Nebraska Energy Office

QUARTERLY REPORT

AUGUST 15, 1980

CHARLES THONE
GOVERNOR

State of Nebraska
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WILLIAM H. PALMER
DIRECTOR

August 15, 1980

The Honorable Charles Thone
Governor of Nebraska
State House
Lincoln, Nebraska 68509

The Honorable Richard Marvel
Speaker of the Legislature
State House
Lincoln, Nebraska 68509

Dear Governor Thone and Speaker Marvel:

This Quarterly Report from the Nebraska Energy Office, for the period April-June, 1980, is submitted in accordance with provisions of Section 57 of LB 954 signed into law April 23, 1980.

If you have any questions, please contact this office.

Sincerely,

William H. Palmer

William H. Palmer
Director

WHP:grh

INTRODUCTION

This quarterly report, compiled by Nebraska Energy Office, provides information and data on four areas of the energy situation in Nebraska.

The first area of the report examines conservation efforts included in the Nebraska Energy Conservation Plan. This section outlines specific measures of the Plan. The Annual Energy Savings Report Summary of 1979 is included in the appendix of this report.

The second area of the report examines the national energy situation. This section contains data and information on the U.S. inventory of oil, gas and middle distillate fuels, import oil price and retail gasoline price.

The third area of the report examines Nebraska energy consumption. This section contains data on the 1979 energy balance, energy production, gasoline available for sale and comparison of supply and delivery of gasoline, LP gas and middle distillate fuels for the months of April, May and June, 1980. This section also contains information on electricity generation and the amount of fuel used for generation.

The fourth area of the report examines climatic conditions in the State and the impact on energy conservation.

I. CONSERVATION EFFORTS

Since September, 1977, the Nebraska State Energy Office has been engaged in a comprehensive program to promote energy conservation by Nebraskans. This work has been supported by Federal funds only.

The U. S. Department of Energy (DOE) requires that the State encourage energy conservation by these steps: Establishment of thermal and lighting standards for buildings, promotion of ridesharing, encouragement of energy conservation in government procurement, establishment of right-turn-on-red laws; cooperation of various government levels to enhance conservation, offering of home energy audits and development of energy education materials.

For 1980, the prime focus of the Nebraska Energy Conservation Plan has been to reduce the State's dependence on imported petroleum. Interruption to petroleum supplies, increasing fuel costs and continued dependence on energy sources outside of America illustrate the need for voluntary cutbacks in consumption.

Petroleum Emphasis

The Energy Office is promoting conservation in the "Import 2 Less" campaign. The Energy Office is also promoting Ridesharing and Driver Energy Conservation Awareness Training (DECAT) programs to employers in an effort to influence employees.

Responding to the opportunities created by LB954, the Energy Office is preparing for the implementation of thermal and lighting standards. The activities of the Energy Conservation Standards Board and most of the implementation of the standards during the 1980-1981 State fiscal year, will be funded by a Federal grant.

The Energy Office provides a seasonal preparedness plan for the Governor's use and will advise him on the use of his expanded energy authority under LB954. Under federal requirements, the Energy Office is directed to prepare plans and to implement plans in times of emergency. These programs include gasoline conservation steps and curtailment procedures for fuel distribution during a severe energy shortfall.

Eight conservation measures are presently expanding in scope. The procurement measure will expand to include more procurement activities by the State Purchasing Agent and the several State agencies designated in LB954. Through these services, the Energy Office plans to promote a model program that cities and counties can utilize.

The commercial energy efficiency staff has been expanded. New materials, on-site audits and technical assistance are being provided.

Residential Audits

The residential conservation measure has shifted emphasis from providing literature and computerized or walk-through audits, to assisting Nebraska's utilities in implementing the Federal Residential Conservation Service Program. The Energy Office continues to work with organizations, associations and employers to promote residential conservation. Home economics materials for classroom use are being prepared by the Office.

Data collection has been expanded to meet LB954 and Federal information requirements. Staff for data management has increased, several additional energy surveys have been undertaken and there has been an increase in volume and types of data assembled.

Public information activities will continue to expand as Energy Office responsibilities increase. The Energy Office has increased the number of energy conferences and the publishing of brochures.

The Local Grants Energy Conservation Grants activity will provide approximately $75,000 to local communities this year.

Energy conservation units of study are available to all levels of education, elementary through adult. This program also offers homeowner courses, and further energy courses soon will be available through community colleges and technical schools.

Energy Extension Service

The Energy Extension Service (EES) includes programs designed to bring energy management to citizens. The Ga$ $aver program provides a computer-equipped van designed to test energy efficiency of automobile engines. The Pumping Unit Management Program (PUMP) provides demonstrations for farmers to aid them in improving efficiency of their irrigation pumping units, and the program offers workshops to train people in testing pumping units.

The Solar Subdivision program encourages the development of solar subdivisions in the State and provides technical assistance to developers, builders and buyers. The Boiler Efficiency Program offers 10 one-day workshops to improve operating efficiency in both private and public sectors and improve skills of boiler plant operators. The Conservation Recognition Program will provide residential energy efficiency certificates and commercial and industry energy efficiency flags.

EES provides the monthly live Easy on Energy television program, broadcast on the Nebraska Educational Television Network. Another informational project is Nebraska Energy News, a newsletter produced six times a year, dealing with energy activities.

EES also will provide for an outside evaluation. Those programs to be evaluated are the Ga$ $aver and the Pump Unit Management Program.

Weatherization Assistance

The Weatherization Assistance Program, funded by DOE, provides for insulation and other measures to make homes of low-income families more energy efficient. Weatherization services are provided by community action agencies and the Inter-Tribal Council agencies under contract to the Energy Office.

Schools, Hospitals, Local Governments

The Federal Institutional Buildings Grants Program provides energy improvement grants for schools, hospitals, nursing homes and local government buildings. The first grant program cycle for Phase Two of the Institutional Grants Program was concluded on March 15, 1980.

Approximately $993,000 in Energy Conservation Measures Grants were awarded to 24 schools and four hospitals. In addition, approximately $212,000 in Technical Assistance Grants were awarded to 87 schools, six hospitals and one nursing home. The Nebraska Energy Office has made recommendations to DOE for a second round of grants. DOE has indicated that those grants will be awarded by September 30, 1980.

For reference, the Nebraska State Energy Conservation Plan Annual Energy Savings Report Summary for 1979 is included in the appendix at the end of this report.

II. THE NATIONAL SITUATION

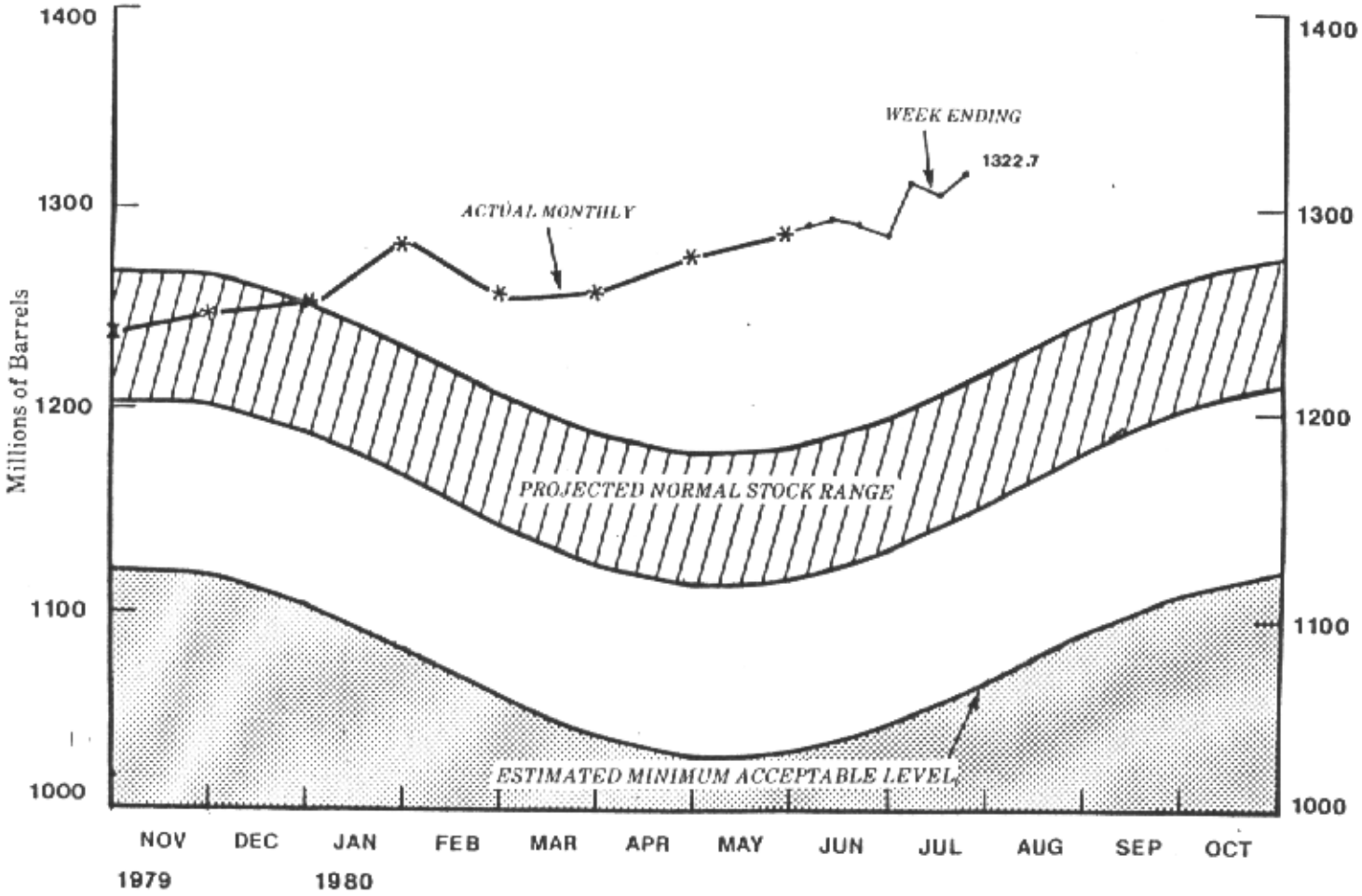
Several DOE graphs showing national level petroleum stock are presented in this report. Figs. II-1, II-2 and II-3 show that the U.S. petroleum (crude oil and petroleum products) gasoline and middle distillate stocks at primary levels now substantially exceed normal levels. There should be no petroleum shortages in the next several months, unless major supply interruptions occur.

