states was that, for a state with Nebraska's building stock, a staff of two to three professionals with a part-time support person would be adequate. The staff will consist of a director with both program management and technical skills. The second professional must be an engineer. The third, optional professional, will be an individual with program administration and planning skills.

Training

The Energy Team will arrange for periodic training of state facilities personnel on common topics in energy efficient facilities' management such as steam trap maintenance and boiler maintenance.

Energy Audits

The Energy Team will establish a priority list of facilities to receive audits from professional engineers. The priority list will, of course, be coordinated with any project financing program developed for state facilities. The technical staff of the Energy Team will, if requested, assist facilities managers in selecting engineering firms to perform the audits and will review audit reports for accuracy and completeness.

Financing

The Energy Team will provide staff for and administer the revolving loan fund, if that financing option is implemented. If the Nebraska Energy Corporation is created, Energy Team staff will work in tandem with the corporation staff to bring energy projects to fruition.

Marketing

Marketing the availability of the Energy Team's services will be the responsibility of the Energy Team staff with substantial assistance from the Nebraska Energy Office. Interviews with officials in Nebraska and other states indicate that a strong executive and legislative policy statement on energy efficiency in state facilities is likely to be the most effective marketing tool.

Costs and Sources of Funding

Staff and administrative costs are estimated at \$150,000 per year. Energy audits for all state agency and college buildings over 20,000 square feet would cost approximately \$1.5 million. These expenditures would be rolled into project finances.

First year costs could be covered by either legislative appropriations or an allocation of oil overcharge funds. Under conservative assumptions, this program should generate agency utility savings from improved maintenance procedures equal to its cost. More importantly, it will establish the administrative mechanism and incentive needed to make responsible and effective use of any project financing that may be developed.

Administering Agency

Interviews with task force members and state agency administrators suggest that this program be administered by the 309 Task

Force which already undertakes some of the program's functions, although on a small scale. The 309 Task Force also has considerable respect from state agency administrators. Finally, the 309 Task Force is regarded as "neutral" by representatives of the state agencies, the university and the state colleges.

Comments from Agency Administrators

In recent interviews with state agency administrators (Departments of Public Institutions, Corrections and Administrative Services), the concept of providing centralized energy management and technical assistance was essential. Administrators see a critical need for all of the functions of the Energy Team given the lack of staff resources to plan and implement major energy projects. They see the role of the Energy Team as developing agency energy monitoring systems, educating and training facilities personnel and guiding and supporting larger capital investments.

REVOLVING LOAN FUND

Overview

This program would use appropriations to establish a revolving loan fund to finance major energy improvement projects in state agency facilities. The loans will finance both the capital costs of the projects and the costs of energy audits carried out under the Energy Team program described earlier. The 309 Task Force will set priorities among projects to be financed, oversee implementation and authorize disbursements from the loan fund.

Facilities and Projects Targeted

State agency and state college facilities, as well as University of Nebraska facilities, would be eligible for loans from the fund. Comprehensive major energy efficiency treatments in the larger buildings (i.e., those over 20,000 square feet) will be targeted. These are likely to be improvements to HVAC (Heating, Ventilating and Air Conditioning) and control systems which have relatively short paybacks and require substantial initial investments. For purposes of modeling the financial operations of the program, average project costs are assumed to be between \$100,000 and \$200,000.

Program Operations and Marketing

This program incorporates the following basic principles:

- The maturities of the loans could be fairly short in order for the fund to recover outlays quickly enough to relend

the funds. Alternatively, the loan terms could be long (i.e., eight years for a four year payback) to allow agencies to retain some of the savings.

- The improvements financed must pay for themselves over a period that is shorter than the maturities of the loans. Otherwise, the net cash flow to the state will be negative.

Loans

Loans would have a maturity of five years and would be advanced without interest. Agencies will be able to borrow to finance improvements estimated by energy audits to have payback periods of 4.5 years or less. Thus, loan payments will be made out of energy savings.

Financing Mechanism

The financing instrument would be an interagency agreement between the administering agency (309 Task Force) and the agency using the loan. The agreement would specify the improvements to be financed, the amount of the loan and the terms of repayment. The loan must have a longer maturity than the payback period of the building improvements financed.

Program Operation

The sequence of steps in developing a project would be as follows:

1. To apply for a loan, an agency would first have to contract for an energy audit. The program could advance the cost of the audit if the agency agrees to implement all improvements with the threshold payback. The cost of the audit would then be rolled into the loan.
2. Assuming the Energy Team program is implemented, the Energy Team staff engineer would review the audit and the agency's application for technical reasonableness.
3. Once audits are reviewed, the 309 Task Force would set priorities on projects and complete a budget request for the projects to be funded that year.
4. For the projects approved, the 309 Task Force would oversee implementation and authorize disbursement of the funds.
5. Once funds are disbursed, the Energy Team staff would monitor energy savings and compute the various budget transactions necessary to repay the loan.

Model of the Program

The level of potential energy cost savings depends on the amount of money in the fund, the project acceptance criteria, the terms of the loans and technical factors at the individual sites. To gain an understanding of the volumes of transactions that could be financed with a given level of funding and the net benefits to the state, a model of the operations of the loan fund is shown in Table 6 with the assumptions shown in Table 5.

Table 5.		
Assumptions for Model of Revolving Loan Program		
Characteristics of Typical Building		
Size:	75,000 sq. ft.	
Energy Use/Sq. Ft.:	\$1.75 or \$131,250/year	
Energy Savings:	\$26,250	
(20% of energy costs/year through cost effective improvements)		
Payback:	4.4 years	
Characteristics of Typical Project		
Costs:	Capital —	\$114,750
	Audit —	7,500
	Total —	\$122,250
		Annual debt payments: \$24,450

**Table 6
Model of Revolving Loan Fund**

Year	1	2	3	4	5	6	7	8	9	10
Cash Position Of Loan Fund										
Amount Lent	1,833,750	1,833,750	1,833,750	1,833,750	1,833,750					
Amount Paid Back										
Round 1		366,750	366,750	366,750	366,750	366,750				
Round 2			366,750	366,750	366,750	366,750	366,750			
Round 3				366,750	366,750	366,750	366,750	366,750		
Round 4					366,750	366,750	366,750	366,750	366,750	
Round 5						366,750	366,750	366,750	366,750	366,750
TOTAL		366,750	733,500	1,100,250	1,467,000	1,833,750	1,467,000	1,100,250	733,500	366,750
Net Cash Out	-1,833,750	-1,467,000	-1,100,250	-733,500	-366,750	1,833,750	1,467,000	1,100,250	733,500	366,750
Cumulative Cash										
	-1,833,750	-3,300,750	-4,401,000	-5,134,500	-5,501,250	-3,667,500	-2,200,500	-1,100,250	-366,750	0
Energy Savings										
Round 1		393,750	393,750	393,750	393,750	393,750	393,750	393,750	393,750	393,750
Round 2			393,750	393,750	393,750	393,750	393,750	393,750	393,750	393,750
Round 3				393,750	393,750	393,750	393,750	393,750	393,750	393,750
Round 4					393,750	393,750	393,750	393,750	393,750	393,750
Round 5						393,750	393,750	393,750	393,750	393,750
TOTAL		393,750	787,500	1,181,250	1,575,000	1,968,750	1,968,750	1,968,750	1,968,750	1,968,750
Net Cash To State	-1,833,570	-1,073,250	-312,750	447,750	1,208,250	3,802,500	3,435,750	3,069,000	2,702,250	2,335,500
Cum. Cash To State	-1,833,750	-2,907,000	-3,219,750	-2,772,000	-1,563,750	2,238,750	5,674,500	8,743,500	11,445,750	13,781,250

The model shows that with an initial investment of \$5.5 million, major improvements to 60-75 large facilities can be financed. The total value of these improvements is \$9.2 million. The loan fund will operate for only five years. After that, the agencies will repay their loans to the General Fund.

