The Economic Impacts of Nebraska's Dollar and Energy Saving Loan Program

Submitted to the
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by

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Introduction

In 1990 the Nebraska Energy Office (NEO) initiated an innovative loan program which prompted the development of almost $44 million of improvements to residential, small business, non-profit, agricultural, local government, and rural nursing home buildings and operations. The Dollar and Energy Savings Loan Program typically provides 5-percent loans to Nebraskans for building and energy system improvements. More than 7,200 projects have been funded through the period ending June 30, 1994.

While a clearly successful program, the NEO seeks to learn whether it has resulted in net economic benefits for the state's economy. Toward that end, NEO officials asked the American Council for an Energy-Efficient Economy to review the program impacts to date, and to determine whether the program has increased or decreased overall employment and income for residents of the state.

Program Description

The NEO Dollar and Energy Savings Loan Program was approved by the U.S. Department of Energy in March 1990. After an initial pilot test it was announced to the general public in July 1990. The program is funded with oil overcharge funds made available by the Energy Office. In effect, the NEO purchases from participating lenders 50 percent of each loan of $1,000 or more at zero interest. It purchases 100 percent of all loans less than $1,000 — also at zero interest. This arrangement allows participating lenders to earn a market yield on their portion of the loan while giving borrowers an effective loan rate of no more than five percent.[1]

The table on the following page summarizes the project loans by sector as of June 30, 1994. The residential sector accounts for 91.7 percent of all project improvements and 73.6 percent of all improvement costs. Of the $43.9 million in project improvements shown in the table, lenders provided 92.7 percent of the funds. The Energy Office purchased 53.7 percent of the loans made through mid-1994, or about 49.8 percent of the total project improvements.

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1. For more details on the loan program, see, *Nebraska's Dollar and Energy Saving Loan Program: Overview and Current Status*, Nebraska Energy Office, 1200 "N" Street, First Floor, Lincoln, NE 68509-5085. Or call (402) 471-2867.

Table 1. NEO Loan Program Summary By Sector		
Sector	**No. of Projects**	**Total Cost ($1,000)**
Residential	6,628	$32,291
Small Business	360	$6,683
Agriculture	211	$3,599
Government	25	$1,256
Nursing Home	3	$68
Totals	7,227	$43,897

As will be shown later, total energy savings from the program are estimated to be $1.83 million dollars from the projects undertaken to date. This information together with the information summarized in Table 1, above, was used for the evaluation of the net program benefits.

Methodology Used

With a reasonable accounting of program expenditures, the macroeconomic impact of the Dollar and Energy Saving Loan Program was evaluated in terms of its net employment and income benefits. This information was then used to estimate the contribution of the program to Nebraska's Gross State Product (GSP). One tool that can assist in that type of evaluation is referred to as input-output modeling, sometimes called multiplier analysis.

Input-output models initially were developed to trace supply linkages in the economy. For example, they show how purchases of lighting equipment not only benefit lighting manufacturers, but also the fabricated metal industries and other businesses supplying inputs to those manufacturers.

The employment and income benefits that are ultimately generated by expenditures for energy efficiency will depend on the structure of a state's economy. Those states which produce fabricated metal products, for instance, are more likely to benefit from expanded sales of locally manufactured ballasts; states without such production will not benefit in the same way.

Different expenditures support a different level of total employment and income. Table 2 compares the total number of jobs and the level of income supported for each one million dollars of expenditures within key Nebraska sectors. The such as agriculture, construction, manufacturing, utility services, wholesale and retail trade, services, government and households. For the purposes of this study, a job is defined as sufficient work to employ one person full-time for one year. Income refers to the employment compensation like to be generated from a given expenditure.

The job and income multipliers in Table 2 include the impacts that ~~art~~ are directly and indirectly created by a given expenditure. They also include the jobs which are said to be "induced" by the expenditure as the wage earners spend their income on such things as food, clothing, health services, and recreational activities within their respective communities.

Table 2. Total Economic Impacts for Nebraska Per Million Dollars of Expenditure in Selected Economic Sectors

Sector	Employee Compensation	Jobs
Agriculture	$460,000	25
Construction	$720,000	38
Manufacturing	$480,000	23
Utility Services	$190,000	9
Trade	$760,000	56
Services	$800,000	45
Households	$340,000	21

Note: These values were adapted from the Nebraska data tables found in the U.S. Department of Commerce's Regional Input-Output Modeling System (RIMS II), May 1992. RIMS provides detail for up to 528 sectors. Hence, the numbers shown in this table reflect typical values that are found in the database.

Of immediate interest in Table 2 is the relatively small total number of jobs supported by expenditures for gas and electric utility services. As it turns out, much of the gain in job creation from energy efficiency programs is derived by the difference between jobs within the energy supply sectors and jobs which are supported by the respending of energy bill savings in other sectors of the economy.

The impact analysis of Nebraska's loan program was carried out in essentially two steps. The first step was to fully describe from an accounting perspective just how the program expenditures affected each of the major economic sectors. The second step was to match each expenditure with its appropriate employment and income multipliers. There are several modifications to this technique, however.[2]

(1) Energy savings and impacts are limited to a 10-year review. Moreover, while the program activity occurred over essentially a three-year period, for purposes of this modeling exercise it was assumed that all investments occurred in 1993.