The international price of oil continued to climb during the first half of 1980 as shown in fig. II-4. The average U.S. import price has reached $33 for a 42-gallon barrel as of July 1, 1980. The national average retail selling prices of petroleum products showed a similar trend, as shown in fig. II-5. There are two periods of rapid price increase, namely March through August 1979 and the first three months of 1980. In the second quarter of calendar 1980, the fuel prices leveled off, and lately, in some instances, the spot market price decreased. The Nebraska Energy Office does not collect any statistical information on the latest price changes.

Fig. II-1

U.S. Petroleum Stocks at Primary Level (Crude and Products)[1]

as of July 18, 1980

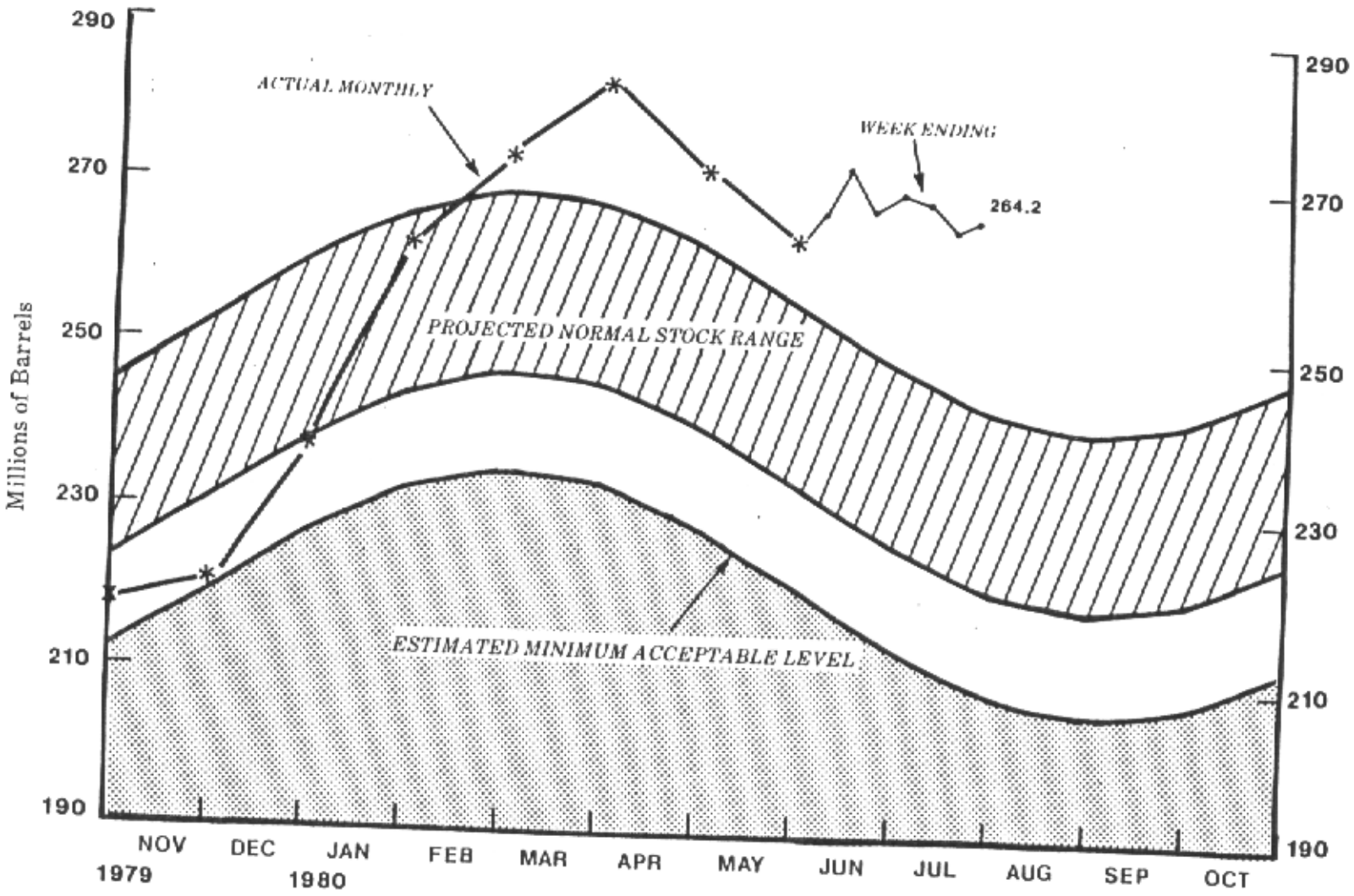


[1] Excludes stocks held in the Strategic Petroleum Reserve.

SOURCE:
- October 1979 - February 1980: EIA, "Petroleum Statement, Monthly"
- January 1979 - May 1980: EIA, "Monthly Petroleum Statistics Report"
- June 6, 1980 - Current week: EIA weekly data
- Projections and estimates through third quarter 1980: EIA estimates (see appendix for derivation and explanation)