Taking energy savings into account, net cash to the state will become positive in year four. The cumulative cash balance will become positive in year six. By the end of year ten, when all loan funds are recovered, the state will have accumulated over \$13.7 million in net energy savings. Moreover, since the technical programs at each site will be fairly comprehensive, the energy savings are likely to persist for some time.

Program Marketing

The loan fund will be marketed by the Energy Team with the assistance of the Nebraska Energy Office.

Costs and Sources of Funding

The administrative costs of this program should be fairly modest. It is likely that the 309 Task Force would require another staff person to run the loan fund program. If the Energy Team program is implemented, this staff person would represent the only "marginal" costs of the program, aside from interest foregone on the loan fund. First year additional staff costs of this program are, therefore, estimated at \$50,000. Initial loan funds of \$5.5 million will begin the revolving loan process. A General Fund appropriation is the assumed funding source.

THE NEBRASKA ENERGY CORPORATION

Overview

This option sets up a financing mechanism that is an alternative to the revolving loan fund described in the previous section. The program will create a nonprofit organization, the Nebraska Energy Corporation, to finance, through revenue bonds, the lease purchase of energy improvements in state owned or leased facilities. Loan repayments by state agencies will be made from the utility cost savings from the improvements. Loan repayment funds will come from annual appropriations.

The Nebraska Energy Corporation will function as a nonprofit energy service company. As such, it will design, finance and implement projects. Loan repayments from the agencies will cover 100 percent of the costs of these activities as well as the administrative costs of the corporation.

Facilities and Projects Targeted

All state agency facilities as well as the facilities of the University of Nebraska and the state colleges will be eligible for the program. The corporation will, however, establish priorities and phase the participation of state facilities.

Comprehensive energy efficiency treatments of facilities will be preferred. Like the revolving loan fund program, this program will target primarily improvements to HVAC and control systems, which have relatively short paybacks and require substantial initial investments. Average project costs are estimated at between \$100,000 and \$200,000.

Program Operations and Marketing

The Corporation Structure

The corporation will be a nonprofit organization governed by a board of directors appointed by the governor and consisting of state officials. This structure allows matters of priority and policy of this public purpose organization to be decided by appropriate state officials.

The day-to-day affairs of the corporation will be managed by officers elected by the board of directors from among the lead state agency. Staff of the corporation will be full-time employees of the state whose salaries and support expenses are paid by the corporation from the proceeds of the bond issue.

Project Financing

Energy projects will be financed by the corporation from the proceeds of bond issues, which will be structured to finance specific energy projects that are identified in advance. Because proceeds of the bond issue must finance the corporation costs as well as the costs of issuance, the total amount of an issue intended to finance \$8 million worth of energy improvements would be approximately \$13.02 million, based on the experience of the Iowa Energy Facilities Corporation. The costs break down as follows:

Cost of projects	\$ 8,160,000
Capitalized interest at average rates of 7.1%	2,370,000
Self-insurance through a 10% reserve fund	1,220,000
Capital administrative expenses	900,000
Underwriting discount	210,000
Costs of issuances	<u>\$160,000</u>
TOTAL	\$13,020,000

State Agency Participation

State agency participation would be voluntary. Once interest is expressed, the corporation's consultants will conduct comprehensive engineering studies of facilities designated by the state agencies. The corporation will evaluate the engineering studies and determine which measures are eligible according to criteria which would include payback period. If the state agency decides not to borrow funds from the corporation for implementation of eligible projects, the agency must pay the entire costs of the engineering studies. In this way, the corporation will not incur costs that cannot be recovered from loan repayments. If the state agency decides to participate, it will borrow funds from the corporation. The loan agreement will be structured so that ownership of the im-

provements is retained by the corporation until all loan repayments have been made, whereupon the title to the improvements is transferred to the state.

Legislative Actions

The funds for loan repayments will come from annual appropriations by the Legislature. The specific amount for energy improvement loan repayments will be designated as a separate line item in the legislative appropriation for the participating state agency.

Legislative authorization is required for Nebraska state agencies to enter into the lease purchase agreements with the corporation and to use annual appropriations for loan repayments. The legislation will limit these new state agency capabilities to energy improvement projects.

Marketing

The Energy Team staff within the 309 Task Force will market the program with assistance from the Nebraska Energy Office. As with the Energy Team and the Revolving Loan Fund option, strong policy support from the governor and the Legislature will enhance marketing efforts.

Start-up Costs and Funding

The first year costs of staffing the corporation, over the costs of staffing the Energy Team, are estimated at \$80,000 for the additional professional and support employees. Initial engineering consulting fees must also be paid with start-up funds. Engineering consultants will be used to identify the pool of energy projects to be included in the first bond issue. Legal consulting fees will also be incurred to set up the corporation and structure the first bond issue. Total estimated first year costs for the program are estimated at \$700,000 assuming that the Energy Team program is approved and funded.

Funding Sources

Start-up funding could come from legislative appropriations. After start-up, all costs, including administration, will be covered from the proceeds of the bond issues. The first bond issue will allow recovery of some of these first-year costs.

State Benefits

During the first six years of the program, net savings to the state will be relatively small because avoided energy costs will be used to repay the bonds. Once the payments are made, however, the task force recommends that the state share energy savings with the

participating agencies to enable them to undertake additional energy efficiency projects. Assuming, for example, that improvements with payback periods up to five years are financed, investments totalling \$8 million will yield \$1.6 million annual utility cost savings over the useful life of the improvements.

Administering Agency

This program would be administered by the 309 Task Force using largely Energy Team personnel, if that program is approved.

Comments from Agency Administrators

The agency administrators interviewed consider that off-budget financing through a revolving loan fund, revenue bond issues or lease purchasing arrangement is necessary given the low level of funding through appropriations.

Administrators would consider the creation of centralized programs like the Energy Team and financing options like the Revolving Loan Fund or the Energy Corporation as strong signals to the importance of implementing energy efficiency projects.

However, the administrators also commented that allowing agencies to keep some share of the energy savings achieved, above the debt repayment, would provide a complete incentive system. The agency's share of savings would be restricted to investment in additional energy efficiency projects.

THE STATE COLLEGES AND THE UNIVERSITY OF NEBRASKA

INTRODUCTION

Although the State College System and the University of Nebraska are the principal managers of large buildings in state government, their experience in energy management and implementing energy efficiency projects has been very different.

The University of Nebraska operates an aggressive and systematic energy conservation program employing a two-person staff in the central facilities administration. The staff monitors and analyzes energy use and costs on a campus-wide basis and holds campus administrators accountable for energy usage in their facilities. Energy saving operating procedures have been implemented throughout the university system. Moreover, the university has undertaken capital improvements to building energy control systems and central campus energy plants totalling over \$8 million. These improvements have been financed primarily through federal matching grants and the 309 Task Force.

The results of this activity are impressive. Since 1981, the university has reduced its energy consumption per square foot by 25-30 percent. These efficiency improvements have resulted in nearly \$15.97 million in utility cost savings (budget utility costs less actual utility cost, FY 80-81 through FY 87-88).

In 1979, the university and the Budget Office agreed on budget language that allowed the university to retain funds allocated for utility payments, but not expended. Thus, the university has been able to use its utility savings to enhance educational programs, purchase fire and safety equipment and make improvements to the physical plant. Since 1981, the university has spent \$9.54 million of utility cost savings on additional equipment and energy projects. It is important to note that the university's energy program was developed with the full support of the board of regents and top management.

