Nebraska Community Energy Management Program

Fremont Energy Study 1983

NEBRASKA ENERGY OFFICE, BOX 95085, LINCOLN, NEBRASKA 68509-5085 PHONE (402) 471-2867

nebraska energy office

TABLE OF CONTENTS

People at the Local Level Will Determine Their Energy Needs for Today and Tomorrow

The Nebraska Energy Office is committed to assisting local communities plan for their own energy future. Lasting energy conservation and planning must happen in city halls, churches, and in civic group meetings all across Nebraska. The Nebraska Energy Office will be there--organizing, researching, and supporting them along the way towards energy independence.

The Nebraska Community Energy Management Program has selected three towns--Fremont, Lexington, and Bayard--to serve as pilot cities. A four-phased planning and action program starts with the formation of a local energy committee representing as many different segments of the community as possible. The Nebraska Energy Office then provides an energy specialist who conducts a data analysis of the energy used by type and consumption. In a subsequent town energy meeting, the data is presented and the assembled group determines how they want to concentrate their efforts to minimize energy consumption. With the help of the Nebraska Energy Office, a comprehensive energy management plan is developed. In the last phase, local activities are developed to implement the plan selected.

The Fremont Energy Study was prepared by Skip Laitner of the Community Action Research Group under contract with the Nebraska Energy Office for the pilot phase of the Nebraska Community Energy Management Program in Fremont, Nebraska.

The Nebraska Energy Office also acknowledges the support and cooperation of the Fremont Chamber of Commerce and the Fremont Energy Committee for their commitment and cooperation in the Nebraska Community Energy Management Program. Voluntarily serving on the Fremont Energy Committee are:

Ron Bolden
Dave Christensen
Terry Gilfry
Per Gjelsten
Tom Grein
Dave Graybill
Monte Harkless
Larry Johnson
Ralph Kessler
Lee Moll
Jim Moore
Randy Reyzlik
Harold Schneider
Steve Thompson

NCEMP

--Ann Brockhoff
Community Energy Manager
Nebraska Energy Office
September 15, 1983

EXECUTIVE SUMMARY

Energy is essential for a healthy economy, but higher prices for energy resources can spell trouble for communities such as Fremont, Nebraska. People typically think of energy costs only when their monthly utility bills arrive or when they pull into a local filling station to fill up the gas tank. Few realize, however, just how much energy "costs" their community in terms of lost economic development. As energy costs grab more and more investment capital or take a bigger bite out of disposable income, many people find that local energy management strategies not only ease the budgetary pressures confronting families and businesses, but they also become the cornerstone of renewed economic development.

Experts differ on the degree to which energy prices have contributed to present economic problems. But all agree that the cumulative impact is pervasive. Farmers, for instance, see the effect directly in the higher prices they pay for diesel fuel or propane, and indirectly in the higher prices for such items as pesticides and fertilizers. With each dollar increase in the wholesale price of a thousand cubic feet (MCF) of natural gas, the price of anhydrous ammonia may climb another $40 per ton--almost 20% more than is now paid.

Senior citizens and low-income families see the effects not only in their heating bills, but in their food and medicine costs as well. In the latter case 80% of pharmaceuticals are petroleum-based which means that as oil prices jump, retail prices for medicines must also increase.

Since money spent on energy tends to produce fewer jobs than money spent on other goods and services, diverting money from agricultural and manufacturing sectors to pay for higher energy bills creates or maintains high unemployment levels. Officials with the Treasury Department see the effect of energy costs in the form of fewer tax receipts since the unemployed are no longer paying taxes. Finally, as the massive utility and oil company construction programs soak up available capital, interest rates are escalated in response to a demand for money that exceeds the supply. This is an indirect cost of energy that threatens the stability of innumerable businesses who already flirt with bankruptcy.

Although Fremont is not an especially energy-intensive community compared to other parts of the country, the impact of rising energy prices appears to be significant nonetheless. It is estimated that the almost 24,000 people living in Fremont consumed a total of 5.41 trillion Btus* in 1982. This is approximately 226 million Btus for each man, woman and child in the town. This total includes energy purchased for transportation and business as well as for the home.

By converting the different energy resources into a common unit of measurement - a gallon of gasoline - we find that each resident consumed the equivalent of 1800 gallons of gasoline to maintain the 1982 standard of living in the community. The total energy bill for Fremont is pegged at $45 million, most of which is exported from Nebraska in order to import the needed energy supplies.

Including only real cost increases (in other words, eliminating the effects of inflation), and assuming only a modest growth in overall energy consumption and price increases, the annual costs of retail energy purchases will jump perhaps seven percent each year the community delays implementation of an aggressive energy management program. If there are no dramatic shifts in costs caused by events such as another oil price shock or the accelerated decontrol of natural gas prices at the wellhead, this means that by 1990 Fremont businesses and residents would be paying almost $81 million for energy under a "business-as-usual" scenario. As measured in 1982 dollars, the net economic benefits to Fremont would be <u>$53 million less</u> than if the total energy bill remained at the present level as a result of a successful energy management effort that could offset the effect of higher prices. Thus, improved efficiency in energy use has the potential of reducing these energy costs in a way that can provide an economic stimulus to the community.

---

*A Btu is a measure of heat contained in a fuel. It is roughly equal to the amount of heat generated by the complete burning of an ordinary wooden kitchen match. For reference, there are 3,413 Btus in each kilowatt-hour of electricity that is purchased; 124,905 Btus in a gallon of gasoline; and 994,000 Btus in each thousand cubic feet (MCF) of natural gas.

ENERGY AND NEBRASKA

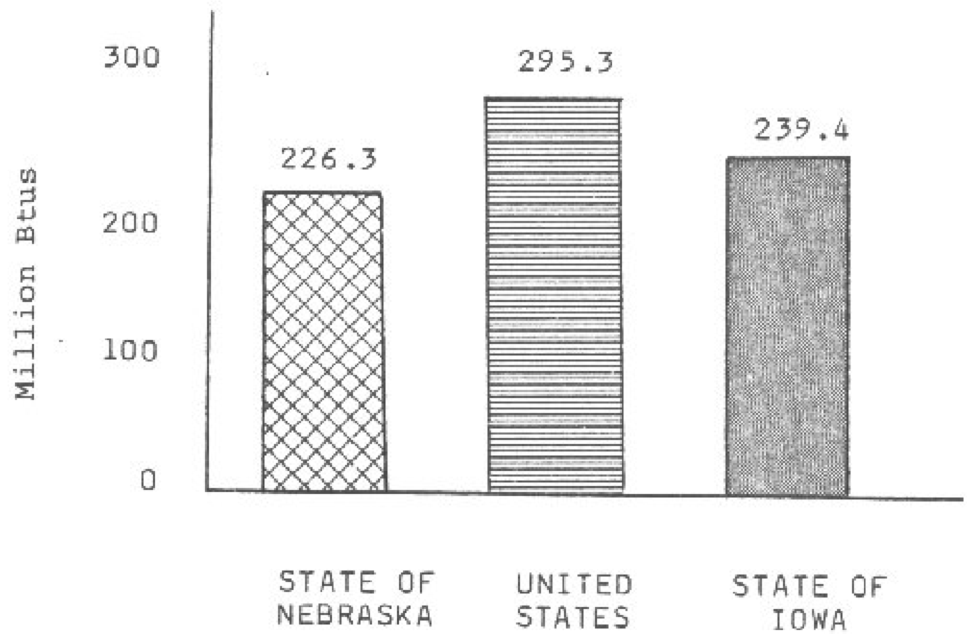
In order to evaluate fully the energy consumption patterns in a community such as Fremont, it helps to develop a framework that provides the reader with a point of reference. For that reason the discussion here begins with a brief look at the Nebraska energy situation. As Figure I illustrates, the state purchases about five percent less retail energy per capita than neighboring Iowa and 25% less than the United States as a whole. Table A supplements this picture by providing a snapshot of where Nebraska uses its energy and in what form the energy is supplied to the state's ultimate users.*

