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PRELIMINARY FORECAST of LIKELY U.S. ENERGY CONSUMPTION/PRODUCTION BALANCES for 1985 and 2000 by STATES

Joseph F. Gustaferro
and
Carol S. Warlick, A. Michael Maher,
Roswell Wing

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This report presents preliminary projections of state energy consumption and production for 1985 and the year 2000. These projections are based on an earlier Department of Commerce national-level energy forecast, Forecast of Likely U.S. Energy Supply/Demand Balances for 1985 and 2000 and Implications for U.S. Energy Policy, and were prepared in support of an interagency effort under the direction of the Department of Interior, to assess the adequacy of the U.S. water resource base to meet future energy development and production needs. A key feature of the report is that energy production and consumption estimated for the years in question (1976, 1985 and 2000) are tabulated for each State in a common format so that easy comparisons can be made. Data provided include: population, energy consumption (for all energy sources), energy facilities, future energy produced (oil, natural gas and coal), output from electrical power sources (oil, gas, coal, nuclear, hydro/geo., other), water requirements, energy facilities (LNG terminals, coal gasification plants, petroleum refining capacity and electric power plants by fuel source) and data on number of solar installations, windmills and energy output from agricultural and municipal waste.

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FOREWORD

This document presents preliminary projections of State energy consumption and production for the year 1985 and 2000.

These projections were developed within the context of an earlier Department of Commerce energy forecast, Forecast of Likely U.S. Energy Supply/Demand Balances for 1985 and 2000 and Implications for U.S. Energy Policy, and were prepared in support of an interagency effort under the direction of the Department of the Interior to assess the adequacy of the Nation's water resource base to meet future U.S. energy needs. It is important to note that the Department of Commerce energy forecast referred to is among the lowest (in terms of projected energy demand growth rates and energy consumption levels) of existing forecasts for the years in question.

The Department of Commerce has a continuing responsibility to assess the availability of energy to meet the needs of industry and commerce on a national and regional basis. In addition, the Department of Commerce assesses industrial and economic resources required to meet the dramatic shift in the energy balance expected to occur, on both a regional and inter-fuel basis, in the years ahead. The State energy projections contained in this paper are intended to serve that assessment process. Moreover, based as they are on a national-level forecast subdivided to the State level, the projections should be of special interest to individuals and agencies concerned with regional and State-level energy planning.

It should be stressed, at the same time, that these State energy projections are preliminary in nature and are conditioned by the same assumptions and judgments that apply to the original Commerce national level forecast. In addition, the distribution and assignment of specific energy production facilities (e.g., electric power plants and coal gasification plants) among particular States, although based on past trends and judgment, in some cases is arbitrary.

An important contribution of the paper, however, is that it does indicate (if even on a preliminary basis) likely State energy development and production requirements that will need to be faced in the years ahead. In doing so, it highlights the fact that many of the problems to be faced in meeting these requirements can be solved at the State level only.

It is hoped that this report will elicit comments and information that will help refine the projections presented and that

it will also serve to stimulate related forecasting and resource planning efforts at regional and State levels.

Mr. Joseph F. Gustaferro of the Office of Ocean, Resource and Scientific Policy Coordination is the principal author of the report. Ms. Carol Warlick carried out the major share of the computational analyses required in developing the State energy projections. Other members of the Office of Ocean, Resource and Scientific Policy Coordination staff who contributed to the paper included Mr. Michael Maher and Mr. Roswell Wing.

James W. Curlin
Deputy Assistant Secretary
for Policy
November 1, 1978

ABBREVIATIONS

BCF	Billion Cubic Feet
B/D	Barrels per day
BEA	Bureau of Economic Analysis, Department of Commerce
BTU	British thermal unit
FEA	Federal Energy Administration (now part of the Department of Energy)
KWH	Kilowatt Hour
LNG	Liquefied Natural Gas
NGL	Natural Gas Liquids
OBERS	Office of Business Economics and Economic Research Service, Department of Commerce
OORSPC	Office of Ocean, Resource and Scientific Policy Coordination, Department of Commerce

In this forecast, units have been standardized for comparative purposes. Electric power plants are listed as 1100 megawatt capacity, all coal is approximately 23.07 million BTUs per ton, and windmills are shown as 100 kilowatt generators. In reality electric power plants range from one megawatt or less to 3,000 megawatts or more; coal ranges from 11 million BTUs/ton to 26 million BTUs/ton; and windmills range from five kilowatts to 100 megawatts. Thus, it takes 220 of the 5-megawatt units to be equivalent to one nominal power plant, and if the San Gorgonio 100 megawatt wind-generated electric power plant in Riverside County, California, is built, it will be equivalent to 1,000 of the 100-kilowatt standard windmills.

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SUMMARY

The disaggregation of the Department of Commerce national-level energy forecast to assess future U.S. energy-related water resource needs resulted in the development of individual State energy consumption/production projections for the year 1985 and the year 2000.

Many States have undertaken extensive assessments of the energy situation within their areas and have developed specific plans to cope with their energy supply needs. The State projections presented in this paper, however, should be of special interest to individuals and agencies concerned with regional and State level energy planning because they derive from (and hence must necessarily be consistent with) a previously formulated national-level energy forecast. The authors know of no other set of individual State energy projections that have been so derived.