Motor Gasoline Stocks at Primary Level

as of July 18, 1980

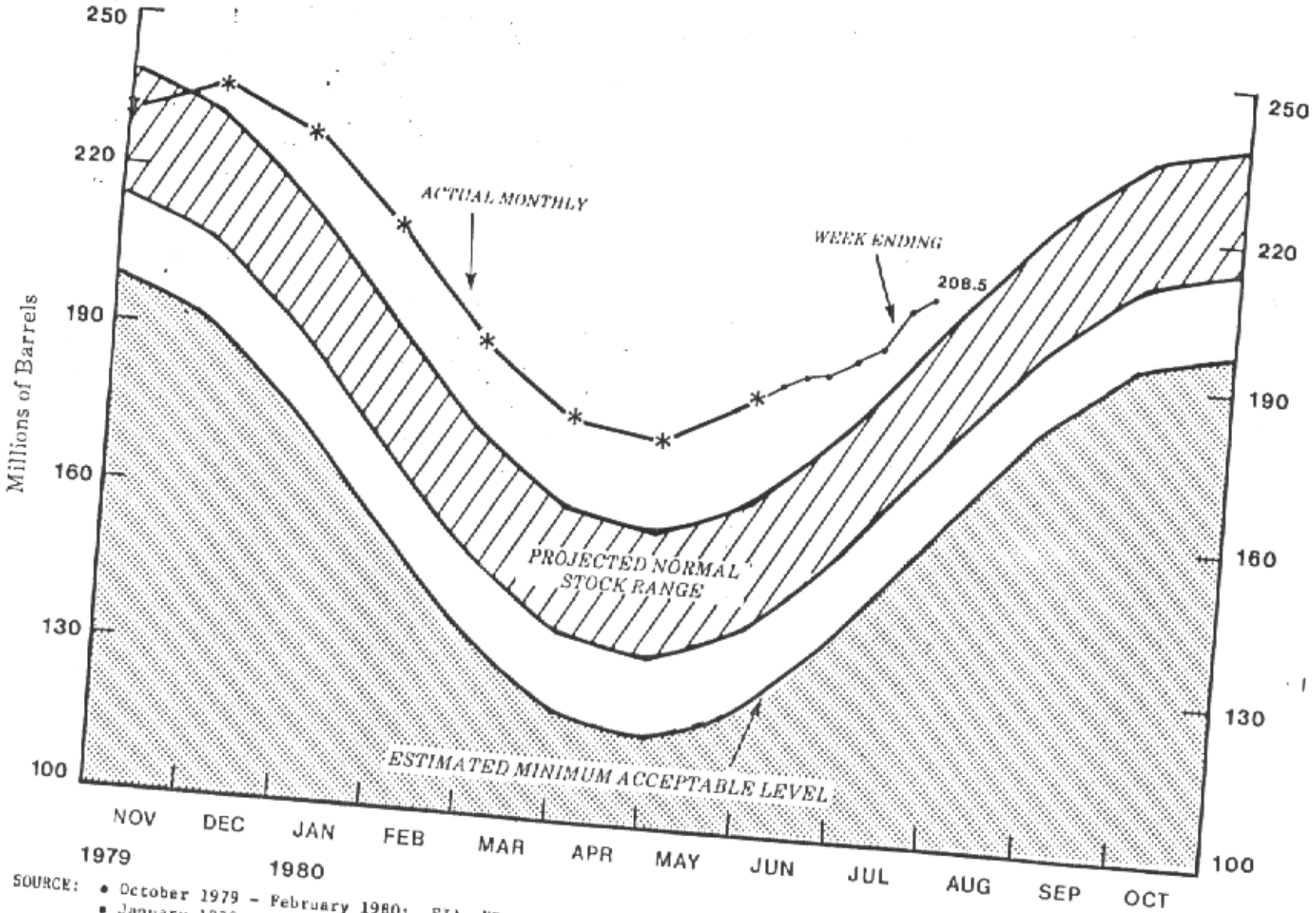


SOURCE:
- October 1979 - February 1980: EIA, "Petroleum Statement, Monthly"
- January 1979 - May 1980: EIA, "Monthly Petroleum Statistics Report"
- June 6, 1980 - Current week: EIA weekly data
- Projections and estimates through third quarter 1980: EIA estimates (see appendix for derivation and explanation)

Fig. II-2

Distillate Fuel Oil Stocks at Primary Level

as of July 18, 1980

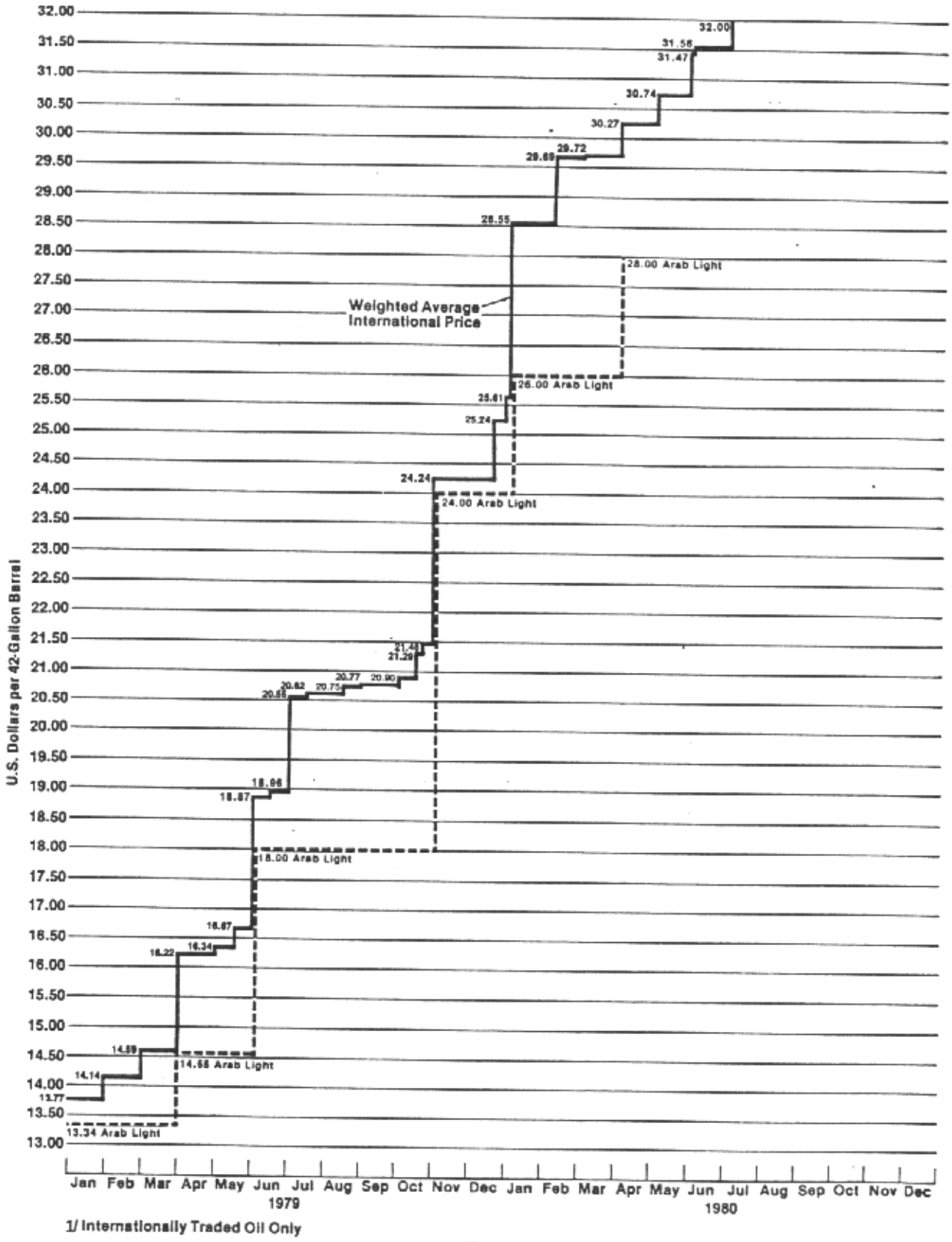


SOURCE:
- October 1979 - February 1980: EIA, "Petroleum Statement, Monthly"
- January 1979 - May 1980: EIA, "Monthly Petroleum Statistics Report"
- June 6, 1980 - Current week: EIA weekly data
- Projections and estimates through third quarter 1980: EIA estimates (see appendix for derivation and explanation)

Fig. II-3

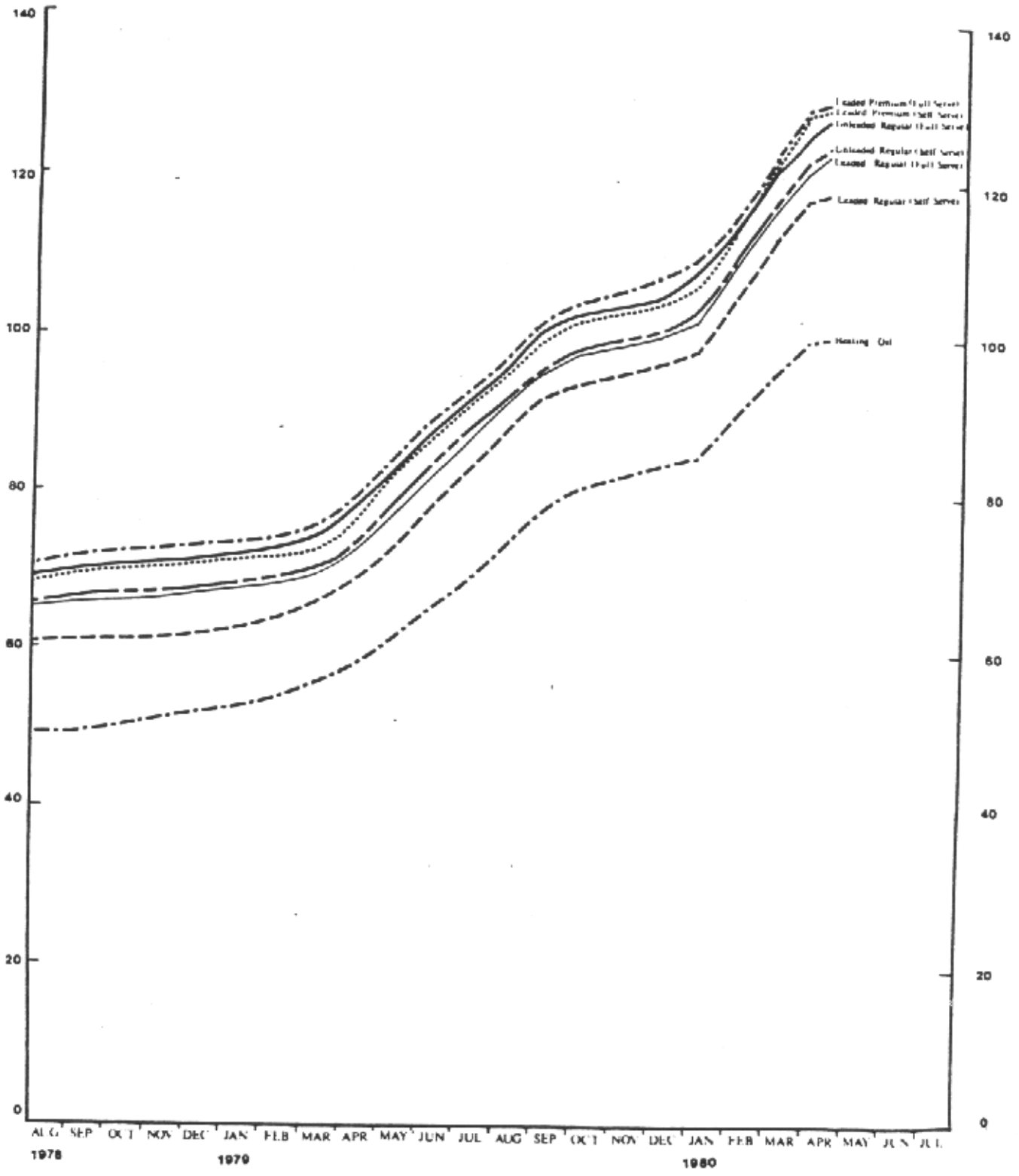
Fig. II-4

World Price of Oil[1/]