*When referring to energy consumption patterns there generally are two perspectives mentioned: end-use consumption which refers to the retail purchases of consumers indicating whether they are residential or industrial users; and gross consumption which reflects total energy used including energy that is lost in the generation and transmission of electricity. Table A illustrates this difference. Nebraska's 1982 gross consumption, including electrical losses, was 533.8 trillion Btus. The end-use purchases totaled 355.2 trillion Btus, however. Since it is the economic impacts that concern us in this analysis, it is the latter figure which interests us, especially the price paid for the purchased energy. As with any cost of doing business, expenses such as energy losses are incorporated in the retail prices and so are implicit in the discussion of end-use consumption. All references in this report -- again, since we are looking at the economic rather than the engineering impacts of energy -- will be in terms of retail purchases.

In reviewing Table A, for example, we find that transportation is Nebraska's most energy-intensive sector. This is not so surprising when you consider two interesting statistics. First, Nebraska has 16% more registered motor vehicles per capita than the United States as a whole; and second, reflecting its rural nature, the state has more than three times the total highway miles per capita than the U.S.

FIGURE I

COMPARISON OF PER CAPITA RETAIL ENERGY CONSUMPTION PURCHASED IN THE U.S., NEBRASKA AND IOWA



Source: Calculated from data provided by the U.S. Department of Energy, the Nebraska Energy Office and the Iowa Energy Policy Council.

TABLE A

COMPARISON OF NEBRASKA END USE
ENERGY CONSUMPTION BY SECTOR

(in 1982 trillion BTUs)

	Residential	Commercial	Industrial	Agricultural	Transportation	Total
Coal	0	.4	6.9	0	0	7.3
Natural Gas	58.1	33.6	30.3	9.8	0	131.8
Gasoline	0	0	0	4.4	94.2	98.6
Aviation Fuel	0	0	0	0	4.0	4.0
Propane LP	4.1	2.7	1.2	8.2	0	16.2
Distillates	2.6	6.3	5.4	19.9	17.4	51.6
Electricity	19.4	13.2	8.9	4.2	0	45.7
End-use Total	84.2	56.2	52.7	46.5	115.6	355.2
Losses in transmission and distribution of electricity	75.8	51.6	34.8	16.4	0	178.6
Total including losses	160.0	107.8	87.5	62.9	115.6	533.8

Source: 1982 Annual Report, Nebraska Energy Office

As further noted in Table A, retail sales of energy in Nebraska consist mainly of natural gas, gasoline, distillate fuels such as home heating oil and diesel fuel, and electricity. Refined petroleum products are the single largest contributor of energy consumed in Nebraska and accounted for 43% of the end-use energy consumed in the state in 1982. Natural gas was the second largest source of energy comprising 37% of the total energy consumed, and electricity was the third largest energy source, providing just under 13% of the 1982 demand for energy.

Only small amounts of these various natural resources are available in Nebraska for energy production. This means that most of Nebraska's energy must be imported, which in turn means that dollars must be exported to pay for the energy. Alternate energy sources hold promise for the future, although in 1982 alternatives such as solar, wind, biomass and alcohol fuels provided less than 1% of the energy consumed in the state. Among these alternatives, the ethanol portion of gasohol accounted for approximately 1% of the fuel used by motor vehicles.

With this information, together with census and other demographic data, we can build an energy usage profile specifically for Fremont. The results of this profile are illustrated in Table B.

TABLE B

1982 FREMONT RETAIL ENERGY PURCHASES BY SECTOR

(in trillion Btus)

Residential	1.30
Commercial	.92
Industrial	1.43
Transportation	1.76
TOTAL	5.41

Estimated Fremont Energy Bill: $45.0 million

Source: Totals calculated from various demographic data provided by the U.S. Census, the Nebraska Energy Office and the Nebraska Department of Economic Development (see text of report for full information).

AN ENERGY PROFILE OF FREMONT

When we speak of an energy profile for Fremont, Nebraska, we are referring to the amount of energy purchased by end-users who live or do business within the city limits of Fremont. However, since many energy transactions and users are not strictly confined to Fremont itself -- for instance, many persons who purchase gasoline in the town may not actually live or do business within the city limits -- the resulting profile is only an approximation of consumption for the community.

Another point to be kept in mind is that the profile has been constructed from a combination of actual use data and from estimates derived from a statistical analysis based upon demographic data such as population, income, automobile registrations, retail sales, industrial activities and so forth. This information was obtained from sources including the U.S. Census data for Fremont and Dodge County, the Nebraska Energy Office and the Nebraska Department of Economic Development.

While a more accurate profile could be generated by conducting an extensive end-use survey of each of the major sectors, such an effort would cost far more than funds presently allow. Nonetheless, to illustrate the magnitude of the economic impacts resulting from a "business-as-usual" approach to continued energy consumption, the methodology used to generate the profile of this report provides a sufficient statistical base to conclude that a major opportunity exists to improve the economic well-being of Fremont through an energy management program. The conclusions in the report are believed to be accurate within a margin of plus or minus ten percent.

In 1982 Fremont's energy consumption was approximately 5.41 trillion Btus. To provide a more meaningful illustration of this number represents, we can put it in the context of what how much equivalent gasoline it represents for each of the 23,979 residents. Since one trillion Btus is comparable to the energy contained in about eight million gallons of gasoline, we might say, instead, that Fremont residents and businesses consumed the equivalent of 43.3 million gallons of gasoline for all 1982 end-use energy needs--approximately 1800 gallons per person. The total energy for the community is pegged at $45 million in 1982, about $1,876 per capita.