(2) Loans were assumed to be an average of five years with a five percent interest rate. It was further assumed that the projects had an average lag of one-half year from the time the construction improvements were made to the first monthly energy bill savings.

(3) All dollar values were deflated to 1989 dollars which is the base year of the RIMS model.

(4) An adjustment for employment impacts was made to account for future labor productivity. This means that compared to 1993, for example, a one million dollar expenditure in the year 2002 will support only 91 percent of the number of jobs as in 1993.[3]

(5) Based upon the numbers provided by the Energy Office, it turns out that only an average of 37 percent of the project improvements were for documentable energy efficiency improvements. This is shown in Table 3. Thus, the decision was made to run an impact analysis for both the full project investment level ($43.9 million) and the amount reasonably attributable to energy efficiency improvements alone ($16.4 million).

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2. For a more complete review of how this type of analysis is carried out, see, Howard Geller, John DeCicco and Skip Laitner, *Energy Efficiency and Job Creation: The Employment and Income Benefits from Investing in Energy Conserving Technologies* (Washington, DC: American Council for an Energy-Efficient Economy, October 1992.

3. The calculation is $1/(1.01)^9 * 100$ equals $1/1.094 * 100$, or 91 percent.

Table 3. Project Paybacks and Efficiency Shares			
Sector	Estimated Payback for Full Project Investment (Years)	Estimated Share of Total Investment that is Efficiency Related (Percent)	Estimated Payback only for Efficiency Related Investments (Years)
Agriculture	10	68	6.8
Small Business	13	38	5.0
Government	12	60	7.2
Nursing Home	13	59	7.5
Residential	38	33	12.5
Average	24	37	9.0

Note: Since it is difficult to know how much energy savings can be actually applied to a give project, the payback periods shown here are based upon Energy Office engineering estimates and a limited number of evaluation completed to date. Personal communication with Larry Kinyon, Nebraska Energy Office, September 19, 1994.

ANALYTICAL RESULTS

Table 4 summarizes the economic analysis completed on the NEO loan program. It anticipates the ebb and flow of dollars from one sector to another as a result of the loan program. For example, as homeowners borrow money from the banks that stimulates a positive impact in the finance sector of Nebraska's economy. The special trade contractors also benefit as their construction crews are given new work to complete.

At the same time, once the households begin to repay the bank loans they forego other expenditures which become a loss to the economy. Lower energy bills become a source of income that is spent by the households on typical consumer purchases. Those purchases act as a positive stimulus to the economy. Finally, the energy suppliers lose revenues which means a loss to the economy. All of the gains and losses must be identified over time and matched up with the appropriate sectoral multiplier. The sum of these products then becomes the net impact shown in Table 4.

Table 4. Summary Impacts of NEO Loan Program		
Category of Impact	**Total Projects**	**Efficiency Only Projects**
Total Investment ($MM)	$43.90	$16.44
Energy Savings ($MM)	$1.83	$1.83
Employment (Job-Years)	789	442
Net Income ($MM)	$17.26	$8.92
Value-Added ($MM)	$28.30	$14.62

Note: Under the scenario described above, the investment is assumed to have occurred in year one of the analysis. The energy savings are recurring annual benefits while the macroeconomic impacts are cumulative net impacts (gains minus losses) over the 10-year period of analysis. Thus, 789 jobs-years are the same as 78.9 jobs occurring each year over the 10-year period.

Table 4, on the following page, summarizes the total investment leveraged by the loan program as well as the anticipated annual energy savings made possible through the installed efficiency improvements. Whether compared on a total project basis, or only in terms of the actual efficiency improvements undertaken, the loan program has a positive economic benefit for Nebraska.

Over the 10-year period of analysis, the economy will support an estimated 789 job-years of employment and $17.26 million in added wage and salary compensation. Averaged over the 10 years, the economy will sustain a net improvement of 78.9 jobs each year for the 10-year period. Wage and salary income will increase by an average of $1.73 million each year for 10-years. It is expected that these benefits will contribute a total of $28.3 million to the Nebraska Gross State Product over the 10-year period, or an average of $2.83 million annually.

The efficiency improvement projects contribute 56 percent of the net benefits despite the fact that they constitute only 37 percent of the total investment. This result seems to confirm the notion that energy efficiency contributes to overall economic efficiency and well-being.

Conclusions

Based upon the analysis described above it is clear that the Nebraska Dollar and Energy Saving Loan program is a positive contribution to the state's economy. In the 10-year period of analysis it supports on the order of 800 job-years of net employment, and it contributes an increase of $17.26 million in net income for Nebraska residents.

While the employment and income benefits seem significant, when compared to the ovreall level of investment, one might conclude that 80 jobs per year is rather a small return. But the problem is only one of scale. One the one hand, an investment of $43.9 million is a lot of money; but on the other, it is less than 0.2 percent of Nebraska's GSP. Moreover, the savings of $1.8 million annually is less than 0.06 percent of the state's annual energy bill.

These insights prompt two suggestions. First, if the Energy Office can find other ways to leverage additional funds for energy efficiency improvements, the size of the economic return will increase accordingly. Second, the Energy Office may want to increase the percentage of loans which result in actual energy efficiency improvements. For example, had the ratio of efficiency improvements risen from 37 percent to 85 percent of total investment, the net employment gain would have increased to over 1,000 job-years.