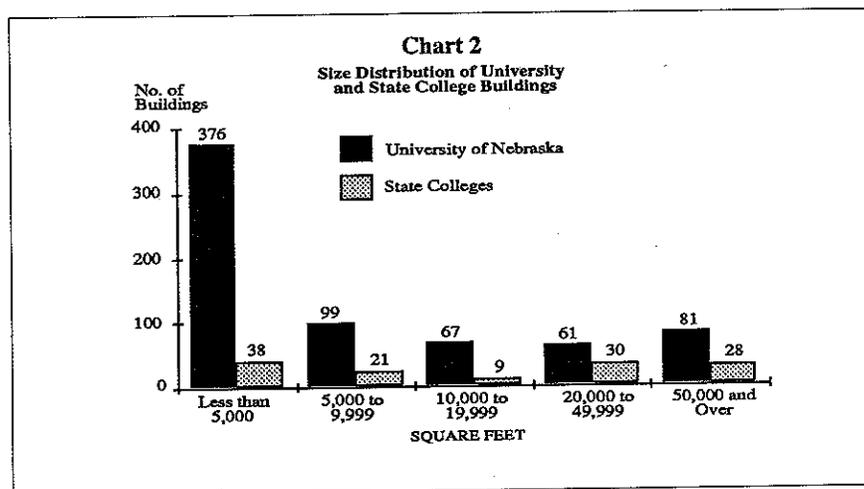
The state colleges have had a quite different experience. The colleges commissioned energy audits for each of the four campuses in 1980-81. However, the colleges have generally not had the resources to take advantage of the energy saving opportunities identified in the audits. The colleges do not have sufficient central facilities management staff to dedicate a position to energy management. Moreover, capital budget requests and applications to the 309 Task Force for engineering studies and capital improvements have not, for the most part, been funded.

The state colleges and the University of Nebraska, as state facilities, will participate in the programs outlined in the discussion of state facility programs. The Energy Team services will meet a critical need at the state colleges but will not serve the university which has a well-developed energy management capability. Both state college and University of Nebraska facilities will be eligible for the financing options proposed as alternatives for state facilities. As an additional financing option, both institutions have bonding authority through their own facilities corporations which may issue bonds for energy projects when authorized and allocated funds by the Legislature.

PROFILE OF STATE COLLEGE AND UNIVERSITY FACILITIES

THE BUILDING INVENTORY

The inventory of state and university buildings represents a large pool of unexploited energy efficiency investment opportunities. The inventory comprises some 200 buildings over 20,000 square feet, as show in Chart 2.



Many of these facilities are energy intensive operations such as sports centers, laboratories, air conditioned office buildings and various 24-hour facilities such as dormitories.

TYPICAL ENERGY SAVINGS OPPORTUNITIES

University of Nebraska

The university has operated a fairly aggressive energy conservation program since 1979. As part of this effort, it has kept reliable campus and system-wide energy consumption and cost records. In Fiscal Year 1987, the university consumed about 1.4 trillion BTUs of energy at a cost of \$6.7 million. Over the past few years, energy use per square foot at the University of Nebraska-Lincoln hovered between 114,000 and 125,000 BTUs/sq. ft., which is a very respectable figure given the nature of the building stock and Nebraska's climate. Since the energy conservation program was implemented, energy consumption per square foot has declined by 25-30 percent.

The State College System

The state colleges commissioned energy audits for each of the four campuses some nine years ago. By now, the campuses and the buildings have changed so much that the information in those audits is out-dated. At the moment there are no centralized records on campus energy consumption. These can, however, be assembled should energy improvements for this sector be pursued.

ENERGY EFFICIENCY OPPORTUNITIES

University of Nebraska

The university has implemented a three-phase strategy to reduce energy costs. The first phase, designated QUICK FIX, concentrated on operating measures such as reduction in heating temperatures, illumination levels and hot water temperatures. These were completed in the early 1980s. The second phase consisted of retrofits to individual buildings, mostly to HVAC controls and lighting systems. A major component of this effort was the development of an energy management system which both monitors and controls energy use in a large percentage of the university's buildings. The university designed and had portions of the energy management system produced locally to reduce costs. The university has spent over \$20 million for deferred repair, replacement and energy efforts. Many projects such as replacement of windows and roofs had an effect on energy use as well as the continued life of the facility.

At this time, the university has identified an additional \$9 million in energy related projects third phase. Much of the work on con-

trols remains to be done. However, the bulk of the remaining improvements are projects to make the campus central energy plants more efficient — boiler replacement, cogeneration, heat recovery, etc. These are major projects costing several hundred thousand dollars each.

The university's energy conservation efforts are unique among Nebraska institutions in their scope and systematic approach. In addition to the sheer size of its inventory, the university has a strong budgetary incentive to be diligent.

The State Colleges

The most recent information on energy conservation opportunities on state college campuses comes from energy audits submitted to the federally-funded Institutional Conservation Program. Most of the projects involve retrofit of HVAC systems and controls and show paybacks of less than six years. Donna Nelson, Fiscal and Facilities Officer of the State College System, reports the State College System has an extensive backlog of projects of the \$50,000 to \$100,000 scale. Furthermore, each of the four campuses are heated and cooled by a central plant which may present opportunities similar to those that have been identified or implemented by the university. These opportunities include boiler replacement, waste heat recovery and distribution upgrade and controls.

CURRENTLY AVAILABLE PROJECT FINANCING RESOURCES

State Colleges-Appropriations and Grants

The colleges have two sources of appropriations to fund capital improvement projects: the capital budget and the 309 Task Force. The 309 Task Force administers a program which is statutorily-mandated to support renovations. The program is funded through appropriations. Donna Nelson reports that very few General Fund requests for energy related improvements have been approved recently. The primary sources of funding for such projects, to the extent available, have been the 309 Task Force and the Institutional Conservation Program (ICP), a federal matching grant program administered by the Nebraska Energy Office.

The funds available through the 309 Task Force are extremely limited in relation to the level of requests. Agency requests in FY 87/88 totalled \$20.8 million of which \$9.8 million were for energy efficiency projects. By contrast, the entire appropriation to the 309 Task Force in FY 86/87 was \$2.46 million.

Institutional Conservation Program

The ICP has made federal grants available to schools and hospitals since 1980. A relatively small portion of these funds have been allocated to the state colleges for energy efficiency projects.

State Colleges-Debt Financing

The state colleges can enter into lease purchase agreements that use annual appropriations for lease payments as long as each project is specifically approved by the Legislature.

The State College Board of Trustees can issue revenue bonds to finance capital improvement projects in revenue producing buildings which are specified in the enabling statute. State statute created the Nebraska State Colleges Facilities Corporation to issue revenue bonds for state college facilities that are not revenue producing, such as classroom buildings. These bonds have been retired using cigarette tax revenues. Legal counsel to the state college board indicates that facilities corporation or board of trustee bonds could be used to finance energy efficiency projects. However, such a strategy would require a legislative commitment to appropriate money to retire the bonds by either maintaining the state college's utilities appropriation at pre-improvement levels or providing for a bond repayment line in the budget.

The University of Nebraska

The university has the same sources for appropriations to fund capital improvement projects as the state colleges, and like the state colleges, requests for capital improvement monies for energy projects have far exceeded the available resources. The 309 Task Force grants for energy improvements in university facilities have totaled approximately \$5 million. Federal grant monies through the ICP have funded 50 percent of the cost of energy projects in university facilities worth approximately \$1 million.

The University of Nebraska Board of Regents can issue revenue bonds for capital improvements in revenue producing buildings. The University of Nebraska Facilities Corporation issues revenue bonds for non-revenue producing facilities with legislative approval. Such legislation must provide a revenue stream for these bonds. The university can also enter into lease purchase agreements that use annual appropriations for the lease payments. The payment stream is from annual appropriations by the Legislature.

BARRIERS TO IMPLEMENTING ENERGY PROJECTS

The main obstacle to major additional energy efficiency improvements in university facilities is a lack of adequate levels of funding to complete them. Robert Pazderka, Facilities Administrator for the University of Nebraska, estimates that \$9 million worth of energy efficiency improvements in university facilities remain.

The state colleges, on the other hand, have lacked the resources necessary to carry out extensive energy conservation programs. Each campus has a director of the physical plant, but the personnel working in this department vary in skill and familiarity with planning and implementing energy projects. None of the state colleges have professional engineers on their staffs and this has inhibited their ability to identify, design and install energy saving improvements. Nor has funding been made available to add such expertise to their physical plant personnel. Private consultants are used to provide assistance in these areas when funds are available.