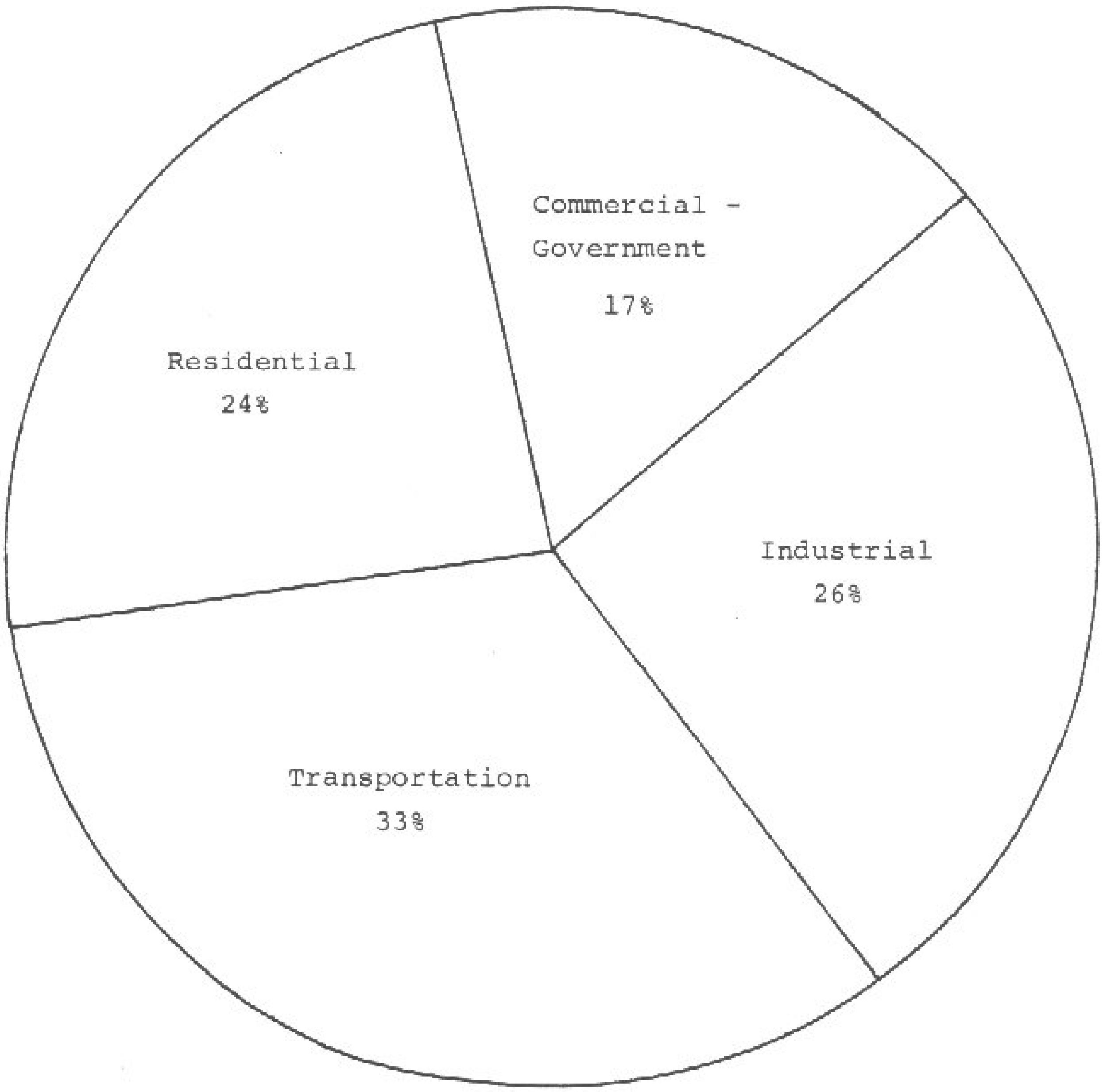
As the pie charts indicate (Figures II and III), the transportation sector is the most energy-intensive area of the Fremont economy. This is consistent with the state profile. Contrasted to the state totals, however, natural gas rather than refined petroleum products is Fremont's largest energy resource, providing about 43% of the city's total energy requirements when compared on an equivalent Btu basis. This is followed by transportation fuels at 33%, electricity at 17% and some miscellaneous fuels such as propane and fuel oil at 8%. In terms of actual consumption measures, these percentages are broken down into the following:

* Natural gas	2,340,342	thousand cubic feet (MCF)
* Transportation Fuel	14,288,115	gallons
* Electricity	269,469,000	kilowatt-hours
* Miscellaneous fuel	3,480,000	gallons

To better understand how usage impacts upon an economy such as Fremont's, it is helpful to break the consumption pattern into a sector by sector analysis.

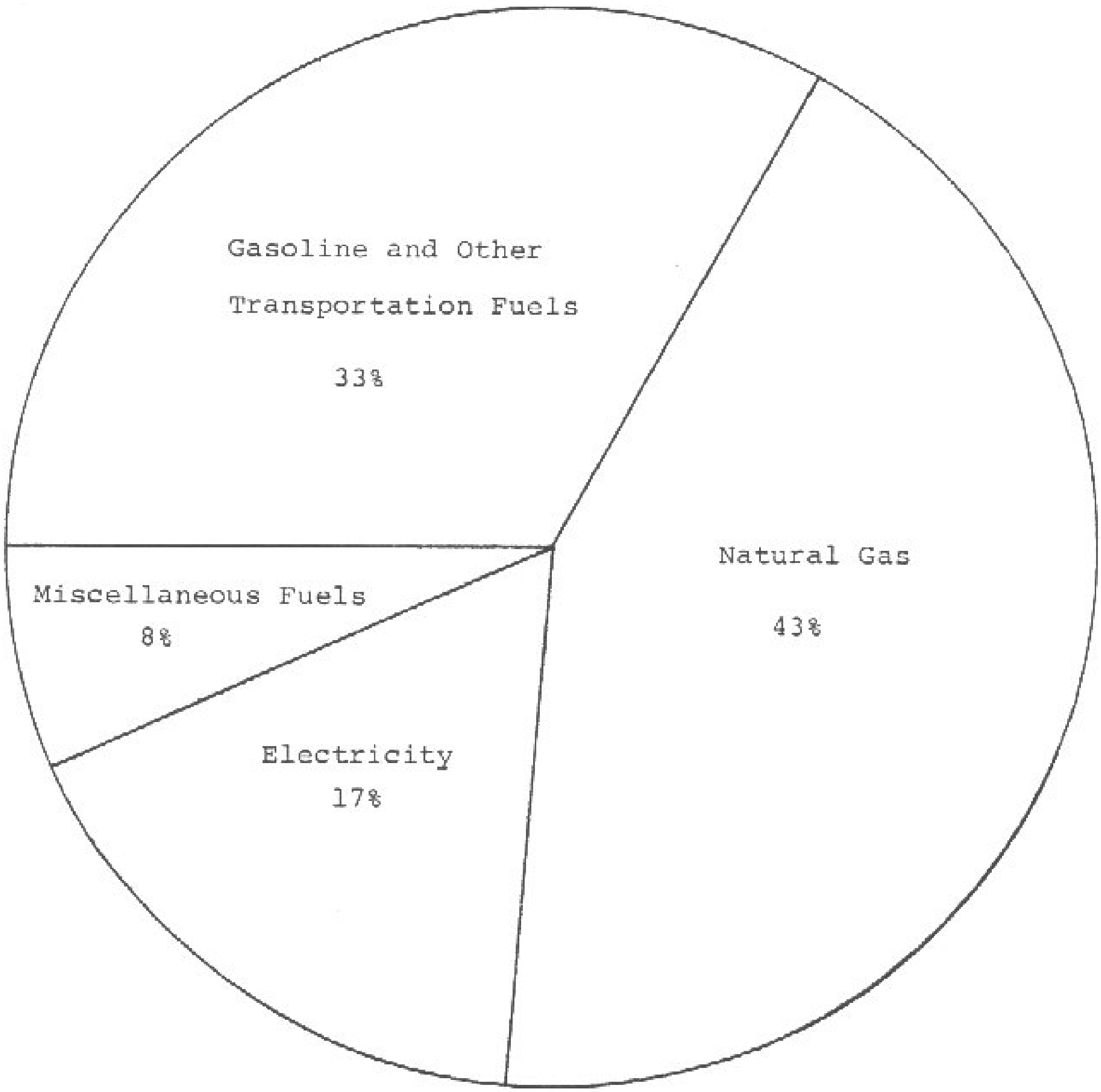
RETAIL ENERGY PURCHASES IN FREMONT BY SECTOR
AS A PERCENTAGE OF TOTAL BTU CONSUMPTION (1982)