The projections presented, of course, must be considered tentative and preliminary and have not yet been reviewed by appropriate State energy planning agencies. When so reviewed and revised, however, these projections should be useful for a number of reasons:

- Federal and State agencies can use the projections for planning purposes.
- Industry can use the projections for industrial energy planning, including planning for plant location and marketing.
- To the extent that the projections further delineate the scope and magnitude of the energy problem, particularly between 1985 and the year 2000, they can be used in the development of programs to heighten public awareness of energy issues.

Analysis of these projections, particularly with respect to energy production requirements, will obviously also help to identify such problems as the impact on coal transportation capabilities and possible impacts on State and regional industrial employment. Most of all, however, the projections should point out the need for increased coordination and interaction between individuals and agencies engaged in energy planning at the national, regional and State levels.

A key attribute of the paper is that the energy production/consumption data for the years in question (1976, 1985 and 2000) are tabulated for each State in a common format so that easy comparisons can be made. In carrying out the disaggregation process, four basic rules had to be applied. While patently obvious, they bear reiterating:

- In order for an energy facility to produce or convert energy, it must occupy a specific site. In other words, everything must be someplace.

- All natural resources, e.g., coal, can only be obtained from States that have that natural resource.

- Disaggregated energy values, no matter how surprising they look, must add up to the aggregated value. The sum of the energy parts must equal the whole.

- Energy production (domestic production plus imports) must equal consumption; a State cannot consume energy that it does not have or cannot acquire from external sources.

Figures 1 through 14 summarize in bar-chart form some of the contrasting features of the U.S. energy picture at the State level in 1985 and 2000. Among the features worth noting are:

- Overall U.S. population is expected to increase to 262,000,000, or some 22 percent, by the end of the century. This approximates the Census Bureau Series II projection. Certain States will grow very little in population terms (e.g., the Northeastern States), however, while others (California, Florida and the Sun Belt States) will grow rather dramatically. This has implications for future energy consumption and production patterns in the United States.

- Oil consumption will continue to increase through 1985 but decrease sharply through the rest of the century. Similarly, oil production except in the case of Alaska and some non-major oil producing States, will continue to decline steadily through the rest of the century.

- Gas consumption is expected to decline gradually though steadily (except in the case of Texas)

through the rest of the century. Gas production also will decline in the continental United States, though much more sharply. The gap between supply and demand in this case is expected to be filled by gas from Alaska, imports from Mexico and Canada, Liquefied Natural Gas (LNG) imports and coal gasification.

- Coal consumption, on the other hand, is expected to increase steadily through 1985 and rise sharply thereafter through the rest of the century. To meet this demand, coal production in the producing States will rise accordingly (more than double in most instances), with the greatest percentage rise taking place in the western producing States.

- Electrical power consumption is expected to increase steadily for all States for the rest of the century (more than doubling in many cases) and will require the completion of 544 additional plants of a nominal megawatt capacity (one every 16 days through the year 2000). (A nominal plant assumes an average of 1,100 megawatt capacity.) Because of expected limitations on the availability of traditional power generation sources, a considerable number of these plants will have to be nuclear powered. The number of nuclear plants required to satisfy California's electricity needs is projected to increase from one nominal plant in 1976 to 32 in the year 2000. The number of such plants in New York is projected to increase from 4 to 22.

- As one might expect, the amount of water that will be consumed in energy development and production will increase markedly in those States where new energy production (including electrical power generation) takes place.

There are no conclusions or findings presented in the paper as such. In addition to offering an approach and a basis for improved coordination and interaction between Federal, Regional and State agencies in the energy field, however, it is hoped that the thoughtful reader also will better understand many of the fundamental issues still to be resolved in dealing with the national energy problem. For example:

- Can the United States and the individual States build the number of nuclear and coal burning electrical utility plants forecast in the face of the environmental, safety and resource problems that exist? For example:

- Will we build 264 nuclear plants by year 2000 if this means 3 in Rhode Island, 11 in North Carolina, 22 in New York and 32 in California?

- Will we provide the transportation required to mine 800 million tons (23 million Btu standard tons) of Western coal? (800 million tons equals 1,150 million tons of the average ton of Western coal containing 16 million Btus.)

- Will the Eastern States dramatically increase their coal production by the year 2000. For example, West Virginia from 111 to 292 million tons, Kentucky from 147 to 342 million tons, and Pennsylvania from 86 to 203 million tons?

- If we do not build the nuclear plants and/or mine these large amounts of coal, will we face massive electric power shortages during the 1990's?

- Can renewable or the so-called inexhaustible energy sources (solar, waste materials, geothermal and those generally classified in the "other" category) make a significant contribution to the energy supply during the critical transition period when they will be most needed (1985-2000)?

- Will it be feasible for the United States to purchase from abroad sufficient energy to compensate for the shortfalls expected?

- If not, can levels of employment, GNP and the U.S. standard of living be maintained with far less energy than has been the case in the past? If so, with how much less?

These are questions and issues that must be faced and dealt with at the State and regional as well as the national level.