1/ Internationally Traded Oil Only

Average Retail Selling Price: Motor Gasoline and Residential Heating Oil
(Cents per Gallon)



SOURCE: Motor Gasoline: • January - June 1978: EIA-8, "Retail Motor Fuels Service Station Survey"
• July 1978 - April 1980: EIA-79, "Monthly Motor Gasoline Service Station Survey"
Residential Heating Oil: • FEA Form P112-M-1/EIA-9, "No. 2 Heating Oil Supply/Price Monitoring Report"

40

Fig. II-5

III. NEBRASKA ENERGY CONSUMPTION

The 1979 Nebraska preliminary energy balance was recently developed and is presented in table III-1. The following trends can be noted in comparison with the 1978 balance.

Total Energy Use

1. Based on Nebraska's 1979 energy use, the State has already nearly reached the 5 percent saving in energy consumption which DOE set as a goal for accomplishment by the end of 1980.

Electrical Generation

2. Energy for electrical generation increased to 201.9 trillion BTU in 1979 compared with 180.1 in 1978, or 11 percent. The largest increase is in coal and nuclear energy consumption. At the same time, the use of petroleum for electrical generation decreased from 7.1 to 4.6 trillion BTU. This is a substantial saving of oil. Note that electricity sales to Nebraska consumers increased very little. This means that most of the additionally produced electricity was sold to other states.

Gasoline Cutback

3. The use of motor gasoline within Nebraska decreased in 1979 by 6.0 trillion BTU (about 48 million gallons) compared with the previous year. The most obvious reason for these savings is the sharp increase in gasoline prices during 1979. According to the Federal Highway Administration, 1979 annual vehicle miles in Nebraska were 4.2 percent lower than in 1978. The decrease contrasts with 3.4 percent annual average growth in the four previous years. At the same time, the Nebraska population increased 0.3 percent, the number of licensed driver increased 1.6 percent and the percentage of licensed drivers in the toal population increased 0.91 percent.

Greater Miles Per Gallon

4. One very positive change is the fact that average mileage (the number of miles traveled per gallon) increased 3.2 percent in 1979 compared with 1978. During the previous four years, there was no significant improvement in miles-per-gallon delivered by the cars owned by Nebraskans.

Fig. III-1 shows the Nebraska energy flow chart. Note that a substantial amount of coal imported into the State is converted into electricity and exported to other states. The State produces a portion of its own energy needs. Along with hydroelectricity, Nebraska produces significant amounts of crude oil. According to the Nebraska Oil and Gas Conservation Commission, oil production for the 25 largest fields was:

Table III-2

	1979 Production in Barrels	1980 Production in Barrels	Drilling Permits			
			1979 Exploratory	1980 Exploratory	1979 Development	1980 Development
January	483,206	502,703	35	45	22	21
February	451,691	480,512	10	21	18	27
March	515,334	516,836	20	20	22	25
April	501,530	486,000	25	19	27	30
May	525,112	540,000	20	27	14	28
June	507,398	N/A	18	17	20	32

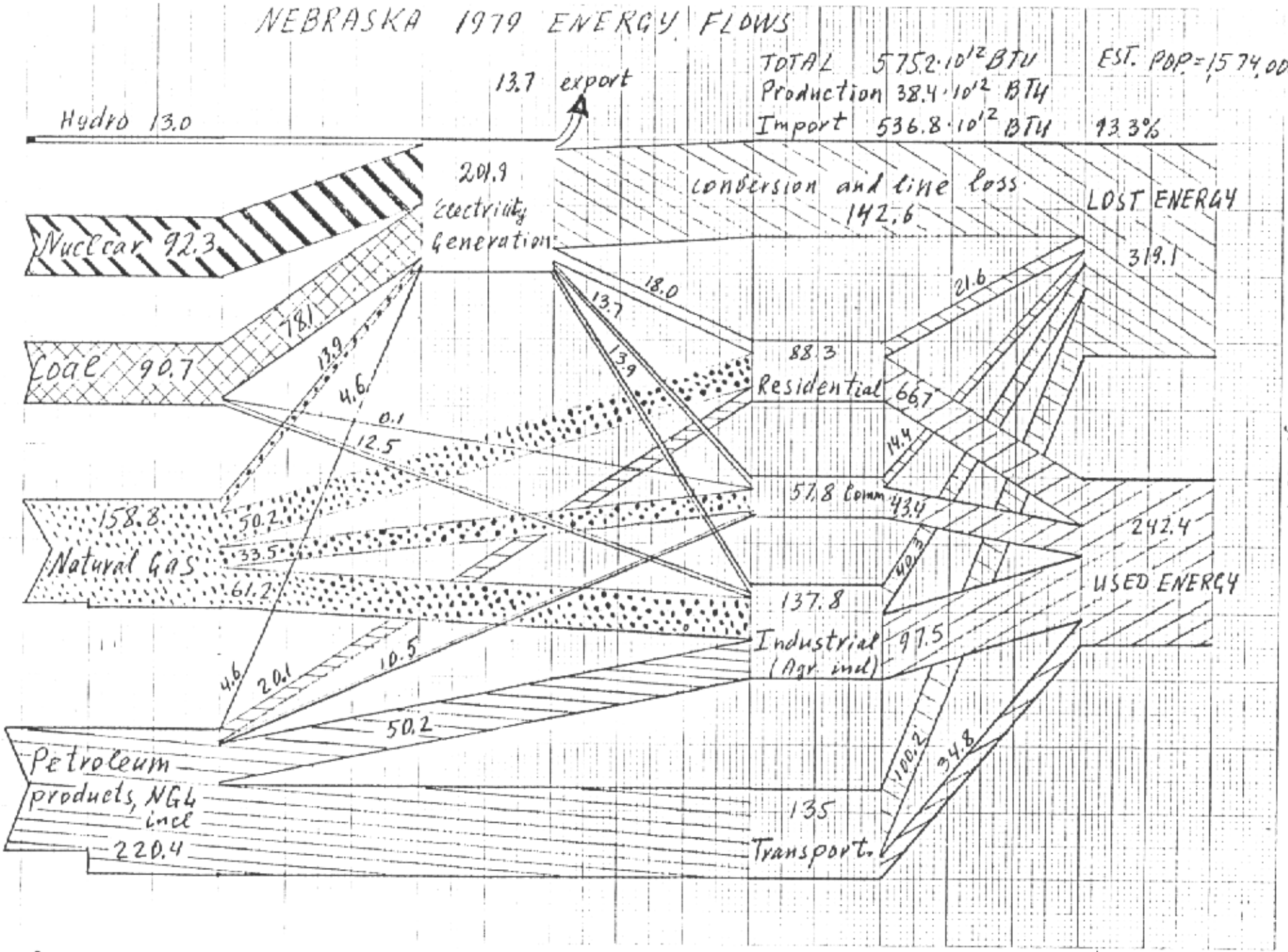


Fig. III-1

Preliminary

NEO July, 1980

UTILIZATION OF ENERGY IN NEBRASKA

Source	1976 (Revised)	1977 (Revised)	1978 (Revised)	1979 (Preliminary)
Natural Gas (billions of cubic feet)				
Residential	53.4	52.9	48.2	50.5
Commercial	38.2	37.5	32.0	33.7
Industrial	58.8	60.4	51.2	49.7
Other	0.1	9.5	8.7	11.9
Electricity	17.4	15.6	12.8	14.0
TOTAL GAS	168.0	175.9	152.9	159.8
Middle Distillate Fuels (millions of gallons)				
Aviation Fuel	37.6	42.8	46.0	42.7
No. 1 fuel oils	14.1	51.6	36.8	42.0*
No. 2 heating oils	271.7	188.5	191.0	207.3*
Diesel fuel	155.2	294.2	309.9	318.7*
TOTAL DISTILLATES	478.6	577.1	583.7	610.7
LP-Gas (millions of gallons)				
Residential/Commercial	156.1	138.8	141.5	147.0*
Internal Combustion	26.3	19.3	17.9	18.6*
Industrial	18.3	25.9	19.9	20.8*
Other	73.4	65.1	50.3	52.3*
TOTAL LPG	274.1	249.1	229.6	238.7
Gasoline (millions of gallons)				
Agricultural	91.7	35.1	24.0	24.4
Transportation	828.6	899.3	927.2	868.1
Other				10.8
TOTAL GASOLINE	920.3	934.4	951.2	903.3
Coal (millions of tons)				
Commercial	N/A	0.03	0.01	.004*
Industrial	N/A	0.28	0.55	.55*
Electricity Generation	N/A	1.82	2.90	3.46
TOTAL COAL	2.27	2.12	3.46	4.01
Electricity Production (millions of kWh)				
from hydro stations	1276	1221	1187	1246
from nuclear sources	5824	7452	7725	8658
from coal	3919	4493	4664	6027
from natural gas	1599	1293	994	1088
from oil	673	425	631	398
Total Electricity Production	13,291	14,884	15,201	17,417
Electricity Sales to Ultimate Consumers (millions of kWh)		12,404	13,339	13,357
Total Annual BTU Equiv. x 10^{12}	507.7	547.9	560.3	575.2

NOTE: Sum of the components may not equal totals due to independent rounding

*Estimates

Table III-1

Nebraska Gasoline

Table III-3 shows the availability of gasoline in Nebraska. It is derived from the Nebraska Department of Revenue tax form 81 with monthly corrections included. Columns 2 through 5 show the actual amount of gasoline available in the State. The calculations in columns 6 to 11 are made to make the possible comparisons easier.