FIGURE II



FREMONT RETAIL ENERGY PURCHASES BY FUEL TYPE
AS A PERCENTAGE OF TOTAL BTU CONSUMPTION (1982)

FIGURE III



END-USE SECTOR ANALYSIS

Residential

According to 1980 Census data and city utility data, there are between 9100 and 9300 residential dwelling units housing the 23,979 residents of Fremont. Of these approximately 60% were constructed prior to 1960 and can be considered to have been constructed below current energy standards. Because of market demand and state adoption of minimal energy standards, most new homes are insulated and more energy efficient than older housing, although still more energy consuming than need be the case if building designs approached the levels that are technically feasible today. A majority of homes are air conditioned, and there is a trend toward central units or wholehouse conditioning.

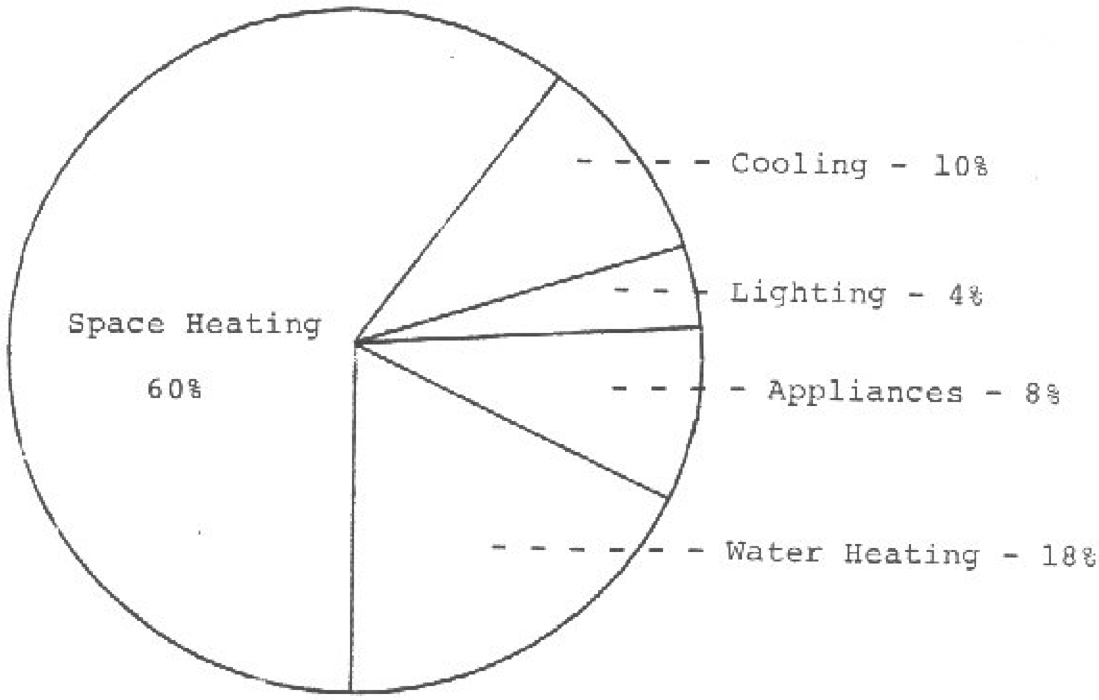
Energy use in the residential sector can be divided into four major categories: space heating, water heating, space cooling, and other appliance use. Of these, space heating accounts for about 60% of the home energy bill. Currently, approximately 71% of the Fremont residential energy needs are supplied by natural gas, 22% by electricity and the remainder by propane or heating oil.

There is an enormous potential for reducing the space heating requirements in residential buildings. For example, a new 1,500 square foot home (typical of the new dwellings being constructed now in Nebraska) can reduce its thermal needs by 60% or more compared to pre-1978 units through improved building design. A well-designed new home might be able to lower its annual heating demand from 161,000 cubic feet of natural gas to 67,000; and a new home that incorporates either some carefully designed solar or super-insulating features can cut that demand even further, to as low as 13,000 cubic feet per year. By 1990 this might produce a savings of $600 to $900 a year to the household in avoided heating bills.

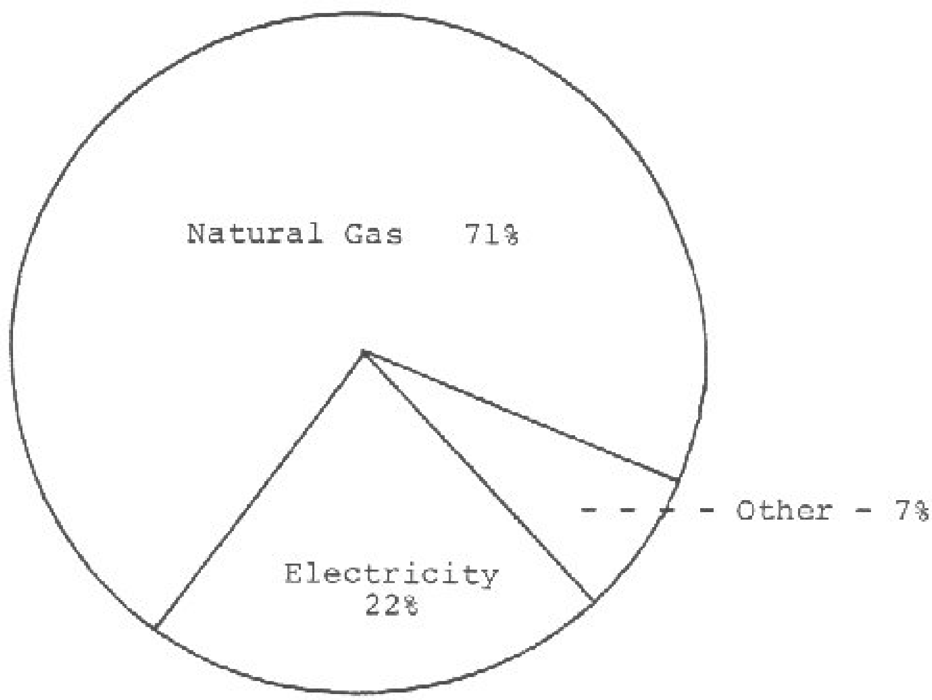
A number of studies suggest that existing building stock can improve its energy efficiency by 40% to 60%. However, it is expected that without new programs to promote conservation in the residential sector, overall consumption will increase slightly as more homes are built. Their increased efficiency will be offset by a move from the present 1300 square feet unit to new homes averaging 1500 square feet or more. This may be especially true in Fremont since the community has a higher per capita income than the state as a whole ($9,650 for Fremont versus $9,086 for Nebraska in 1980 dollars). This usually translates into a parallel increase in energy consumption.