Figure 1

Population
Seven Highest— —Yr 2000

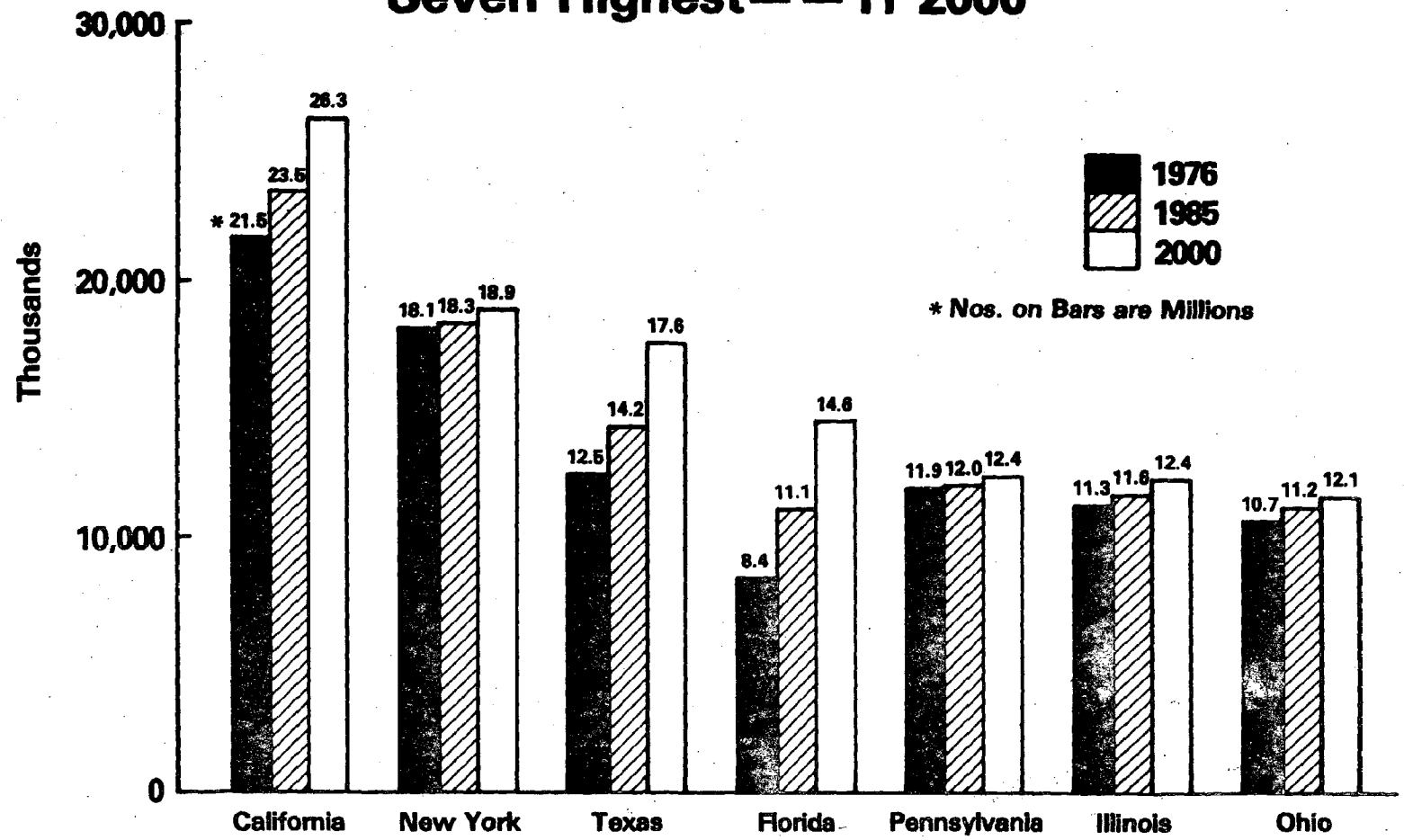


Figure 2

Oil Consumption Seven Largest Consumers --Yr 2000