The lack of budget incentives is also a barrier to major energy improvements. While the state colleges have indicated a good deal of commitment to carrying out energy efficiency projects in their facilities, reductions in utility expenses that are reflected in future cuts in overall appropriations are problematic. This issue has been raised by state agencies in general.

Finally, the college campuses, like other state facilities, are heated and cooled by central plants and are master-metered for electricity. This poses problems in monitoring the results of energy efficiency projects.

STATE COLLEGES AND THE UNIVERSITY PROGRAM AND FINANCING OPTIONS

Program and financing options to develop energy efficiency projects in state college and University of Nebraska facilities are those described for state facilities in general: the Energy Team, a Revolving Loan Fund and the Energy Finance Corporation. The only exception is that Energy Team services would not be available to the University of Nebraska. To summarize, program and

financing options for the state colleges and the University of Nebraska are as follows:

The Energy Team

The energy management and project development services of the Energy Team will be made available to the state colleges. These services would include the identification of facilities' managers, development of an energy cost and use monitoring system, education and training of facilities' staff and the performance of energy audits. For further information on the Energy Team, refer to page 23 of this report.

Revolving Loan Fund

The university and state colleges will have access, on a competitive basis with state agencies, to the Revolving Loan Fund. This fund would be capitalized with General Fund appropriations. For further information on the Revolving Loan Fund, refer to page 26 of this report.

The Nebraska Energy Corporation

Although the university and state colleges will have access to the Nebraska Energy Corporation described on page 30, they will also have the option of financing energy projects through their Facilities Corporations. Depending on the financing terms, using the currently operating Facilities Corporation may be an administratively less expensive method of financing energy projects.

LOCAL GOVERNMENT JURISDICTIONS

Municipalities • Counties • School Districts •
Technical Community Colleges

INTRODUCTION

The most significant characteristics of local government jurisdictions in Nebraska in terms of implementing cost-effective energy efficiency projects are:

- With a few exceptions, most local jurisdictions in Nebraska serve rural areas, own few facilities and operate on relatively small budgets.
- Local government in Nebraska is highly decentralized. There are 544 municipalities, 93 counties, 350 school boards and six technical community colleges representing 14 campuses.
- Local jurisdictions, in general, lack staff and budget resources to undertake major energy projects.
- Local jurisdictions are geographically dispersed. This situation will complicate program delivery and raises concerns about the availability of technical services.
- Local jurisdictions depend heavily on local tax levies to finance capital improvement projects. Tax levies in many Nebraska localities are in decline as the population decreases and ages.
- Although local governments have broad borrowing powers, few jurisdictions have borrowed to finance energy projects.
- Local government officials are generally unaware of the economic benefits of energy efficiency projects. As such, they have not directed staff or financial resources toward that goal.
- There have been no federal or state government programs to encourage energy efficiency in municipal or county facilities and only one very limited funding for energy projects in county courthouses.

These factors indicate the need for a program that is capable of providing on-site services that include a substantial education component. The management program proposed for this sector —

the Energy Circuit Rider Program — will provide energy management, energy technical assistance and training services from a base at the area technical community colleges. The task force recommends three financing options for local jurisdictions which include a revolving loan fund administered by the Nebraska Energy Office, increasing funding to the federal Institutional Conservation Program and a pooled bonding authority for local jurisdictions to join together to issue bonds for energy efficiency improvements.

PROFILE OF LOCAL GOVERNMENT FACILITIES

THE BUILDING INVENTORY

Municipalities

There are 544 municipalities in Nebraska varying in size from villages of 50 residents or less to the metropolitan cities of Lincoln and Omaha. The number and size of municipal buildings varies with population, but even relatively small towns have considerable municipal property in buildings of different types. A complete inventory of these buildings is not available on a statewide basis. Some municipalities operate community health facilities. Of these, seven are hospitals, 26 are intermediate-care facilities and two are residential-care facilities.

The city of Columbus, a first class city of 18,000 people, can be used to illustrate municipal building stock. The city has 18 municipal buildings. These include a library, city hall, sewage treatment plant and tool house, as well as three recreational buildings, a garage and ten other buildings related to the water company, cemetery and dog pound.

Counties

There are 93 counties in Nebraska. There is no inventory of county buildings available for the entire state. However, each county is likely to have a courthouse and a jail, although these may be in the same structure. Many county courthouses are very old, dating from the late 1800s and early 1900s. Counties in Nebraska operate 27 hospitals, nine intermediate-care facilities, and one residential-care facility.

Public Schools

There are 350 schools boards in Nebraska. All but a few operate school facilities.

Technical Community Colleges

There are 14 technical community colleges in Nebraska organized into six districts. Four of the colleges are located on former military bases. Building inventories range from 20 buildings at the Fort Omaha Campus to one building at the Elkhorn Valley Campus. Community college administrators estimate the total number of buildings operated by Nebraska community colleges at 75.

TYPICAL ENERGY SAVINGS OPPORTUNITIES AND ENERGY CONSUMPTION PATTERNS

Municipalities

There is no centrally available data on energy consumption in municipal buildings. Again, the city of Columbus municipal buildings can serve as an example although Columbus is unusual among Nebraska municipalities in that several major buildings in the city use electric instead of gas heat. Energy use in four of Columbus' buildings is shown in Table 7. Gas for hot water is used in all four buildings, but because of electric heating and air conditioning in the library, city hall and aquatic center, electricity costs far exceed gas costs in these three buildings. Electric motors for pumping account for the high electricity use in the sewage treatment plant. Electricity use in the tool house is limited to lighting and motors.

Facility	Gas		Electric		Total Costs	Size (sq.ft.)	Cost/ sq.ft.
	Use (mmBTU)	Cost	Use	Cost (mkwh)			
Library	632	\$2,907	221	\$10,495	\$13,402	8,000	\$1.68
City Hall	895	\$4,004	355	\$15,851	\$19,885	8,101	\$2.45
Sewage Treatment	825	\$4,221	2,348	\$63,943	\$68,164	not applicable	
Aquatic Ctr.	769	\$3,640	252	\$11,984	\$15,624	15,660	\$1.00
Average Unit Prices:		Gas \$4.73 per mmBTU		Electricity \$0.0322 per kwh			

Overall, the levels of energy consumption and costs in these buildings are sufficiently high to justify capital investments in energy saving devices and improvements.

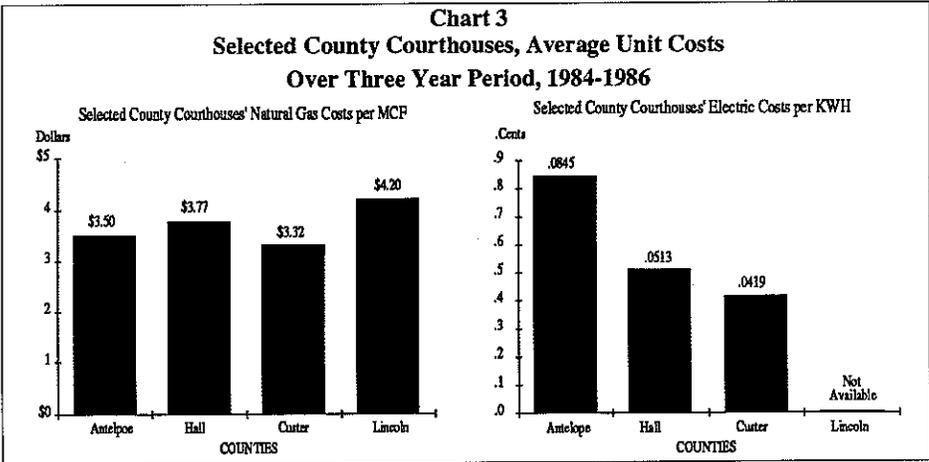
Counties

Table 8 and Chart 3 shows energy consumption and cost data for four typical county courthouses that applied to the Courthouse Trails project, an energy conservation program funded with oil overcharge funds. As in state facilities, energy consumption levels are highly variable. Energy costs per square foot range from \$0.45 to \$2.57. Also, unit energy costs are highly variable. Antelope County pays \$0.085 per kwh for electricity versus \$0.042 per

kwh in Custer County. Gas prices vary from \$3.32 per thousand cubic feet to \$4.20 per thousand cubic feet. This data indicates that, in many courthouses, investments in energy efficiency will be cost-effective.