FIGURE IV

ILLUSTRATION OF TYPICAL RESIDENTIAL CONSUMPTION IN FREMONT



PERCENT BY END-USE



PERCENT BY FUEL TYPE
(excluding transportation)

Commercial

Fremont appears to have a fairly strong commercial sector. Per capita retail sales averaged more than $5,376 in 1982 compared to a statewide average of $5,220. The commmercial sector, including local government operations, employs about one of every four persons in the labor force. Thus, not only are the sales of goods and services affected by rising energy prices, but local employment opportunities are threatened as well.

Activity in the commercial sector takes place in a variety of settings such as stores, offices, hotels, theaters and restaurants. The needs for energy vary widely among these facilities, but they all have common requirements for heating and cooling of their interior space, lighting, and other requirements such as office equipment, cooking, elevators, computers and communications systems.

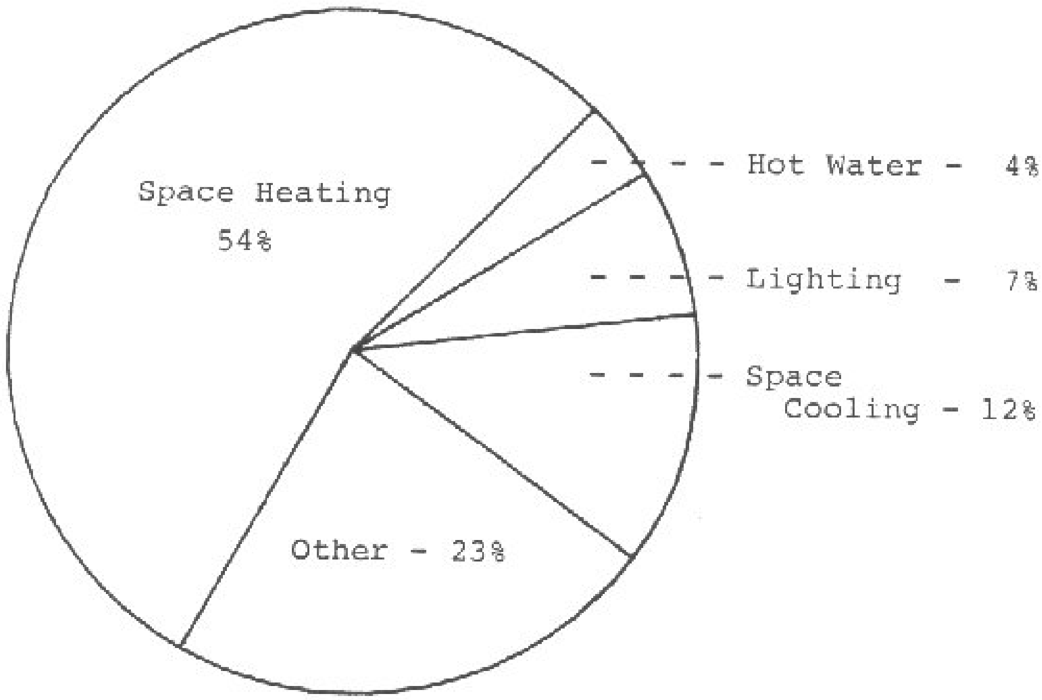
Space heating typically accounts for 54% of the total energy budget for the commercial sector; space cooling, 12%; lighting, 7%; water heating, 4%; and other uses mentioned above, 23%.

The primary energy sources used in the commercial sector are natural gas and electricity with some contributions from the middle distillates and propane. Use by fuel type is presented in the pie chart contained in Figure V.

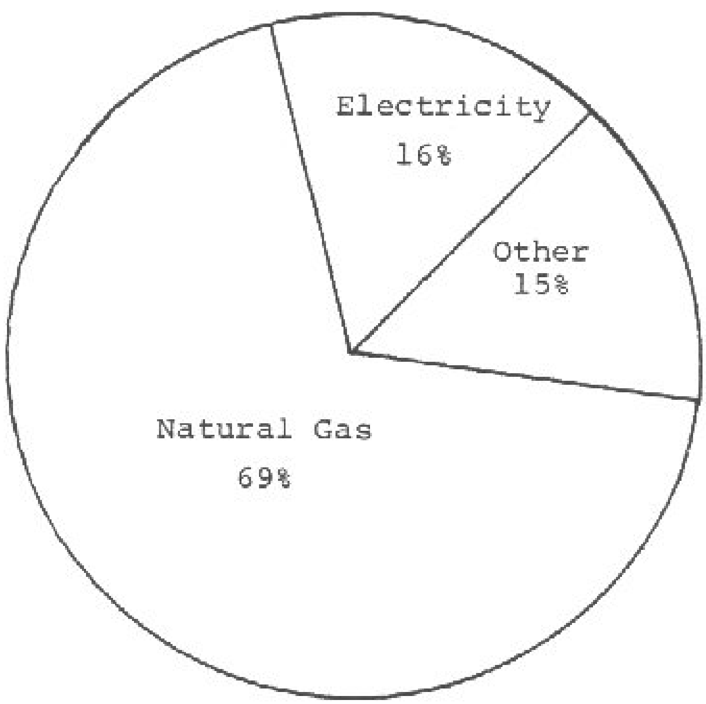
The U.S. Department of Energy and the U.S. Department of Commerce estimate that savings of 20% to 50% in commercial buildings is possible. Many retail trade associations publish energy guide books that claim 10% to 30% energy savings if implemented. The Nebraska Commercial Conservation Program has found the greatest savings to businesses are achieved by simply properly operating and maintaining existing mechanical systems.

FIGURE V

TYPICAL FREMONT COMMERCIAL CONSUMPTION



PERCENT BY END-USE



PERCENT BY FUEL TYPE
(excluding transportation)

Industrial

Because many commercial enterprises may be included in the industrial sector when compiling utility and energy data, it is difficult to segregate industrial businesses from commercial enterprises. However, a solid estimate of industrial energy consumption can be made by establishing a relationship between overall energy demand and the measure of value created by the industrial sector. Value added is the difference between the value of a finished product and the value of the materials that went into its production.