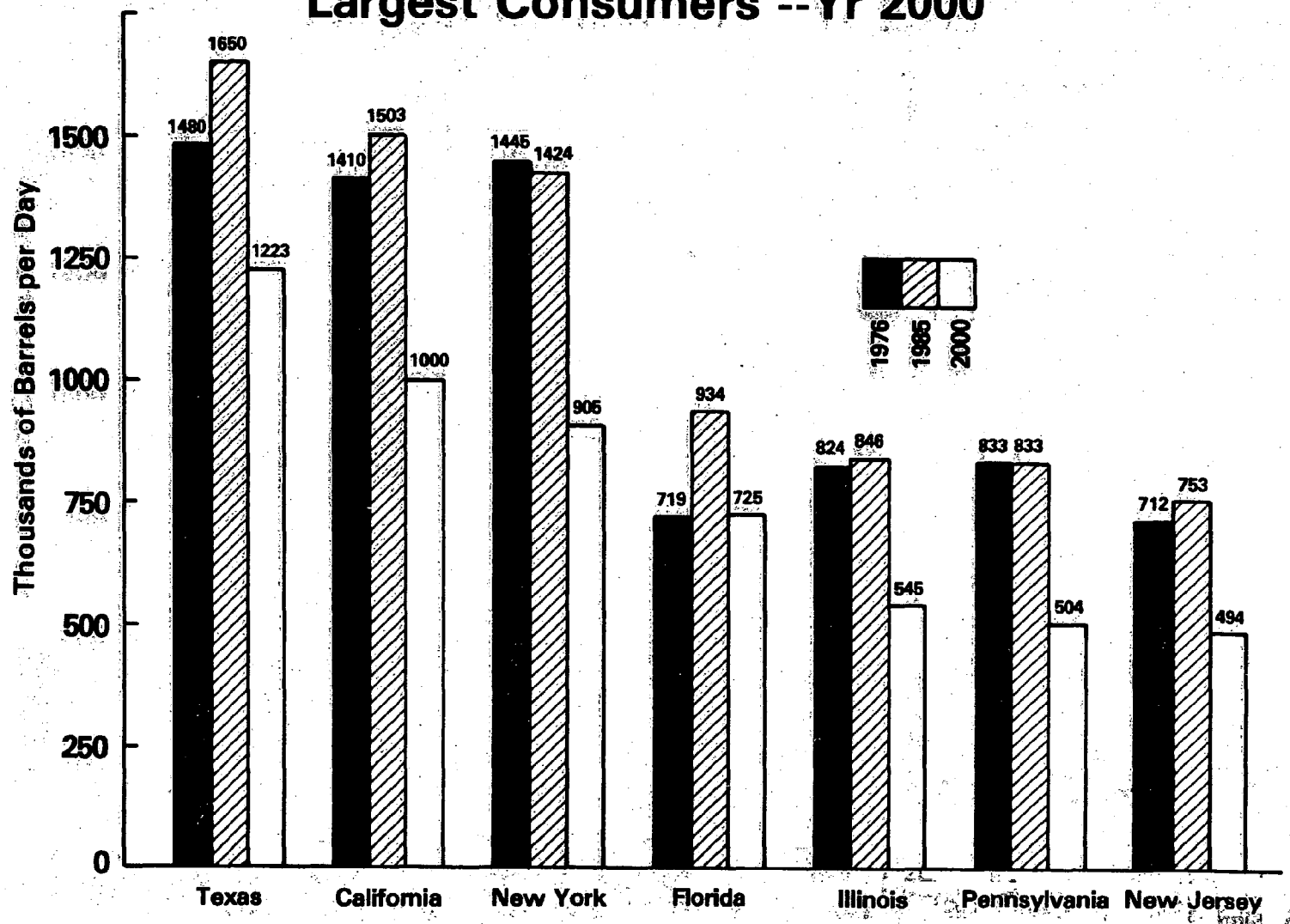


Figure 3

Oil Production
Seven Largest Producers
-Yr 2000

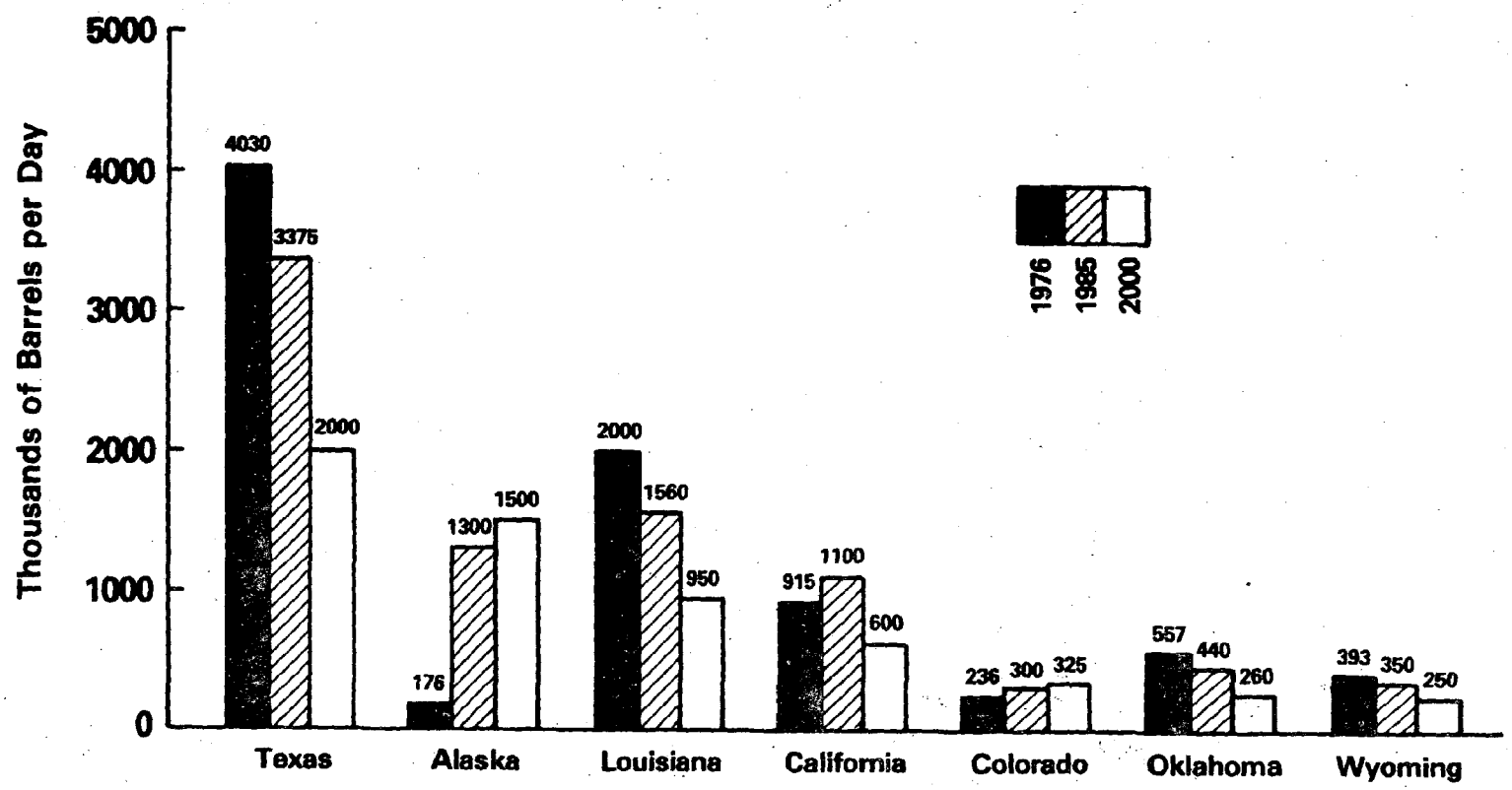