Column 7 represents the monthly amount of gasoline averaged for three years: 1977, 1978 and 1979.

Column 9 represents the average monthly share for the same period of time.

Columns 8 and 10 are used for comparing the accumulated amount of gasoline for the first half of 1980 with the average amount of the first half of 1977-79. The comparison of the first half of 1980 with the corresponding period of 1979 is given in the column 6. One warning when making such a comparison: the data for the last reported months will be revised (probably on the higher side) and the 1980/1979 ratio (now 0.886) may be revised upward.

Another warning should be given for the interpretation of all figures in this table. It concerns the difference between the amount of gasoline imported into the State and amount exported out of the State. It does not mean that this amount was actually consumed in this month. Storage can make a substantial difference between monthly figures on availability and actual use.

8/07/80

MOTOR GASOLINE AVAILABLE (IMPORT MINUS EXPORT) IN STATE OF NEBRASKA
COMPARISON WITH THREE PREVIOUS YEARS
(FROM TAX FORM 81 IN THOUSAND OF GALLONS)

Column: 1	2	3	4	5	6	7	8	9	10	11
MONTH	GAS77	GAS78	GAS79	GAS80	1980/1979 /ACCUM/	3 YEAR AVERAGE	AVERAGE ACCUMUL.	MO.AV SHARE	1980 GAS ACCUMUL	RATIO 1980/79
JAN	69,334	69,166	69,602	63,763	.916	69,367	69,367	7.462	63,763	.916
FEB	62,501	63,227	69,367	59,390	.886	65,031	134,398	6.995	123,153	.856
MAR	70,780	75,162	73,397	63,056	.876	73,113	207,511	7.864	186,209	.859
APR	77,085	74,597	72,355	65,109	.882	74,679	282,190	8.033	251,318	.899
MAY	79,039	84,422	77,630	72,253	.892	80,363	362,553	8.644	323,571	.930
JUN	86,543	86,165	75,955	65,129	.886	82,887	445,440	8.916	388,700	.857
JUL	92,844	88,253	80,054			87,050	532,490	9.364	388,700	
AUG	82,343	89,733	82,473			84,849	617,339	9.127	388,700	
SEP	79,853	79,202	72,609			77,221	694,560	8.306	388,700	
OCT	82,107	86,061	78,565			82,244	776,804	8.847	388,700	
NOV	76,506	78,351	76,555			77,137	853,941	8.297	388,700	
DEC	76,453	76,887	74,824			75,721	929,662	8.145	388,700	
FINAL	934,388	951,226	903,386	388,700	.886	929,662	5,906,255	100.000	3,668,914	.886

12 RECORDS TOTALED

Federal Gasoline Statistics

Another source of information about petroleum fuels consumption in the State is from the U.S. Department of Energy "Major Fuel Supplier Report". It shows not only the fuel supply for next month, but also the fuel delivered during the preceding month. Because non-"major" suppliers are not included, the total amount of fuel is somewhat lower than the amount shown in Department of Revenue tax statistics. For instance, according to DOR tax statistics, 903.4 million gallons of gasoline were imported into the State in 1979. The same year, 805.1 million gallons were reported as delivered in Nebraska according to Federal reports. It is assumed that the 98.3 million gallon difference, or 10.9%, is accounted for by shrinkage, losses, fuel added into storage and fuel imported and delivered by non-major suppliers.

Table III-4 shows supply and delivery for the same period of 1979 and 1980. Note that reported gasoline deliveries in the second quarter of 1980 are 4 to 6 million gallons lower than in the corresponding months of 1979. Second quarter gasoline savings account for up to 14.2 million gallons, or 7.3%. Gasoline supply for the same period increased 5.0% compared with 1979. Supply increase in July and August compared to the same months last year are 9.5% and 9.2% correspondingly. The same supply compared with July and August 1979 delivery shows a 30% and 28% increase, and causes the gasoline price to temporarily fluctuate downward, noticeable at the beginning of August, 1980. This illustrates the plentiful supply of gasoline to Nebraska customers this summer. During the second quarter of 1980, middle distillate deliveries were 11.4% lower than in the corresponding quarter of 1979. In July and August of 1980, the supply of middle distillates is just above the 1979 delivery level. The middle distillate supply in July and August of 1980 is just above the corresponding 1979 deliveries, so there is no reason to expect a downward fluctation of diesel fuel and heating oil prices.

Table III-4

Supply and Delivery of Liquid Fuels in Nebraska

from EIA-25 Reporting Form

Thousand of Gallons

Month	Propane				Motor Gasoline				Middle Distillate			
	1979		1980		1979		1980		1979		1980	
	Supply	Delivery	Supply	Delivery	Supply	Delivery	Supply	Delivery	Supply	Delivery	Supply	Delivery
April	10,150	8,007	7,999	9,131	63,300	69,314	59,598	64,461	41,228	47,668	34,558	35,383
May	8,662	7,034	9,098	4,204	70,427	71,204	76,606	65,473	45,373	47,694	52,457	43,687
June	10,874	7,446	10,600	6,402	74,306	68,033	82,302	64,378	48,125	36,528	48,476	37,796
July	23,657	1,217	20,025	N.A.	73,459	61,723	80,439	N.A.	57,751	46,450	51,765	N.A.
August	19,949	6,672	21,297	N.A.	82,184	70,311	89,716	N.A.	49,598	50,067	51,080	N.A.

N.A. - data is not available

Electric Generation Fuels

Fuel used and electricity generation by Nebraska utilities are shown in Table III-5. Comparing the first half of 1980 electricity generation with the corresponding period of 1979, this year's electrical generation is substantially lower. One of the reasons is that Nebraska nuclear power stations were stopped for additional mandated check-ups.

Increased amounts of coal were used for electrical generation. On the other hand the amount of petroleum products (heavy oil, light oil) and natural gas used by electric utilities was substancially lower. Electric utilities saved significant amounts of petroleum products for other users.

Fig. III-5

PPRIMARY FUELS USED FOR ELECTRICITY GENERATION

BY MAJOR NEBRASKA ELECTRIC UTILITIES

8/12/80 (FROM FPC 12 REPORTING FORMS)

YEAR	MONTH	NET GENERATION MWH	BITUM. COAL SH. TONS	HEAVY OIL BARRELS	LIGHT OIL BARRELS	NATURAL GAS MCF	PROPANE GALLONS
YEAR TOTAL							
78	01	1,516,208	263,522	215,020	69,717	152,346	
78	02	1,304,066	232,661	198,790	64,293	266,684	
78	03	1,292,560	207,372	41,902	10,612	658,164	
78	04	649,300	160,442	5,482	6,318	1,008,926	
78	05	1,029,624	151,879	4,966	4,275	667,041	
78	06	1,182,672	139,649	17,535	28,658	1,747,526	
78	07	1,557,446	215,644	70,798	23,699	1,641,875	
78	08	1,571,799	200,955	28,016	20,351	1,765,296	
78	09	1,286,511	142,926	17,363	26,593	1,698,311	
78	10	1,151,683	166,154	8,634	10,534	1,400,209	
78	11	1,394,979	292,496	62,768	28,116	1,246,514	
78	12	1,326,934	256,783	257,465	44,858	191,386	
YEAR	TOTAL	15,223,764	2,360,888	928,779	338,215	12,844,274	
79	01	1,598,419	248,477	241,938	92,371	70,279	
79	02	1,397,495	220,518	135,336	48,732	570,065	
79	03	1,378,960	196,434	13,391	10,922	1,398,855	
79	04	1,071,662	221,455	8,266	4,486	1,249,862	
79	05	1,396,011	186,640	8,356	7,047	1,331,70[illegible]	
79	06	1,419,590	250,881	22,461	5,177	1,251,935	
79	07	1,686,664	378,781	7,948	5,020	1,521,238	
79	08	1,768,745	469,543	15,650	10,322	1,540,765	
79	09	1,497,479	322,389	9,569	3,102	1,242,965	
79	10	1,594,218	317,230	8,861	4,441	1,375,469	
79	11	1,403,674	345,177	25,206	7,316	1,309,404	
79	12	1,513,861	503,544	49,110	4,789	1,686,601	
YEAR	TOTAL	17,446,776	3,406,635	545,558	204,927	14,008,723	
80	01	1,426,943	404,910	39,062	5,146	244,773	
80	02	1,351,826	469,262	15,734	3,932	292,572	300
80	03	1,042,381	573,557	1,566	4,767	305,423	1,445
80	04	853,687	409,414		11,874	217,393	
80	05	759,660	416,726		3,644	49,997	
80	06	1,084,656	354,577		6,372	298,373	
YEAR	TOTAL	6,519,155	2,660,439	47,092	35,405	1,408,524	1,745
FINAL	TOTAL	39,189,717	8,515,962	1,522,229	578,547	28,321,521	1,745

55 RECORDS TOTALED

1000 KILOWATTHOURS = 1 MEGAWATTHOUR = 1 MWH

IV. IMPACT OF WEATHER CONDITIONS

Heating degree days for Nebraska from July 1, 1978 to April 15, 1979 totalled 6,898. Because of billing procedures, the larger portion of that unusally heavy load was charged and counted in the later part of the heating season. As a result, energy consumption increased in the residential sector in 1979, compared with 1978.