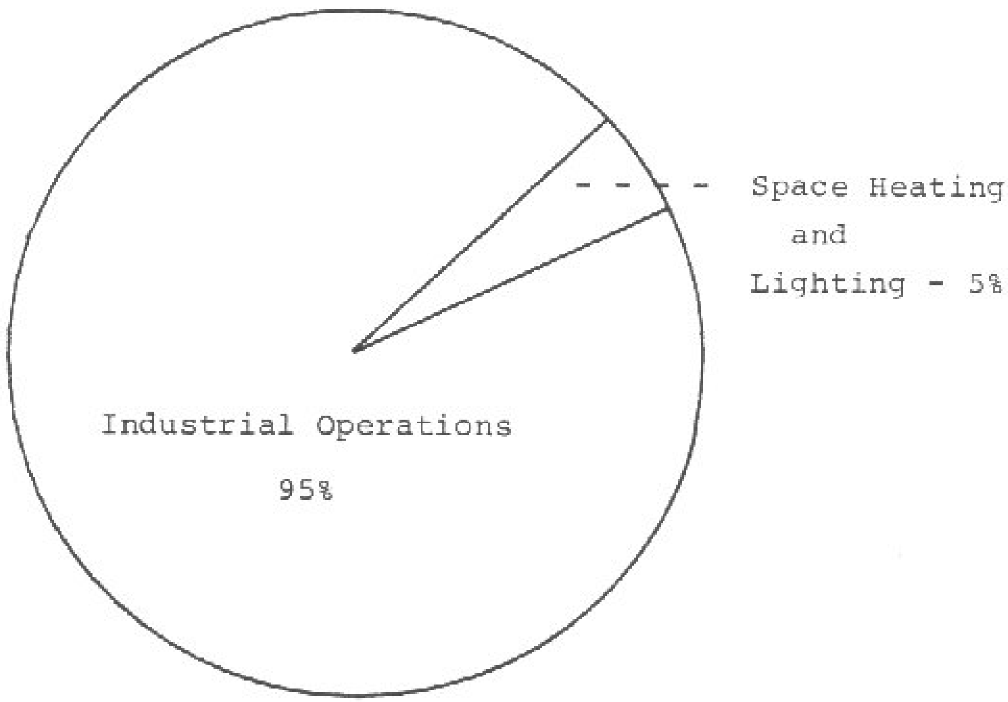
Comparing Nebraska as a whole to Fremont, we find that on the average Fremont is a heavily industrial community. For example, the value added to raw materials by production per capita in Fremont is estimated to be $3,243 (in 1977 dollars), while the state as a whole averaged only $1,826 per capita. This larger industrial activity accounts for the higher demand for energy in Fremont when contrasted with the state. This point is outlined in Figure VI. One interesting note is that it takes the energy equivalent of one gallon of gasoline for every $20 of manufactured goods produced in Fremont as measured by the value added index.

Even with the recent loss of CF Industries, a large producer of ammonia fertilizer, natural gas consumption continues to meet the largest industrial load, providing an estimated 52% of overall needs. Electricity supplies 33% of total energy requirements while other fuels such as propane and fuel oil picked up the remaining 15%. Most of the consumption is absorbed by industrial operations with only 6% of the total energy going for heating and lighting.

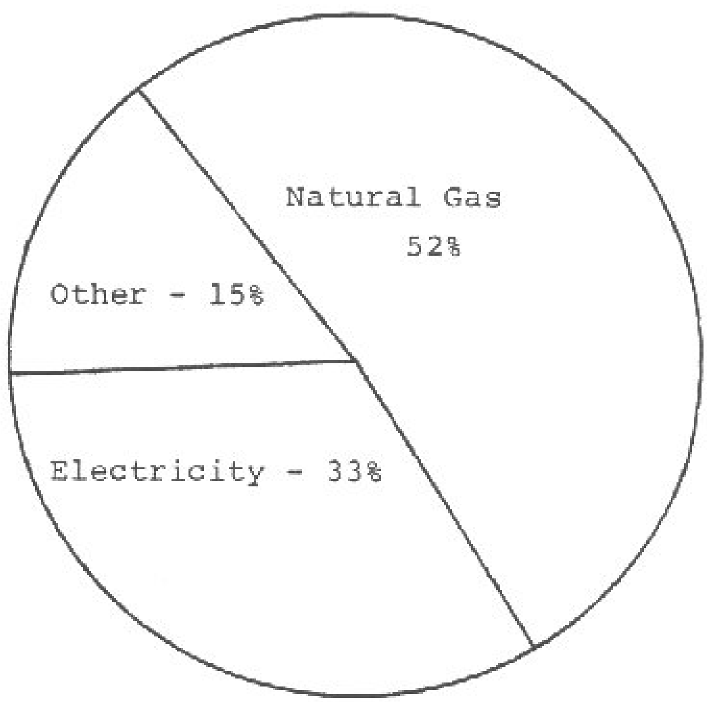
In 1981 the Nebraska Energy Office, in cooperation with the Grand Island Chamber of Commerce, conducted team audits of twelve manufacturers. Every facility audited revealed the potential of at least 15% reduction in energy consumption through low cost/no cost recommendations. This is a strong indication that even with the significant conservation efforts undertaken by industry through 1980, more opportunities exist to reduce demand still further.

FIGURE VI

FREMONT INDUSTRIAL CONSUMPTION



PERCENT OF END-USE



PERCENT OF FUEL TYPE

Transportation

Most energy for transportation is supplied by gasoline, oil, and diesel fuels. Supplemental amounts are provided by super-unleaded with ethanol (gasohol) and propane. Mileage driven in Nebraska peaked in 1978 and then decreased in 1979-80. Since 1981 mileage has again been gradually increasing although total fuel use continues to decline since improved efficiency in miles per gallon has more than offset any driving increases.

Fremont has almost 13,000 automobiles registered, about one car for every 1.92 persons. This is 4% more than the state average. Registration of other vehicles such as trucks and motorcycles appears to be similar to the state average. With the higher automobile registrations, Fremont uses more energy per capita for passenger car travel than Nebraska. Since there is only a negligible contribution from the aviation fuels compared to the state totals, it turns out that per capita consumption for the transportation sector is comparable to the state consumption rates.

Summary

Figure VII provides a summary comparison of per capita energy consumption in Fremont with consumption in the state. The most immediate conclusion is that Fremont tends to be a heavy industrial user of energy relative to other parts of the state.