Table 8
Energy Consumption in County Courthouses Over Three Year Period, 1984-1986

County	Size (Sq. Ft.)	Fuel		Electric		Total Cost	Cost/Sq. Ft.
		Use (mmBTU)	Cost	Use (kwh)	Cost		
Antelope	12,180	1,009	\$3,529	20,556	\$1,907	\$5,436	\$0.45
Hall	25,474	3,138	11,841	1,046,400	53,723	65,564	2.57
Custer	24,727	1,122	3,729	200,391	8,387	12,116	0.49
Lincoln	37,064	5,299	\$22,256	N/A	\$31,332	\$54,788	\$1.47



Engineers familiar with municipal and county buildings report that inadequate maintenance is a major problem in controlling energy costs. Typically, maintenance persons are not familiar with the technical aspects of the HVAC systems and controls they are assigned to operate and maintain. Moreover, it is difficult to obtain manufacturers' service representation in rural areas. Thus, even when up-to-date equipment is installed, it deteriorates quickly, as do any fuel economies it might have achieved.

Public Schools

Table 9 shows energy use in four schools of different types and sizes in Nebraska. Nebraska Energy Office staff who operate programs for energy efficiency projects in public schools report that typical energy mechanical systems are gas-fired boilers for heat and hot water and gas absorption air conditioning unless the school is new and/or has been retrofitted to electric compressors. Review of records from the Institutional Conservation Program (ICP) indicate that numerous opportunities for projects with three to five year paybacks exist in the public schools.

**Table 9
Energy Use in Public Schools**

School	Construct. Date	Size (Sq. Ft.)	Energy Consumption (mmBTU/Yr.)	Annual Energy Consumption Per Sq. Ft.	Annual Energy Costs	Annual Energy Costs Per Sq. Ft.
North Platte Sr. High	1961	121,750	10,740	140,108	\$74,800	\$0.61
York Middle Junior High	1917	86,400	5,805	67,183	29,228	0.34
Cedar Elementary	1957	23,268	1,850	79,517	16,027	0.69
Aurora Sr. High	1956	75,000	6,807	90,761	\$34,219	\$0.46

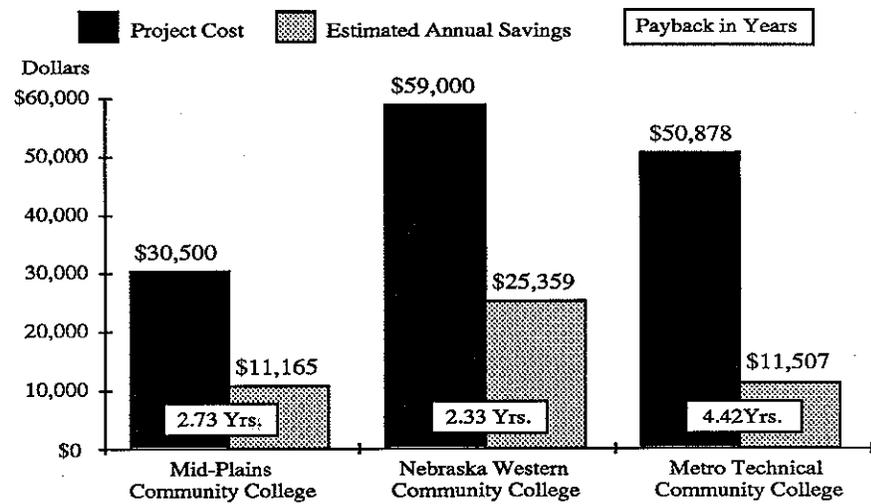
Fuel Equivalents: #6 Oil 149,690 BTU per gal.
 Natural Gas 1,030 BTU per cubic ft.
 Electricity 3,412 BTU per kwh

Technical Community Colleges

A number of community colleges have taken part in the ICP. Results of audits on these facilities show that there are numerous opportunities for investments in capital improvements with pay-backs of under five years, as shown in Chart 4.

Chart 4

**Costs and Benefits for Energy Projects
in Nebraska Community Colleges**



CURRENTLY AVAILABLE PROJECT FINANCING RESOURCES

Municipalities and Counties-Capital Budget or Sinking Funds

Cities and counties in Nebraska have several financing options for capital improvements. Cities and counties have levy powers and frequently fund capital improvements through a sinking fund mechanism. This allows a pay-as-you-go operation. Interviews with a number of municipal and county officials in Nebraska reveal a strong preference for this strategy.

The local governing body of any city of the first or second class, or any village, has the power to levy a tax, not to exceed 10.5 cents on each \$100 in any one year, upon the actual value of all the taxable property within the municipality for a term not to exceed ten years. This additional tax levy is used to establish a sinking fund for the construction, purchase, improvement, extension, original equipment or repair of selected public buildings. The governing body of the municipality must submit any proposal to establish a sinking fund to a general election.

County boards in Nebraska draw up county budgets on an annual basis and public hearings are required prior to approval of the budget. There is a constitutional limit on the amount that can be budgeted. A county may not exceed 50 cents per \$100 assessed valuation. However, the limit can be exceeded if authorized by a vote of the people. Approximately eight to ten counties in Nebraska have reached the statutory limit, and others are approaching the limit. Some 22 counties were above the 45 cent level in the 1987-88 fiscal year. As with municipalities, county boards are authorized to increase appropriations to address certain unanticipated emergency requirements.

Counties and Municipalities Borrowing Capability

Municipalities and counties have broad authority to borrow funds for capital improvement projects. All municipalities may issue general obligation bonds if approved by a referendum. All municipalities may issue revenue bonds to improve revenue-producing facilities such as museums, waste-to-energy processing facilities, etc. A referendum is not required for these issues.

Municipalities, except for Lincoln, may enter into multi-year lease purchase agreements. Lincoln may not enter into lease purchase agreements of any kind. A bill was introduced in the 1988 legislative session to broaden Lincoln's authority in this area, but the bill failed to pass.

Counties may issue general obligation bonds to finance capital projects. Borrowing in this way to finance improvements must be approved by referendum. For all buildings, counties may appropriate annually between \$150,000 and \$2 million, depending on their size, without a referendum. Counties have very broad lease purchase authority. They can enter into multi-year agreements and are not subject to a dollar amount cap on such agreements.

Although the borrowing authority of Nebraska municipalities and counties is very broad, it is not often exercised. Municipalities and counties in Nebraska have a general aversion to incurring debt. When they do, they often work with local financial institutions and occasionally pool projects so as to bring the total amount of capital to a level that is sufficient for bond issuance. In addition, most Nebraska municipalities, except for Lincoln and Omaha, have aging populations and declining tax bases — factors which further inhibit borrowing for capital improvements.

No federal or state appropriations or grants have been made to municipalities in Nebraska for energy efficiency projects. The Nebraska Energy Office has funded a small program, the Courthouse Trails project, to demonstrate energy efficiency techniques in county courthouses. The program uses oil overcharge funds. The response to the program was excellent as 25 applications were received and \$629,000 in oil overcharge funds will be expended on projects in six counties. The six counties were obligated to contribute a total of \$250,000 to the projects. The program is ongoing and the expected completion date is 1990.

School Districts

School districts rely on a sinking fund mechanism to raise funds for most capital projects. When additions and improvements or equipment purchases are necessary, a school board may propose a special annual tax for that purpose. The amount of the tax cannot exceed 14 cents on each \$100 upon the actual value of the taxable property in the district for a term not to exceed ten years. The proposed tax must be voted on by residents of the school district.