Figure 4

Natural Gas Consumption Seven Large User States

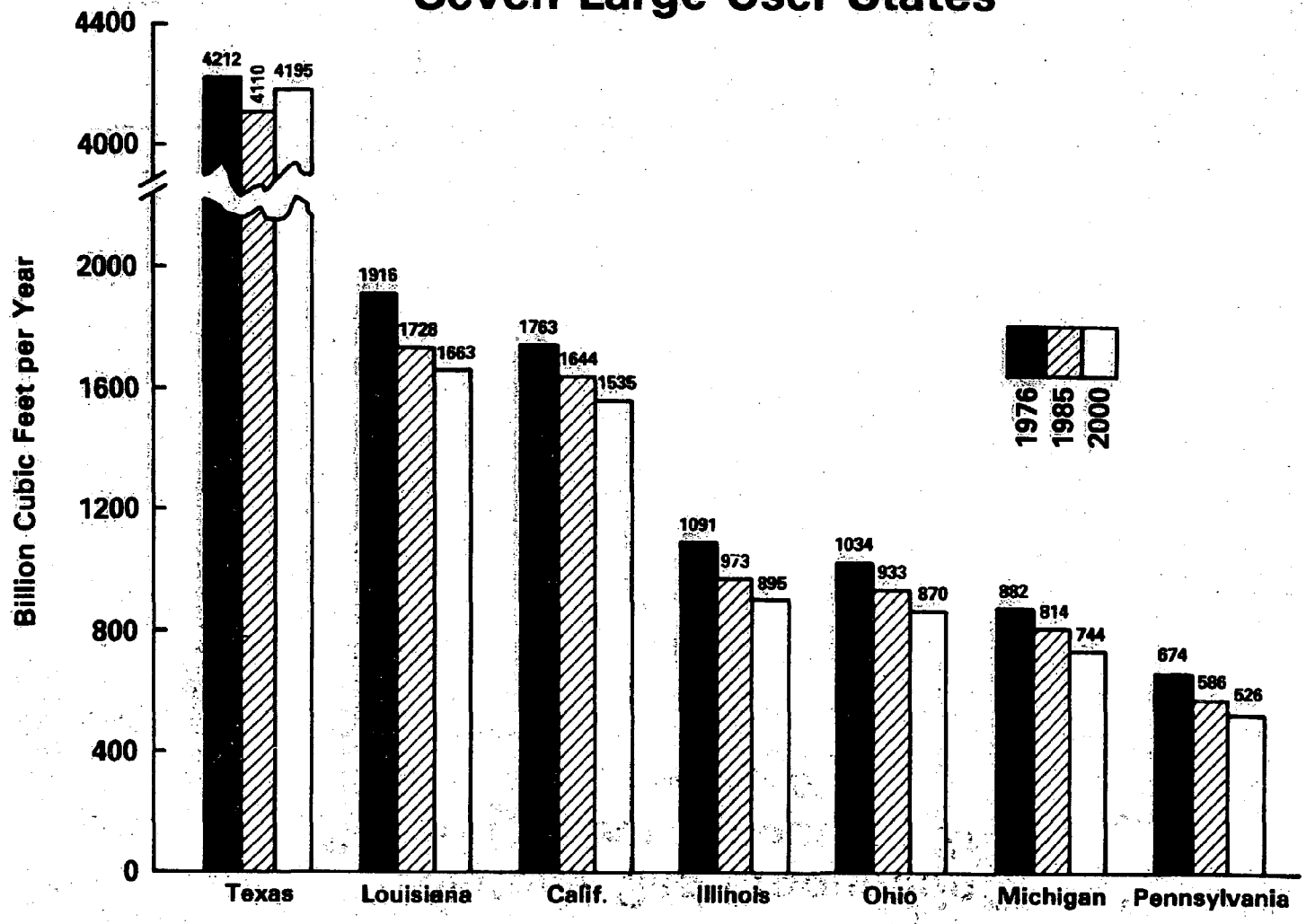


Figure 5

Natural Gas Production