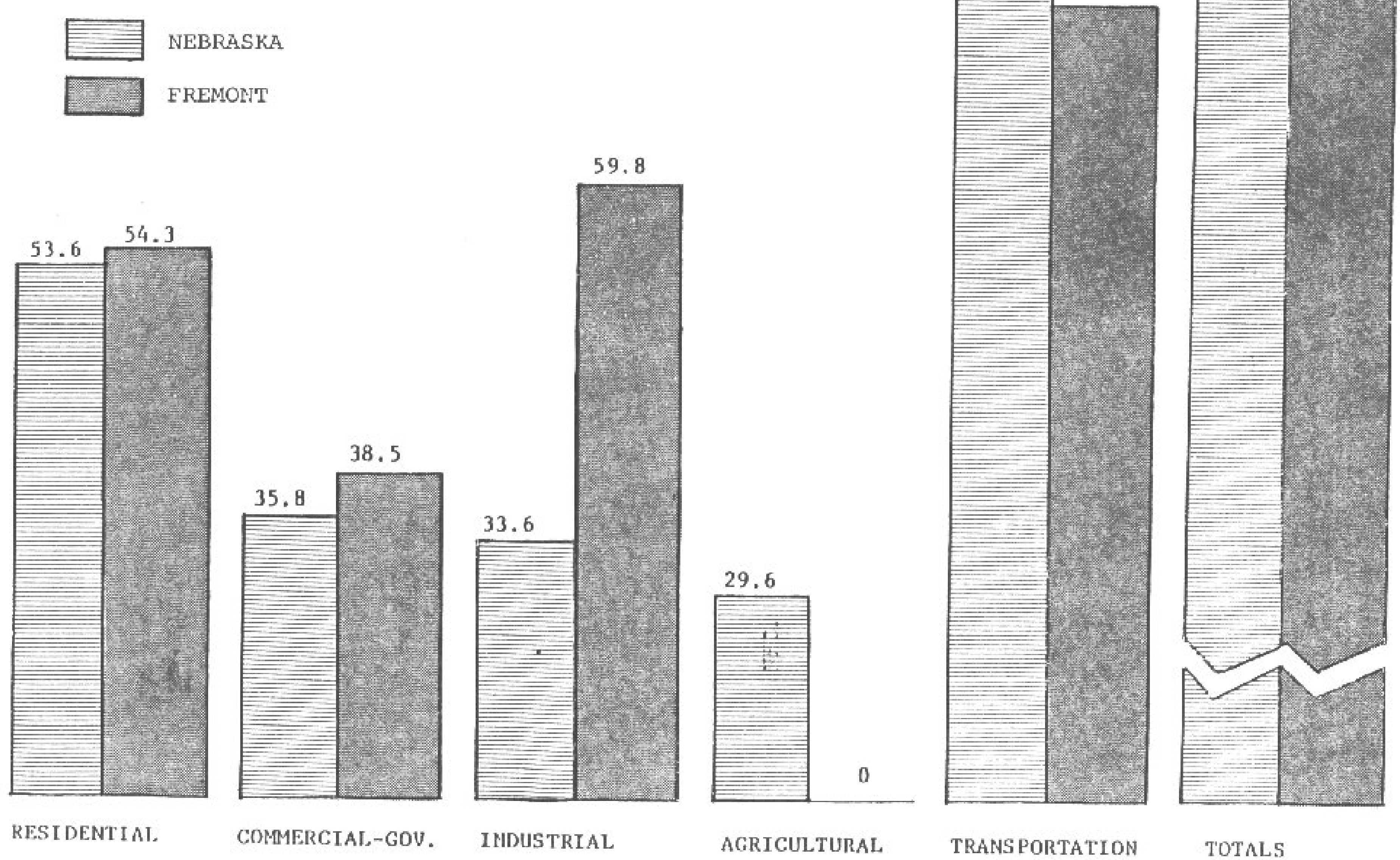
In most other aspects energy consumption levels in Fremont are comparable to the state. According to data supplied by the Nebraska Energy Office, the annual increase in energy consumption during the 1970s was approximately 3%, down from the nearly 6% rate in the preceding decade. After peaking in 1979, energy use declined about 5% in both 1980 and 1981 but was followed by a 4% increase in 1982. The Energy Office estimates further that a more moderate 1.5% annual rate can be expected in overall energy use through 1990, however.

Given the similarity in energy intensity between Fremont and the state, coupled with a projected increase in population of .8% per year in Dodge County as a whole, it seems reasonable to expect that, absent any major conservation programs within the community itself, the Fremont retail energy consumption is likely to grow at that parallel rate.

COMPARISON OF NEBRASKA AND FREMONT PER CAPITA

ENERGY CONSUMPTION BY SECTOR - FIGURE VII

(in 1982 million BTUs/person)



1990 ECONOMIC IMPACTS

In reviewing the future impacts of rising energy costs upon a local economy, there are several different perspectives we can explore. The first is to explore the costs to the average household for its direct consumption. The second is to evaluate the community's annual energy bill for all sectors in terms of Fremont's per capita incomes. The last approach is to look at how rising energy prices affect the local economy productivity.

To begin our analysis we need first to look at typical 1982 energy costs in Fremont. This is presented in Table C, both in dollars per conventional measure (e.g., gallons, MCF or thousand cubic feet, and kilowatt-hours) and in dollars per million Btu. This will allow a comparison of equivalent costs. It is interesting to note that our most expensive energy supply is electricity, approaching $15/million Btu while natural gas is the least expensive at $5.22 per million Btus. However, because a typical household or business uses so much more natural gas in absolute terms, the bills tend to be considerably higher than for electricity. The weighted average of all retail energy purchases in 1982 is listed at $8.36/million Btus. Assuming a real price increase of only six percent per year, by 1990 the average price of energy can be expected to climb to $13.22/million Btu (in 1982 dollars, effectively eliminating the impact of inflation). Many analysts believe this may prove to be a low estimate, projecting real price increases to average 10% or more on average. To the extent that this is the case, then our discussion here will tend to understate the costs of energy consumption.

The prices listed on Table C understate the cost to the residential consumer since, on average, residential electrical and natural gas rates are higher than for commercial and industrial customers. Table D identifies these costs in terms of the 1982 consumption of a typical Fremont household and projects the costs of a similar household in 1990, assuming 3-4 persons in each household.

Should this trend materialize, the implication is clear: even with a modest conservation effort the household energy costs will experience a 44% increase, rising from $2,229 in 1982 to as much as $3,213 in 1990.

But this information does not tell us about the household or individual share of industrial or commercial-governmental energy requirements. As previously noted, Fremont spends $45 million a year for all uses of energy. This represents a per capita expenditure of $1,876. Since the 1982 estimated per capita income approaches $10,500, it means that 18% of the Fremont income must go to pay for energy consumption in one form or another. If we assume that energy prices rise as little as 6% per year after discounting for inflation, and if overall usage increases by only 1.5% annually, by 1990 each of the 25,500 residents of Fremont (up from the present 23,979) will be paying $3,150 to purchase the energy needed by the community. Should real incomes rise by as much as 3% per year, the net result will be that in eight short years, per capita energy costs will jump to 24% of the personal income levels. This point is illustrated in Figure VIII.

Having to spend more of our business and family budgets on energy, by definition, implies there will be less money for other goods and services. In short, the productivity of the local economy will be weakened if Fremont cannot find a way to stem the flow of energy dollars. While these numbers are not absolute forecasts of the future, they do underscore a central theme of this report: increasing energy costs will be a major factor in determining the quality of future economic development.

Another measure of productivity is to compare the economic benefits that result from spending a dollar on one commodity compared to another. As Table E illustrates, under optimum circumstances, a one dollar expenditure for conventional energy yields a "multiplied" economic benefit of only $.70 for a state such as Nebraska. This figure reflects a composite of electricity, natural gas and oil expenditures and it reflects the fact that when money is spent for a commodity such as energy, the effect is to generate business activity and tax revenues that, in turn, create a demand for additional manufacturing and employment that will ripple through the economy and multiply the value of the original expenditure.

In the case of most conservation and normal consumer purchases, a one dollar expenditure under optimum conditions can yield as much as $2.20 in net multiplied benefits to the state. Thus, for each dollar that can be diverted from conventional energy supplies in a cost-effective fashion, the local economy can gain as much as $1.50, essentially the difference between a multiplier of $2.20 rather than $0.70. With this perspective in mind, then, we can now take a look at the impact of future energy bills on the Fremont economy by comparing a moderately aggressive conservation effort within the community to a "business-as-usual" approach to energy matters.