The borrowing authority of school districts is similar to that of municipalities and counties. School districts can issue general obligation bonds to finance new construction and major repairs. A referendum is required.

School districts had broad lease purchase authority, but this was limited by legislation in recent years. Currently, school districts must have voter approval to enter into lease purchase agreements

for capital construction and/or equipment over \$25,000. A bill was considered by the Legislature in 1988 that would increase the limit on the amount financed through lease purchases to 0.5 percent of the total assessed valuation, however, the bill failed to pass. Sources of funds for repayment of leases must come out of the general fund or current building fund with terms limited to seven years.

School districts have specific levying powers. They can levy up to a specified mill as part of the municipal property tax to finance capital projects. Raising the school building fund levy requires a referendum. School districts can use levy monies to create a building reserve fund and then engage in capital projects on a pay-as-you-go basis. Usually, school districts haven't needed to use the school building fund levy power to its full extent.

Public schools in Nebraska are major recipients of federal and state funds for energy conservation projects. Federal grants are made through the Institutional Conservation Program (ICP) which is funded annually by Congress to provide 50 percent matching grants for energy efficiency projects in schools and hospitals.

The first Nebraska ICP grants to schools and hospitals were made in 1980. Federal appropriations for the Nebraska program have varied over the years beginning with over \$1 million in the first three years. The 1987 appropriation is the lowest in the history of the program allowing for only \$229,081 of grants for implementation of conservation improvements.

Since 1981, a portion of the state severance tax on oil and natural gas has financed energy efficiency projects in public K-12 schools through the State School Weatherization Program. The program began as a grant program but was changed by statute to a no-interest loan program in 1985. Loan terms are flexible and can run as long as 14 years. Loans are repaid through utility cost savings. The amount of funds available for the program varies with the amount of severance tax received by the State. Severance tax revenue for the program has declined over the past two years due to lower oil and natural gas prices.

Currently, there is approximately \$7.7 million in the loan pool and lending is taking place at the rate of \$3 million per year. The Nebraska Energy Office, which administers the program, estimates the need for energy efficiency projects remaining in public K-12 schools at approximately \$17 million. State sunset provisions for the program direct that it will operate with state oil and gas sever-

ance taxes until July 1, 1990. From 1990-1996 it will operate with loan repayments. No new loans will be made after 1996. At that time, loan repayment moneys will go into the Permanent School Fund.

Technical Community Colleges

Nebraska's technical community colleges fund capital improvement projects through levies against property in the counties they serve. This is done at the area level. There are six technical community college areas which cover the entire state contiguous with county boundaries. The technical community colleges frequently set up sinking funds so that capital improvements are paid for on a current budget basis. The technical community colleges have debt financing capabilities similar to other local jurisdictions. They may issue revenue and general obligation bonds and do lease purchasing.

The Nebraska technical community colleges are eligible for federal grants through the ICP. They have received a relatively small portion of the funds made available through these programs.

BARRIERS TO IMPLEMENTING ENERGY PROJECTS

Local jurisdictions are usually small operations without the staff resources to manage energy projects. Lack of maintenance and energy management appears to be as much of a barrier to energy conservation as access to financing for capital improvements. Even in Nebraska schools, which have had many energy efficiency improvements funded, energy savings may not be maintained because of the lack of staff trained to manage energy use and operate systems efficiently.

Many jurisdictions in Nebraska are not in a good position to self-finance energy efficiency projects. Frequently the tax base for funding local governments and schools is declining and therefore funds for capital improvements are very limited.

PROGRAM AND FINANCING OPTIONS FOR LOCAL JURISDICTIONS

THE ENERGY CIRCUIT RIDER PROGRAM

Overview

A number of states have programs to provide energy management, technical audits, training and technical assistance in obtaining financing to diverse, small jurisdictions in the area of energy efficiency. The programs are frequently called "Energy Circuit Rider Programs" since experts travel to clients and provide services on-site.

The Energy Circuit Rider Program option for Nebraska local jurisdictions will provide for an energy expert, based at a local community college, who will assist local jurisdictions in the following areas:

Energy Management

The Energy Circuit Rider will train administrators and set-up accounting and analysis procedures to track energy consumption and cost data. Different approaches will be needed for free-standing and campus-type facilities. Appropriate systems for small buildings can also be developed.

Education and Training

Facilities personnel will be trained in efficient operation and preventative maintenance of energy systems. Training will include identification and implementation of low cost and no cost efficiency measures.

Technical Energy Audits

The Energy Circuit Rider will perform walk-through energy audits of facilities. He or she will also assist local jurisdictions in obtaining engineering services for more complex engineering studies and technical energy audits.

Technical Assistance in Obtaining Financing

The Energy Circuit Rider will assist local jurisdictions in applications for bond, loan or grant financing. The Energy Circuit Rider will also provide administrative assistance in actually developing financing strategies.

Technical Assistance For Projects

The Energy Circuit Rider will provide technical assistance (specification writing and obtaining qualified contractors) or assist local jurisdictions in obtaining these services to support the implementation of energy efficiency projects.

In addition, training programs at the community colleges will be held for facilities personnel. Certification may be offered for this training.

Facilities and Projects Targeted

Eligible local jurisdictions for the Circuit Rider Program are:

- Municipalities
- Counties
- Public school districts
- Technical community colleges
- Hospitals
- Other nonprofit institutions

Program Operations and Marketing

Pilot Phase

The program will begin as a pilot effort involving two Energy Circuit Riders based at two technical community colleges. The Hastings Campus and the Milford or Beatrice Campuses have been proposed as the initial sites. The cost of the Energy Circuit Rider's services would be split between the local jurisdiction and oil overcharge funds. The program is expected to be self-sustaining in two years.

Staff

The Energy Circuit Rider Program will be staffed by two full-time professionals at each campus. They included a community college administrator who will manage and market the program, and the Energy Circuit Rider who will provide services and training as well as market the program. A part-time support person should be adequate.

Costs and Funding Sources

The Energy Circuit Rider Program will require start-up funding but should pay for itself the third year through fees for services. As an incentive to the local governments to participate, the state could subsidize the Energy Circuit Rider's fees. If the Energy Circuit Rider does not generate energy savings equal to or greater than the cost of his or her services after the two year pilot project, the program will be revised or terminated. Fees paid by local jurisdic-

tions during the first two years can be held in an escrow account and can be used for further development of the program in year three.

Administering Agency

The Nebraska Energy Office will work directly with the technical community colleges which will set up and administer the program.

Reaction of Local Officials to the Energy Circuit Rider Program

A number of county and municipal officials and administrators of community colleges were interviewed concerning the Energy Circuit Rider Program services. Executive directors of their trade associations were also interviewed.

There is general agreement among local officials that training of facilities personnel and some energy management functions are important services and would be used if fees were relatively low. However, local officials are uncertain about the usefulness of services relating to the planning and management of major capital improvement energy projects. Their resistance stems from doubts as to the availability of appropriations or debt financing funds to implement the projects. The administrators are very interested in the availability of grants for these projects.

Regardless of their level of interest in Energy Circuit Rider services, the local administrators agree that the technical community colleges should administer the program. The presidents of technical community college areas who were interviewed agree that their institutions have the capability to administer an Energy Circuit Rider Program and that it is well within the mission of the community colleges to do so. They currently provide a number of services similar to those proposed for the Energy Circuit Rider Program including weatherization of mobile homes and training in asbestos control.

REVOLVING LOAN FUND

Overview

This financing option would use oil overcharge funds or state appropriations to establish a revolving loan fund to finance major energy improvement projects in municipal and county facilities. The loans would finance both the capital costs of the projects and the costs of services of the Energy Circuit Rider that are related to development of these major projects. Loan funds would also cover the costs of the required engineering studies for the projects.

Facilities and Projects Targeted

Municipal and county facilities and the facilities of the technical community colleges would be eligible for loans from the revolving fund. Boiler replacements, distribution system improvements, lowered ceilings, insulation, air infiltration measures and window replacements will be typical projects in older municipal and county buildings. Average project costs are estimated to range from \$30,000 to \$50,000.