Seven Largest Producing States
Year 2000

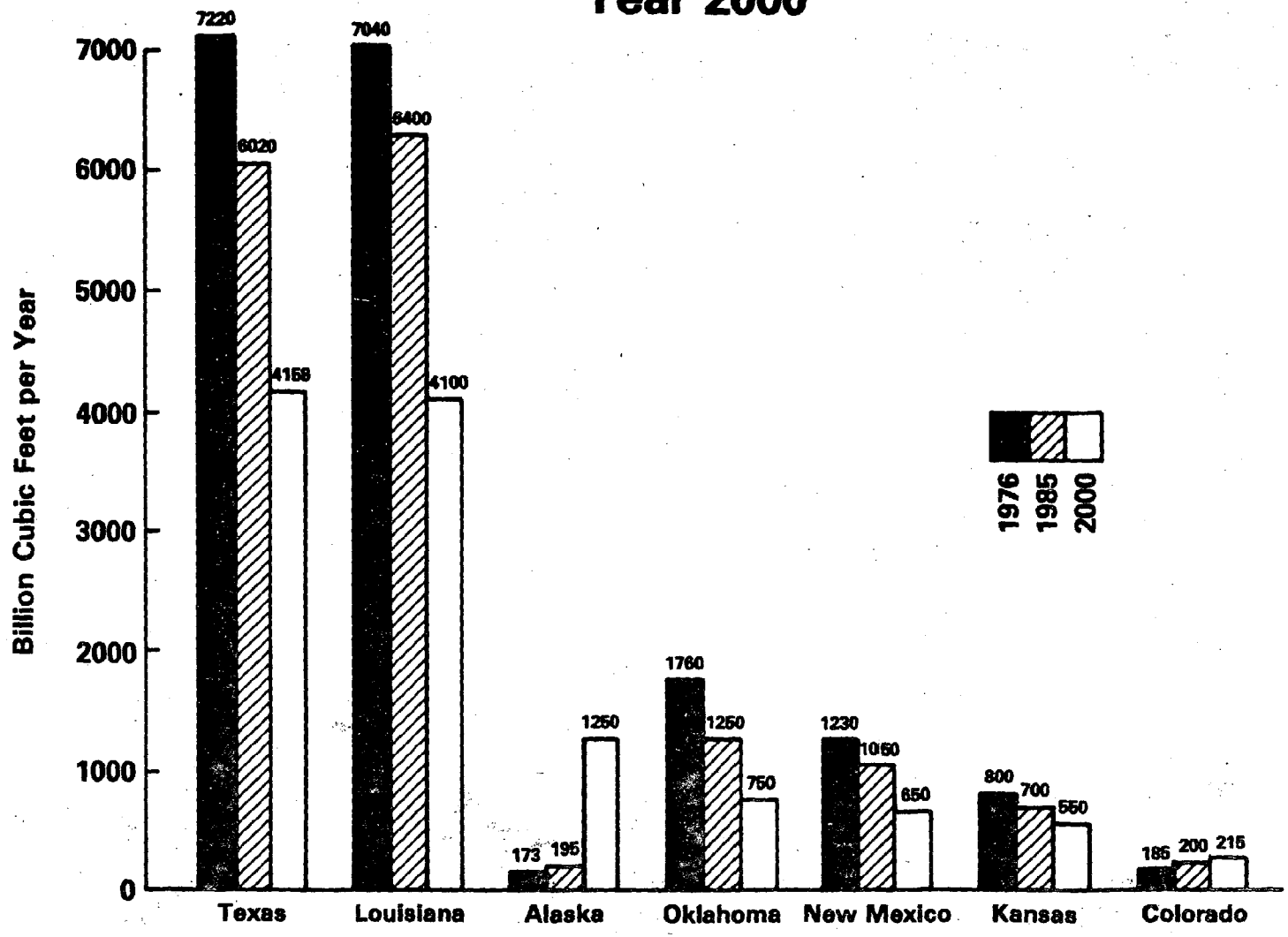


Figure 6

Coal Gasification and LNG Facilities Operational