The 1979-80 heating season (from July 1, 1979 through April 13, 1980) recorded 5,981 population-weighted heating degree days, very near the normal average of 5,954.

From the beginning of the 1979 cooling season until July 29, 1979, 602 cooling degree days were recorded. This summer, 781 cooling degree days were recorded by July 27, 1980. The hotter summer has required higher air conditioning loads and greater irrigation fuel expenditures.

The precipitation picture is equally significant. The April through July precipitation comparison of the eight major Nebraska climatic zones for this summer with the previous period is shown in the following table.

See Table IV-1 at end of section.

Table IV-1 shows that during the summer of 1979, precipitation was slightly above normal. In a recently-completed Nebraska Energy Office irrigation survey, respondents replied that the 1979 summer was "wet" and in many places rains came "just at the right time." As a result, the operation of irrigation systems was "much lower than usual."

This summer, on the contrary, the amount of spring and summer precipitation was only 64 percent of normal. Cooling degree days for the same period were 30 percent higher than normal. These figures are numerical expressions of how hot and dry this season has been. It is quite natural to expect that all irrigation systems will be working at maximum possible capacity in order to compensate for adverse weather conditions. Energy used for irrigation this summer will be much higher than recent annual averages.

Table IV-1

Precipitations in inches

Time covered	climatic zones								Arithmetric Average
	NW	NC	NE	CEN	EC	SW	SC	SE	
Actual April 1-July 29, 1979	8.3	12.3	12.2	13.4	14.8	11.1	15.0	16.4	12.94
Actual April 1-July 27, 1980	6.4	7.1	6.4	6.4	10.3	9.3	9.4	10.8	8.26
Normal April 1-July 27, 1980	10.45	11.74	13.71	12.94	14.57	10.91	13.10	15.35	12.85

APPENDIX

NEBRASKA STATE ENERGY CONSERVATION PLAN
ANNUAL ENERGY SAVINGS
REPORT SUMMARY

October 30, 1979

This energy savings report, prepared pursuant to Title III, Part C, of the Energy Policy and Conservation Act of 1975, (P.L. 94-163), and Title IV, Part B, of the Energy Conservation and Production Act of 1976, (P.L. 94-385), includes revisions to the annual energy reports for calendar 1977 and 1978, and the first calculations for calendar 1979.

A-1

NEBRASKA STATE ENERGY CONSERVATION PLAN

ANNUAL ENERGY SAVINGS REPORT

SUMMARY FOR 1977, 1978 and 1979

Reporting Period	Savings Shown On 1978 Report (10^{12} Btu)	Energy Savings Reported In 1979 (10^{12} Btu)
1977	5.359	5.492
1978	8.271	8.487
1979	N/A	16.668
Totals:	13.630×10^{12} Btu	30.647×10^{12} Btu

The savings shown represent progress toward the projected goal of 41.280×10^{12} Btu established for the Nebraska State Conservation Plan.

NEBRASKA 1979 STATE ENERGY CONSERVATION PLAN

ENERGY SAVINGS REPORT SUMMARY

October 30, 1979

Measure		Energy Savings 10^9Btu	Explanation
1-001	Thermal Efficiency Standards	679.6	Voluntary compliance calculated for the several building sectors from Nebraska Annual Housing Report, 1978; from code enforcement statistics for mobile & modular housing assembled by the Nebr. Dept. of Health; and from surveys of building design professionals in Nebraska.
1-002	Lighting Efficiency Standards	11.1	Voluntary relamping calculations made from the actual energy programs of 121 public-access buildings during a survey of 791 facilities reporting energy savings.
1-003	Carpool/Vanpool/Public Transit	165.2	Energy savings accumulated from Lincoln and Omaha carpool and mass transit ridership; Offutt AFB Vanpools.
1-004	Procurement Standards	0	No State auto procurement savings for the second year of life-cycle-cost purchasing.
1-005	Right-Turn-on-Red	0	No savings claimed. Legislation passed in 1973.
1-006	Commercial Energy Efficiency	269.3	Nebraska Plan energy audits continued for the fifth year.
1-007	Residential Energy Efficiency	8,324.4	Residential energy savings from Home Energy Savers' Program, utility residential programs, DOE Weatherization activity, and computer-run compliance calculations based on statewide statistical sampling by NASIS '79.
1-008	Utility Energy Conservation	18.5	Utility in-house and operational programs only reported under this measure. No utility irrigation scheduling is reported under this Measure.
1-009	Agricultural Energy Efficiency	3,715.1	Second year of implementation and information transfer for the Kansas-Nebraska Agricultural Energy Program.
1-010	Solid Waste Management	97.9	Two industrial operations using wood scrap for their heating fuel have achieved the energy savings reported. Research continues for an RDF-fired plant in Lincoln.
1-011	Driver Education	36.8	Energy-related driver's education program introduced in September, 1978, and court referrals for adult violators.
1-012	Vehicle Inspection	7.9	A voluntary vehicle inspection program approach for 1979 reporting initial results.
1-013	Energy Emergency & Curtailment	0	No energy savings from emergency or curtailment activity in 1979.
1-014	Used Oil Recycling	185.5	Waste oil collection figures from State government & private sector operations.
1-015	Liquid Fuels Development	0	Gasohol information services only.

NEBRASKA 1979 STATE ENERGY CONSERVATION PLAN

ENERGY SAVINGS REPORT SUMMARY

October 30, 1979

Measure		Energy Savings 10^9 Btu	Explanation
1-016	Public Buildings Energy Management (NEW FOR 1979)	0	Data for 1979 is reported under Measure 2-022.
1-017	Public Information on Energy (NEW FOR 1979)	0	No energy savings calculated since Measure activity was initiated July 1, 1979.
1-018	Industrial Energy Audits (NEW FOR 1979)	2,504.6	Initial reporting of industrial energy conservation activity as a separate measure.
1-019	4-H Energy Program (NEW FOR 1979)	0	The first of three levels of program materials has reached 4-H clubs in September, 1979. The balance are in the design stage.
1-020	Governmental Transportaion (NEW FOR 1979)	67.9	State agency travel energy savings under executive order, plus school bus fleet savings from a pilot program for energy efficiency in routes.
2-021	Intergovernmental Coordination	0	The Local Government Grant Program savings will be reported in 1980.
2-022	Energy Audits	577.1	Energy audit savings from 1979 NEA School/Hospital preliminary energy audit activities are reported. Of the two thousand audits conducted, 791 had achieved measurable savings.
2-023	Energy Education	7.0	School energy programs for 20,000 pupils since September, 1978 were evaluated for the reported energy savings.
		16,667.9 x10^9 Btu	
	equals	16,668 x 10^{12} Btu	

NEBRASKA 1979 ENERGY SAVINGS DOCUMENTATION OUTLINE

Measure — **Documentation and Statistics**

1-001

Energy savings of 679.6 x 10^9Btu were calculated for eight classes of structures in Nebraska's building inventory to demonstrate substantial and continuing voluntary compliance with the ASHRAE 90-75 standard, even though mandatory legislation has not yet passed. Savings were calculated for the actual number of new structures erected in each class, except for office buildings.

Building Class	No. of Units	Heating Savings (10^9Btu)	Cooling Savings (10^9Btu)
Mobile Homes	1642	27.8	2.6
Single Family Homes	8018	241.2	22.8
Low Rise Apartments	198	6.0	0.5
High Rise Apartments	2331	61.2	5.4
Commercial Buildings	583	124.1	12.2
Schools	27	34.7	3.3
Hospitals/Institutions	31	77.3	8.0
Offices (estimate assumed the standard 2% rate of replacement)	6	48.7	3.8
		621.0	58.6

1-002

Energy savings of 11.1 x 10^9Btu were garnered from actual calculations of relamping savings achieved in 121 public-access buildings from 1,571 schools, hospitals or municipal buildings audited.