Administering Agency

The Nebraska Energy Office would be the administering agency for this program. The Energy Office already operates the Energy Efficiency School Loan Program — a revolving loan fund to finance energy improvement projects in K-12 schools in Nebraska. The Energy Office is also experienced in working with local jurisdictions.

Program Operation and Marketing

The program would operate like the revolving loan fund for state facilities. The maturities of the loans must be fairly short in order for the fund to recover outlays quickly enough to relend. To keep the net cash flow to local jurisdictions positive, the improvements financed must pay themselves back over a period that is shorter than the maturities of the loans.

The task force recommends zero-interest loans. Local government decision-makers are in, general, opposed to debt financing. Zero-interest loans should provide an attractive incentive.

To apply for a loan, a local jurisdiction, with assistance from the Energy Circuit Rider, would contract with an engineering firm to conduct an energy audit. The program would advance the cost of the audit if the local jurisdiction agrees in advance to implement all improvements with the threshold payback. The cost of the audit would then be rolled into the loan.

Once audits are reviewed by the administering agency, priorities on projects would be set and a budget request completed for the projects to be funded that year. For the projects approved, the administering agency would oversee implementation and authorize disbursement of the funds. Once funds are disbursed, the Nebraska Energy Office would monitor energy savings and compute the various budget transactions necessary to repay the loan. The financing instrument would be an agreement between the Nebraska Energy Office and the local jurisdiction using the loan.

The program would be marketed by the Nebraska Energy Office and the Energy Circuit Riders with assistance from municipal, county and community college trade associations.

Costs and Funding Sources

The costs of this program would be fairly modest. Given their considerable experience in this area, it is likely that the Energy Office would require only one additional staff person to operate the loan fund program. Thus, this staff person would represent the only marginal costs of the program. First year additional staff costs of this program are estimated at \$50,000. Initial loan funds of \$2.5 million would be sufficient to begin the revolving loan process. Legislative appropriations or oil overcharge funds are possible funding sources.

EXPAND FINANCING TO THE INSTITUTIONAL CONSERVATION PROGRAM

Overview

This program would utilize a current federally funded program and would make 50% matching grants to municipalities and counties to fund energy improvements.

The Institutional Conservation Program (ICP) was originally designed to support improvements in municipal and county, as well as educational and health facilities. However, the local government part of the program never received federal funding. This financing option will use state appropriations or oil overcharge monies to broaden the scope of the ICP to include municipal and county facilities.

Facilities and Projects Targeted

Municipal and county facilities would be eligible for 50 percent grants from ICP. Boiler replacements, distribution system improvements, lowered ceilings, insulation, air infiltration measures and window replacements will be typical projects in older municipal and county buildings. Average project costs are estimated to range from \$30,000 to \$50,000.

Administering Agency

The Nebraska Energy Office would be the administering agency for this program. The Energy Office already operates the ICP. This financing option represents an extension of that program. The Energy Office is also experienced through this program as well as the School Energy Efficiency Loan Program in working with local jurisdictions.

Program Operation and Marketing

This program will become part of the ICP which may even have experienced staff available if federal funding levels continue to decline. The availability of the 50 percent matching funds would be marketed by the Energy Office and the Energy Circuit Riders with assistance from municipal and county trade associations. Given that local government is reluctant to use debt financing, the 50 percent matching grants should be a strong incentive for participation. Local jurisdictions would first have technical energy audits performed and then become eligible for 50 percent matching funds for implementation and reimbursement of the audit fees. The Energy Office would set criteria for funding, prioritize requests, and then prepare a budget request for state appropriations and/or oil overcharge monies.

Costs and Funding Sources

The costs of this program would be fairly modest. Given their considerable experience, it is likely that the Energy Office would not require additional staff to operate the expanded ICP. First year grant funds should be determined on the basis of projects prioritized by the Energy Office. An appropriate first year goal would be 30 projects each funded at 50 percent of costs, or averaging \$20,000 each for a total of \$600,000 in grant monies. Legislative appropriations or oil overcharge monies are possible funding sources.

BONDING AUTHORITY

This financing option would promote the formation of a bonding authority to issue revenue bonds and use the proceeds to finance energy improvements. The authority would need legislative authorization.

The bonding authority will function as a nonprofit public purpose entity. As such, it will identify, design, finance and implement energy projects in local jurisdiction facilities. The revenue bonds issued by the authority would be repaid through a lease purchase agreement between the authority and the local jurisdiction. The payments from the local jurisdictions would cover 100 percent of the costs of the activities of the bonding authority.

For further details on the specifics of the bonding authority, refer to page 30 in the state government facilities section of this report.

PRIVATE NONPROFIT ORGANIZATIONS

Health Care Facilities • Private Colleges

INTRODUCTION

Among Nebraska's private nonprofit organizations, health care facilities and colleges own the largest and most energy-intensive capital plants. Many of these buildings are occupied 24-hours a day. Hospitals operate under building and health codes which require considerable energy inputs to maintain. Energy audits of hospitals and private colleges indicate that there is a substantial backlog of projects with paybacks of five years or less.

The resources available to these organizations for energy management and improvements, as well as their record in this area, vary a great deal. A number of colleges and hospitals have pursued aggressive energy management and capital improvement programs using their own resources, with occasional recourse to the federal grants made available through the Institutional Conservation Program (ICP). However, most hospitals are too small to commit staff or funds to this purpose.

A number of hospital and college administrators interviewed by the task force consultants indicated they would be interested in participating in a technical assistance program such as the Energy Circuit Rider Program. Moreover, some of these administrators expressed interest in low interest loan programs to finance capital improvements. These could be made available through the revolving loan fund described in the local jurisdiction section. Increased funding of the ICP is also an attractive option to hospital and college administrators.

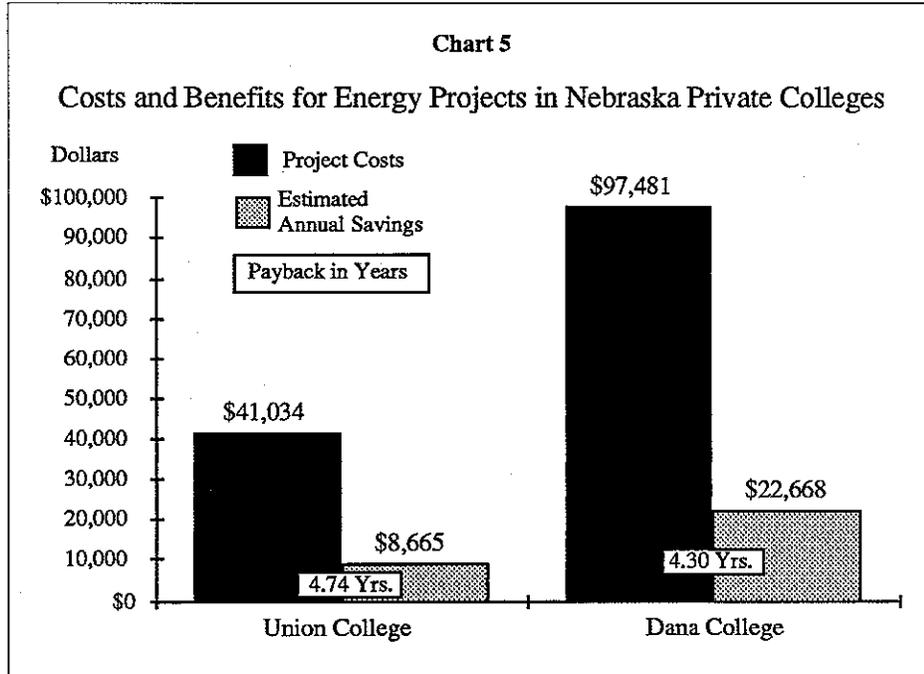
PROFILE OF PRIVATE NONPROFIT FACILITIES

THE BUILDING INVENTORY

Private Colleges

There are 12 private colleges in Nebraska. There is no centralized building inventory for these campuses. According to Howard Dooley, Executive Director of the Nebraska Educational Facilities

Authority, much of the physical plant of the private colleges was built in the 1950s. The ICP has supported audits of four private college buildings; although only two were for sizable buildings. These two audits identified capital improvements projects with five year paybacks, as shown in Chart 5.