Facilities by Year 2000

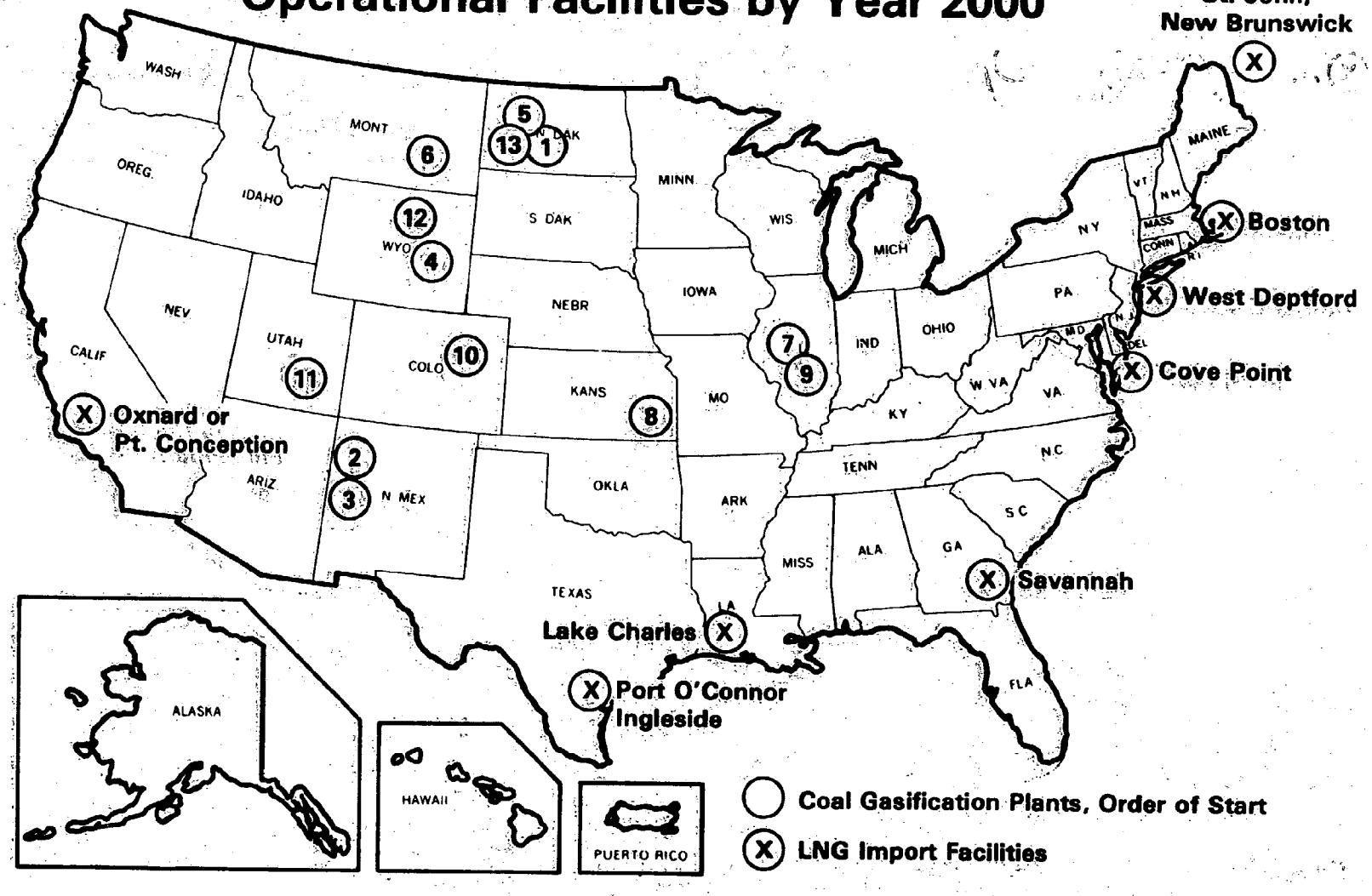


Figure 7

Coal Consumption
7 Illustrative States
(Largest Users-Yr 2000)