TABLE C

TYPICAL 1982 RETAIL ENERGY PRICES IN FREMONT, NEBRASKA

Fuel Source	$/Unit	$/Million Btu
Gasoline	$1.22/gallon	$ 9.76/mmBtu
Natural Gas	$5.19/MCF	$ 5.22/mmBtu
Electricity	$ .051 kwh	$14.94/mmBtu
1982 average energy price for all sources:		$ 8.36/mmBtu

Projected 1990 average energy price for all sources (in 1982 dollars): $13.22/mmBtu

TABLE D

ILLUSTRATION OF AVERAGE HOUSEHOLD COSTS IN FREMONT

1982

electricity	- 7,400 kwh at $.053	= $ 392
natural gas	- 120 MCF at $5.65/MCF	= $ 678
gasoline	- 950 gallons at $1.22/gal.	= $1,159
	Annual Total:	$2,229

1990

electricity	- 6,500 kwh at $.062	= $ 403
natural gas	- 90 MCF at $9.50/MCF	= $ 855
gasoline	- 850 gallons at $2.30/gal.	= $1,955
	Annual Total:	$3,213

FIGURE VIII

ENERGY COSTS AS A PERCENTAGE OF PERSONAL INCOME - FREMONT

(1982 dollars)

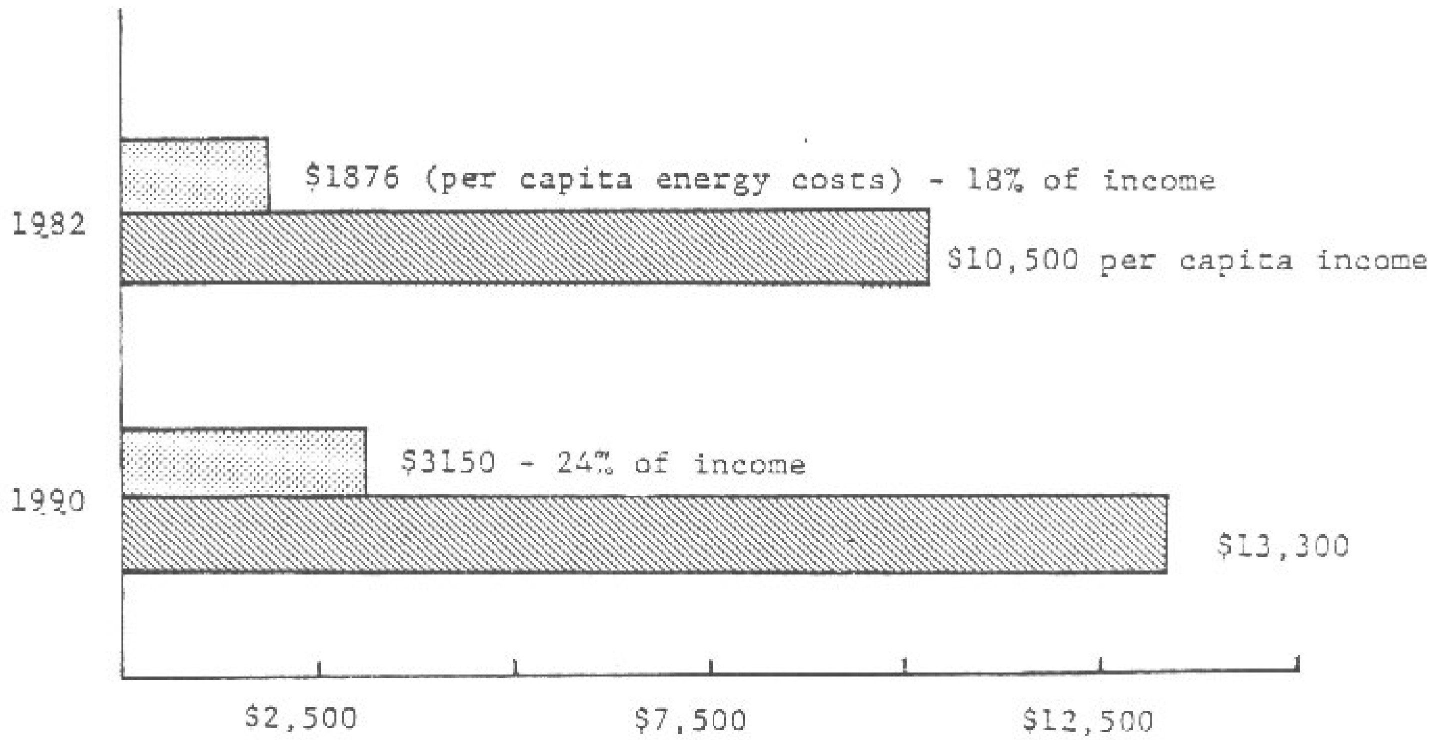


TABLE E

ESTIMATED LONG TERM NET ECONOMIC EFFECTS OF A ONE DOLLAR PURCHASE OF CONVENTIONAL ENERGY SUPPLIES VERSUS CONSERVATION OR NORMAL CONSUMER PURCHASES

Purchase	Economic Multiplier	Money Exported From State	Net Economic Impact
Conventional Energy Supplies	1.50	.80	.70
Conservation or normal consumer expenditures	2.55	.35	2.20

Under a business-as-usual scenario, the energy consumption can be expected to increase almost 13% or more, through 1990, depending upon how strong the economic recovery proves to be.

Anticipating the kind of higher energy prices projected in Table C, the total energy bill for the Fremont community can be expected to increase from $45.23 million to $80.52 million by 1990. Recalling that each dollar diverted from other sectors to pay for a higher energy bill "costs" the economy about $1.50 in lowered productivity, a $35 million increase in the overall energy bill implies that Fremont will experience as much as $52.94 million less as part of its share of the Gross State Product than if the energy bill remained at the 1982 level. (See Table F, column 2).

Pursuing a conservation or an energy management scenario, one that takes advantages of improvements in energy efficiency as discussed earlier in the report, it is possible to reduce the projected 1990 consumption to 85% of the baseline scenario, or down to 5.18 trillion Btus from the projected 6.09 trillion Btus under the business-as-usual scenario. This lowered demand could result in a reduced annual expenditure compared even to the 1982 total.

Again referencing a positive multiplier effect by diverting money away from conventional energy expenditures, the conservation scenario can generate an increase in local economic activity of $16.82 million compared to the business-as-usual approach. This point again suggests that energy conservation strategies can become a major source of local economic redevelopment programs for Fremont.

# # # # #

TABLE F

ECONOMIC CONTRAST BETWEEN BUSINESS AS USUAL AND CONSERVATION SCENARIOS

	Business-As-Usual		Conservation	
	Consumption (trillion BTUs)	Costs (million 1982 $)	Consumption (trillion BTUs)	Costs (million 1982 $)
1982	5.41	45.23	5.41	45.23
1990	6.09	80.52	5.18	68.48
Net increase in 1990 energy bill		35.29		23.25
Loss to economy as a result of expenditures in excess of 1982 costs		-52.94		-16.82
			Gain to economy as a result of 1990 conservation compared to 1990 business-as-usual scenario.	+36.12

141E