Private Hospitals

An inventory of public and private health care institutions in Nebraska is shown in Table 10. Pat Snyder, Executive Director of the Nebraska Health Care Association, reports that there was substantial construction of health care facilities in the state in the 1960s and that these facilities are now becoming out-dated. However, there is currently an excess of beds in hospitals and nursing homes in Nebraska. Resources for capital projects are therefore limited.

Table 10
Inventory of Health Care Facilities in Nebraska

Type of Operation	Number of Facilities			Total
	Hospitals	Intermediate Care and Skilled Nursing	Residential Care	
City	7	26	2	35
County	27	9	1	37
District	8	0	0	8
State	8	4	1	13
Nonprofit	60	71	12	143
Proprietary	4	94	19	117
Total	114	204	35	353

ENERGY CONSUMPTION PATTERNS

Table 11 shows energy use in three hospitals in Nebraska. These figures show that hospitals are among the most energy-intensive commercial facilities. Moreover, the three hospitals profiled use a good deal more energy than the standard for hospitals in Nebraska's climate zone.

Name of Hospital	Size (Sq. Ft.)	Annual Energy Consumption (mmBTU)	Ann. Energy Consumption Per Sq. Ft. BTU	Annual Energy Costs	Annual Energy Costs Per Sq. Ft.
Pawnee County Memorial	12,964	3066.2	236,500	\$ 22,716	\$ 1.75
St. Mary's, Nebraska City	95,868	18,857	196,700	108,921	1.14
Bergan Mercy, Omaha	733,330	178,455	243,349	\$1,277,719	\$1.74
Fuel Equivalents: #6 Oil 149,690 BTU per gallon					
Natural gas 1030 BTU per cubic foot					
Electricity 3412 BTU per kwh					

Table 12 shows the magnitude of energy savings that has been achieved in nine large and nine small hospitals that received ICP grants. These 18 studies were picked at random from a list of 50 project descriptions. Of the eighteen projects, seven show pay-backs of less than four years. All but four of the projects are predicted to pay back within five years. The estimated costs of the projects average around \$60,000 and range as high as \$150,000.

Table 12
Energy Efficiency Opportunities in Nebraska Hospitals

Name	Sq. Ft.	Cost of Project	Projected Cost Savings	Payback in Years
Large Hospital Projects				
Phelps Memorial	57,011	\$ 7,500	\$ 1,473	5.22
Great Plains Medical	112,350	116,725	26,640	4.36
Good Samaritan	206,042	42,980	19,020	4.28
UNO Medical Center	142,484	18,600	3,294	5.65
Phelps Memorial	57,011	9,073	3,668	2.47
Bergan Mercy	733,330	149,350	43,310	3.45
Good Samaritan	206,042	10,000	1,709	5.85
Aurora Memorial	52,063	63,900	6,632	9.64
Columbus Community	65,000	23,330	6,680	3.49
Small Hospital Projects				
Boone County Community	21,428	\$37,025	\$8,345	4.44
Fillmore County	39,424	17,450	8,362	2.09
Saunders County	23,020	33,720	7,491	4.50
Brodstone Memorial	34,135	34,060	6,319	5.39
Nemaha	28,800	23,000	6,266	3.67
Blair Community	28,223	2,100	466	4.51
Niobrara Valley	14,018	3,470	1,178	2.95
Pawnee County	12,964	53,313	10,661	5.00
Blair Community	28,223	39,500	10,748	3.68

Source: Nebraska Energy Office records of the Institutional Conservation Program.

CURRENTLY AVAILABLE PROJECT FINANCING RESOURCES

Private Colleges

Private colleges finance most capital improvements through fundraising or through loans from larger organizations, such as national churches, with which they are affiliated.

Revenue bonds may be issued for the purpose of making low interest loans for capital projects to Nebraska private colleges by the Nebraska Educational Facilities Authority (NEFA). Created by statute in 1981, NEFA has issued a total of \$93.99 million in revenue bonds and \$.985 million in commercial paper notes. NEFA may pool projects and has done so in its later issues.

Private Health Facilities Hospital administrators interviewed for this project reported that capital improvements are principally financed through three mechanisms: fundraising, surplus operating revenues and commercial borrowing. Private nonprofit health facilities in Nebraska may issue revenue bonds as long as their articles of incorporation do not prohibit incurring debt in this way. The transaction costs of this approach are generally too high to warrant its use for relatively small capital improvements, such as energy system improvements.

The Nebraska Investment Finance Authority (NIFA), an entity created by the Legislature in 1983 to provide for and encourage the investment of private capital for the public interest, is authorized to issue revenue bonds for capital projects for health care facilities. NIFA recently created a lending pool for private hospitals, financed by revenue bonds.

Loans from the pool may be structured with any maturity. Interest rates to the borrower are now running at around five percent. Dennis Velleck, the Executive Director of NIFA, reports that the minimum feasible project size is \$500,000. This limits the pool's applicability to energy projects, unless they are financed as part of a larger capital improvements program. The bond insurers for the pool require a good credit rating for borrowers. This has the effect of requiring many hospitals, especially small ones, to purchase some form of credit enhancement in order to use the pool.

State and federal funding sources for energy efficiency projects in this sector are limited to the ICP. ICP is funded annually by Congress to provide 50 percent matching grants for energy efficiency projects in schools and hospitals (both public and private nonprofit) in Nebraska. The 1987 appropriation is the lowest in the history of the program allowing for only \$299,081 of grants for implementing conservation improvements.

BARRIERS TO IMPLEMENTING ENERGY PROJECTS

There are few barriers to implementing any projects since both private colleges and hospitals have strong, direct incentives to undertake energy efficiency programs and capital projects. Private colleges face intense competition for students, and the level of tuition is a key dimension in this competition. Cost control is an important element in a college's operating strategy.

Hospitals and nursing homes also face strong cost-control pressures. Public health care reimbursement systems, primarily Medicare, cover operating costs such as energy only up to a limit established by the cost experience of various categories of hospitals. Any cost overruns must be made up from other sources.

Many of the state's larger hospitals and more well-endowed private colleges have undertaken extensive energy related capital investments. However, most of the smaller hospitals, which account for 80 of the state's 114 hospitals, do not have the staff to organize or oversee such projects or to ensure that energy-conscious maintenance routines are followed. Moreover, these hospi-

tals have many competing needs for available capital funds. Even though energy audits indicate that most hospitals could generate net savings through energy projects, energy only accounts for five to eight percent of operating costs, and is therefore not a compelling object for investment.

PROGRAM AND FINANCING OPTIONS

Programs for private colleges and health care facilities should target the smaller organizations in these sectors. The following are the specific recommended program options:

The Energy Circuit Rider

Services of the Energy Circuit Rider Program described in the local jurisdiction section will be made available to hospitals. This program is described on page E-50.

Expand ICP

A mechanism for advancing funds for energy improvements in colleges and hospitals is already in place through the ICP, which is administered by the Nebraska Energy Office. The state could appropriate funds from either the General Fund or oil overcharge funds to the program to supplement declining federal appropriations. In addition to using an established administrative apparatus, this approach maintains competition for the funds on the basis of return on investment in the projects funded. This program is described on page E-54.

Revolving Loan Fund

Private colleges and hospitals could be made eligible for loans from the revolving loan fund established for local jurisdictions. This program is described on page E-52.

Nebraska Educational Facilities Authority (NEFA)

NEFA has expressed interest in issuing a pooled bond specifically targeted at energy efficiency projects in the private colleges. The Nebraska Energy Office could assist in contacting the colleges and assessing the amount and types of projects which would qualify for this type of financing. Projects would need a payback sufficient to cover the cost of the bonds.