1-003

Energy savings of 165.2 x 10^9Btu were reported for increased ridership from the following transportation programs:

a) Lincoln Carpool/Vanpool Program: 208,893 gallons of gasoline saved (or 26.1 x 10^9Btu);
b) Metro Area Transit System: 1,085,418 gallons of diesel saved (or 135.6 x 10^9Btu); and
c) Offutt Air Force Base Vanpool Program: 27,500 gallons of gasoline saved (or 3.4 x 10^9Btu).

1-004

No energy savings were produced by the second year of life-cycle-cost purchasing for the State fleet. While a significant number of sub-compact autos were acquired, their increased energy efficiency was offset by the number of larger cars and trucks purchased.

1-006

Energy savings of 269.3 x 10^9Btu were accumulated from the 380 Nebraska Plan Class "B" on-site energy audits of commercial buildings surveyed prior to 1979, and from 44 audits performed this year.

NEBRASKA 1979 ENERGY SAVINGS DOCUMENTATION OUTLINE

October 30, 1979

Measure	Documentation and Statistics

1-007

Energy savings of 8,324.4 x 10^9 Btu were computed from statistical data provided by the Nebraska Annual Social Indicator Survey for 1979 (NASIS '79), conducted by the University of Nebraska Bureau of Sociological Research. The Nebraska Energy Office contracted with the Bureau for energy-specific questions to be included in the intensive 1877 home statewide survey. Compliance data developed for input to the FEA/DOE worksheet (shown on page III-7-5 of the 1979 Nebraska Conservation Plan) were used to produce the energy savings reported. These are:

a)	Degree of compliance with winter thermostat decrease:	0.287;
b)	Degree of compliance with summer thermostat increase:	0.100;
c)	Degree of compliance with caulking and weatherstripping:	0.549;
d)	Degree of compliance with storm windows:	0.240;
e)	Degree of compliance with attic insulation:	0.224;
f)	Winter thermostats decreased (in degrees F)	3.254;
g)	Summer thermostats increased (in degrees F)	3.402; and
h)	Wall insulation:	0.151.
	produces	7,203 x 10^9Btu

(NOTE: Wall insulation was added this year based on NASIS '79 data available. It does not appear on the FEA/DOE worksheet.)

A special NASIS '79 question,related to a reduced number of heated rooms in the Nebraska household. Of the 1877 homes sampled, 44.4% identified closing off a room as one of the conservation measures employed to reduce energy costs. Calculations assumed that the room sealed off was a 10 by 12 foot bedroom. The savings projected for reduced space heating was 1,121.4 x 10^9 Btu for this conservation activity alone.

An area of residential energy savings, separately identified but included in the general calculations reported above, was the DOE Weatherization Program. The Nebraska Energy Office data survey of Weatherized homes revealed that 1747 homes were retrofitted with DOE funds in 1979. Each saved an average of 20.15 x 10^6Btu. The total savings for Weatherization, thus, would be 35.2 x 10^9Btu.

NEBRASKA 1979 ENERGY SAVINGS DOCUMENTATION OUTLINE

October 30, 1979

Measure	Documentation and Statistics
1-008	Energy savings of 18.5 x 10^9 Btu were reported for three natural gas utilities conducting active energy conservation programs for corporate in-house and operational activities. Totally, one dozen natural gas and electric utilities were contacted. Five had begun conservation activities but had not reduced their work to statistics, or reported savings in percentages only. It had been the intent to report energy savings due to electric load levelling under this Measure. Such an analysis was not possible in 1979. An attempt will be made to isolate such data for 1980.
1-009	Energy savings of 3,715.1 x 10^9Btu were reported for the agricultural sector by the Department of Agricultural Engineering, University of Nebraska-Lincoln. Their analysis is as follows: a) Moisture-dependent irrigation scheduling: 3,324.4 x 10^9Btu (or 23,951,219 gals. of diesel fuel); b) Irrigation pump efficiency increases: Savings were reported for 150 wells. 12.5 x 10^9Btu (or 90,000 gals. of diesel fuel); c) Fuel Storage Improvements: Savings on 5% of the State's farm tanks were reported for repainting and the building of shading devices. 13.9 x 10^9Btu (or 100,000 gals. of diesel fuel); 31.2 x 10^9Btu (or 250,000 gals. of gasoline); and d) Field Operations: Three row crop field activities were measured: (1) "Shift Up and Throttle Down" 13.9 x 10^9Btu (or 100,000 gals. of diesel fuel); (2) Reduced Tillage: 20% of the State's farmers have eliminated the equivalant of one complete field operation. 249.8 x 10^9Btu (1.8 million galls. of diesel fuel); and (3) Matching tractors and implements: A 2 1/2% fuel savings on the 15 million acres of row crop field work where slippage is critical. 69.4 x 10^9Btu (500,000 gals. of diesel fuel). NOTE: The University also reported a savings of 972 x 10^9Btu (or 7 million gals. of diesel fuel) for reduced quantities of field applied nitrogen resulting from curtailed irrigation under Item "a" above. These energy savings are indirect in nature and not included in the savings claimed.

NEBRASKA 1979 ENERGY SAVINGS DOCUMENTATION OUTLINE

October 30, 1979

Measure	Documentation and Statistics
1-010	Energy savings of 97.9 x 10^9Btu were garnered from two Nebraska manufacturers who use their wood scrap as fuel for space heating purposes. The RDF plant for the City of Lincoln is still in the study stage and no savings are reported for that work.
1-011	Energy savings of 36.8 x 10^9Btu were obtained from two specific driver education programs: a) High School Student Driver services: 18.8 x 10^9Btu saved; b) Adult Driver Court Referral activities: 18.0 x 10^9Btu saved.
1-012	Energy savings of 7.9 x 10^9Btu were achieved from a voluntary vehicle inspection program by the Cornhusker Motor Club. Of the 3,651 vehicles examined, 1,794 passed and 1,857 failed.
1-014	Energy savings of 185.5 x 10^9Btu were accumulated from the collection of 1,336,750 gallons of waste oil from State government and private sector operations.
1-018	Energy savings of 2,504.6 x 10^9Btu were assembled from ten major industrial facilities with active energy conservation activities. The majority of the savings (1,897.3 x 10^9Btu) was achieved in one plant after a $12 million investment in heat exchangers and waste heat recovery devices.
1-020	Energy savings of 67.9 x 10^9Btu were reported from the several State agencies reducing travel and from efficient school bus routes. Governor Charles Thone ordered reduced travel for State operations on May 18, 1979. Through September, the cooperating agencies achieved a reduction of 3,940,782 vehicle miles, totalling 32.44 x 10^9Btu saved. Efficient school bus routes saved 35.5 x 10^9Btu savings.
2-022	Energy savings of 577.1 x 10^9Btu were totalled from the heating and cooling operations of 791 school, hospital, municipal and public care facilities under the NECPA Title III, preliminary energy audits. Lighting savings from the same data analysis is reported at Measure 1-002. The savings reported are 20.1% of the total energy used by the facilities studied. These findings are consistent with Nebraska Plan energy savings for the last five years.
2-023	Energy savings of 7.0 x 10^9Btu were estimated for energy education programs in Nebraska schools involving 20,000 students in the K-12 curriculum range.

NEBRASKA REVISED 1977 STATE ENERGY CONSERVATION PLAN

ENERGY SAVINGS REPORT SUMMARY -- October 30, 1979

Measure	Energy Savings (10^9)	Explanation
1-001	0	No savings eligible: No bill yet introduced.
1-002	0	No savings eligible: No bill yet introduced.
1-003	5.031	Energy savings accumulated from Lincoln and Omaha carpool and mass transit ridership; Offutt AFB vanpools.
1-004	0	1977 was the base year for State auto procurement data.
1-005	0	No savings possible. Legislation passed in 1973.
1-006	203,910	Nebraska Plan energy audits.
1-007	5148.000	Residential energy savings from Home Energy Savers' Program, utility residential programs, CSA weatherization activity and general computer-run compliance calculations.
1-008	0	(Data not yet available)
1-009	0	1977 was the base year for the Kansas-Nebraska Agricultural Energy Program.
1-010	0	Research activity only.
1-011	0	Energy-related driver's education material not yet introduced.
1-012	0	No organized vehicle inspection program in existence.
1-013	0.973	Energy savings from January-February, 1977, waiver of truck sizes and weights to alleviate number of fuel oil shortfalls.
1-014	1.513	Waste oil collection figures from State government. (SEE "A" BELOW)
1-015	0	Research activity only.
1-016	0	Research activity only.
1-017	0	Research activity only.
1-018	0	Research activity only.
1-019	0	Research activity only.
1-020	0	Research activity only. Van service did not begin until late in 1978.
2-021	0	Coordination of intergovernmental activity only.
2-022	0	No Class "C" audit activity; Class "B" audits reported at Measures 1-006 and 1-007; (Data on Class "A" audits not yet available.)
2-023	0	Education programs begun but number of persons affected was too small to count.

$5,359.327 \times 10^9$
$+ \ 132.700 \times 10^9$
$5,492.027 \times 10^9$

equals 5.492×10^{12} Btu

A: PRIVATE SECTOR WASTE OIL COLLECTIONS FOR 1977.

NEBRASKA REVISED 1977 ENERGY SAVINGS DOCUMENTATION OUTLINE-- October 30, 1979

Measure	Data Available From	Documentation and Statistics
1-003	NEO	Energy Savings of 5.031×10^9 Btu were reported for increased ridership from the following transportation programs: a) Lincoln Carpool/Vanpool Program: 118,298 gallons of gasoline saved; b) Lincoln Transit System: 36,867 gallons of gasoline saved; c) Omaha Metro Area Carpool: 239,926 gallons of gasoline saved; d) Offutt Air Force Base Vanpool Program: 7,450 gallons of gasoline saved.
1-006	NEO	Energy savings of 203.910×10^9 Btu were accumulated from 380 Nebraska Plan Class "B" on-site energy audits of commercial buildings.
1-007	NEO	Energy savings of 5148×10^9 Btu were totalled from the following residential sources: a) 1,100 Class "B" utility company energy audits; b) 3,000 Class "B" energy audits performed by private organizations; c) 4,743 CSA weatherized homes; d) Computer-run compliance calculations based on the following assumptions: 1. Heating: Thermostat turn down of 1 degree by 50 percent of single-family homeowners. 2. Cooling: Thermostat turn up of 2 degrees by 20 percent of single-family homeowners. 3. Appliance turnover of 5 percent, with 25 percent of new purchases being energy efficient. 4. Insulation: 30 percent of single-family homeowners have insulated and retrofitted to improve their heating/cooling efficiency by 15 percent.
1-013	NEO	Energy savings of 0.973×10^9 Btu, were calculated from the use of oversized and overweight trucks to haul 83,310,067 gallons of middle distillate product during January and February, 1977, during a shortfall of heating fuels during a severe cold spell. An emergency executive order permitted the hauling of larger-than-normal fuel loads during the crisis period. Data was collected by the NEO from the State's fuel distributors.
1-014	NEO	Energy savings of 1.513×10^9 Btu was calculated from the collection of 10,900 gallons of waste oil from State of Nebraska vehicle operations. ENERGY SAVINGS OF 132.700×10^9 Btu WERE ADDED FROM THE COLLECTION OF 956,000 GALLONS OF WASTE OIL FROM PRIVATE SECTOR OPERATIONS.

NEBRASKA REVISED 1978 STATE ENERGY CONSERVATION PLAN

ENERGY SAVINGS REPORT SUMMARY -- October 30,

Measure	Energy Savings (10^9)	Explanation
1-001	16.591	Voluntary compliance based on a 2 percent building replacement rate for commercial, industrial, and publicly-owned buildings.
1-002	0	No calculation of voluntary delamping possible at this time.
1-003	5.301	Energy savings accumulated from Lincoln and Omaha carpool and mass transit ridership; Offutt AFB vanpools.
1-004	12.696	State auto procurement savings for one year of life-cycle-cost purchasing.
1-005	0	No savings possible. Legislation passed in 1973.
1-006	249.753	Nebraska Plan energy audits.
1-007	5345.600	Residential energy savings from Home Energy Savers' Program, utility residential programs, DOE weatherization activity and general computer-run compliance calculations. (See "A" below)
1-008	0	(Data not yet available
1-009	140.000	Kansas-Nebraska Agricultural Energy Program first year of implementation.
1-010	0	Research activity only.
1-011	0	Energy-related driver's education material introduced in September, 1978.
1-012	0	No organized vehicle inspection program in existence.
1-013	0	No energy savings from emergency or curtailment activity to date in 1978.
1-014	193.000	Waste oil collection figures from State government and private sector operations. (See "B" below)
1-015	0	Research activity only.
1-016	0	Research activity only.
1-017	0	Research activity only.
1-018	0	Research activity only.
1-019	0	Research activity only.
1-020	0	Research activity only. Van service did not begin until late in 1978.
2-021	0	Coordination of intergovernmental activity only.
2-022	2525.000	Class "A", "B", and "C" audit activity.
2-023	0	Education programs begun but number of persons affected will not be counted for a year.
	8,487.941x10^9	
equals	8.487x10^{12}	

NOTES:

(A) STATISTICAL SAMPLING OF WEATHERIZATION CLIENT HOMES HAS PRODUCED A SIGNIFICANT INCREASE IN ENERGY SAVINGS REPORTED FOR THAT SECTOR. (SEE THE ACCOMPANYING DOCUMENTATION OUTLINE FOR FURTHER INFORMATION.)

(B) EIGHT FIRMS OR AGENCIES, THREE PUBLIC AND FIVE PRIVATE, REPORTED WASTE OIL COLLECTIONS FOR THIS REVISED REPORT.

NEBRASKA REVISED 1978 ENERGY SAVINGS DOCUMENTATION OUTLINE -- October 30, 1979

Measure	Data Available From	Documentation and Statistics
1-001	NEO	Energy savings of 16.591×10^9 Btu were calculated from a computer analysis of commercial and publicly-owned buildings in the State to demonstrate a first phase of voluntary compliance with ASHRAE 90-75 standards even though mandatory legislation is not yet in place. The 2 percent compliance factor was obtained from the Nebraska Department of Economic Development's building replacement rate statistics. The unit savings of 20 million Btu was the expected differential of energy use between the old building and its replacement. The number of buildings affected in this first study of building standard application was: a) Commercial buildings: Total Inventory = 36,827; 2 percent affected = 737 structures. b) Publicly-owned buildings (includes administrative, office, school, and hospital structures): Total inventory = 4,652; 2 percent affected = 93 (or 1 building per Nebraska county). As more data is available on the replacement and renovation rate of these and other classes of structures, the computer analysis will be redone and the compliance factors increased.
1-003	NEO	Energy Savings of 5.301×10^9 Btu were reported for increased ridership from the following transportation programs: a) Lincoln Carpool/Vanpool Program: 103,740 gallons of gasoline saved; b) Lincoln Transit System: 38,472 gallons of gasoline saved; c) Omaha Metro Area Carpool: 251,922 gallons of gasoline saved; d) Offutt Air Force Base Vanpool Program: 30,000 gallons of gasoline saved.
1-004	NEO	Energy savings of 12.696×10^9 Btu were calculated for one year of modified life-cycle-cost purchasing of automobiles for the State fleet. While there was an increase of six percent in the miles driven, compared to the base year of 1977, six percent less gasoline was consumed for the reporting period.
1-006	NEO	Energy savings of 249.753×10^9 Btu were accumulated from 380 Nebraska Plan Class "B" on-site energy audits of commercial buildings performed in 1977, and an additional 40 audits processed in 1978. As further 1978 energy audits are evaluated, they will be added to the total savings for this Measure.
1-007	NEO	Energy savings of 5345×10^9 Btu were totalled from the following residential sources: a) 800 Class "B" utility company energy audits; b) 1,500 Class "B" computer-assisted energy audits performed by the NEO with municipal and utility assistance; c) 1,232 DOE weatherized homes FOR WHICH THE UNIT SAVINGS WERE INCREASED FROM 1 MILLION BTU TO 20.15 X 10^6 BTU BASED ON A STATISTICAL SURVEY OF 212 CLIENT HOMES PERFORMED IN 1979.

Measure	Data Available From	Documentation and Statistics
		d) Computer-run compliance calculations based on the following assumptions: 1. Heating: Thermostat turn down of 1 degree by 50 percent of single-family homeowners. 2. Cooling: Thermostat turn up of 2 degrees by 20 percent of single-family homeowners. 3. Appliance turnover of 5 percent, with 25 percent of new purchases being energy efficient. 4. Insulation: 30 percent of single-family homeowners have insulated and retrofitted to improve their heating/cooling efficiency by 15 percent. The assumptions used above are the same as for the 1977 report prepared at the same time. As greater degrees of compliance are established, the 1978 energy savings report will be revised upward.
1-009	NEO	Energy savings of 140.000×10^9 Btu were calculated from a preliminary report of the first year of Kansas-Nebraska Agricultural Energy Program implementation. The calculation is based on 600,000 gallons of diesel fuel equivalent saved in irrigation and 400,000 gallons of diesel fuel equivalent saved in field operations.
1-014	NEO	ENERGY SAVINGS OF 193×10^9 BTU WERE CALCULATED FROM THE COLLECTION OF A TOTAL OF 1,336,750 GALLONS OF WASTE OIL FROM STATE OF NEBRASKA VEHICLE OPERATIONS IN THREE AGENCIES AND FROM FIVE PRIVATE COLLECTION SERVICES.
2-022	NEO	Energy savings of 2525×10^9 Btu were calculated from Class "A" energy audits and in-house management programs reported for 145 businesses and industries. For many of these organizations, and others with whom the NEO has had audit contacts, 1978 data is incomplete. A revision of the energy savings will be made when annual reports by the firms are made. No Class "C" activity will be reported for 1978 apart from residential Measure 1-007 since the materials for self-help commercial/industrial programs are just emerging.