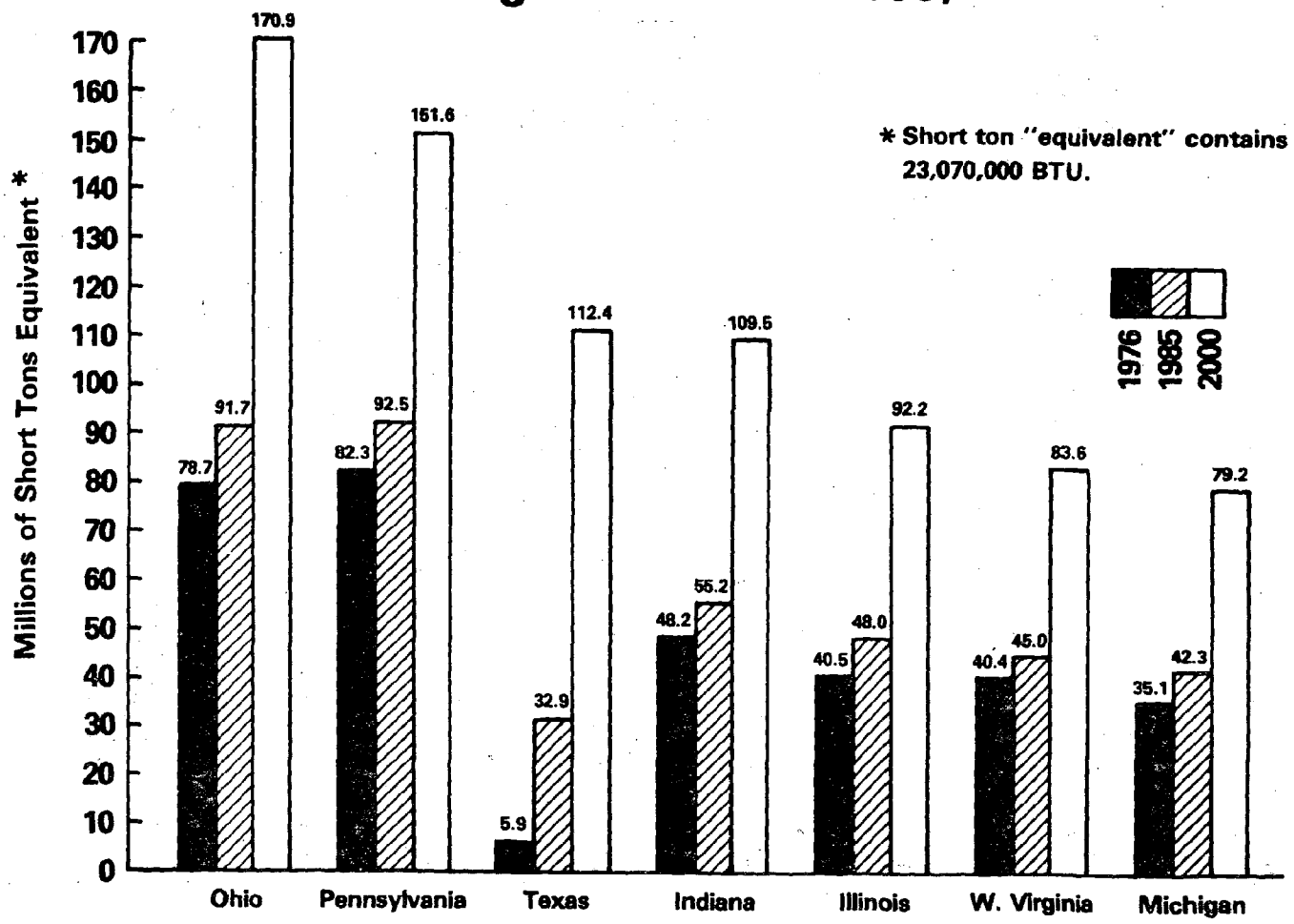


Figure 8

Coal Production
Seven Largest Producing States
Year 2000

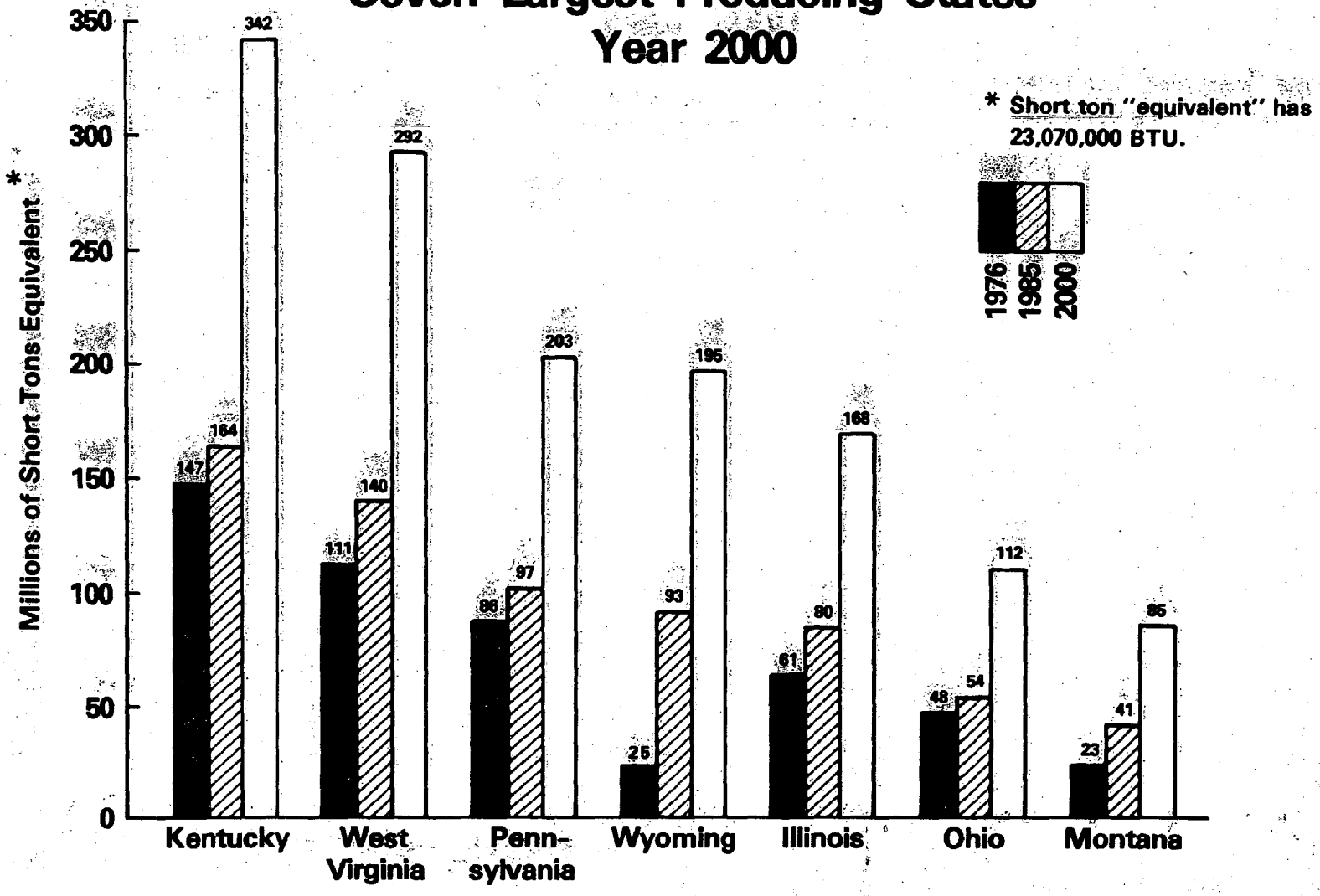
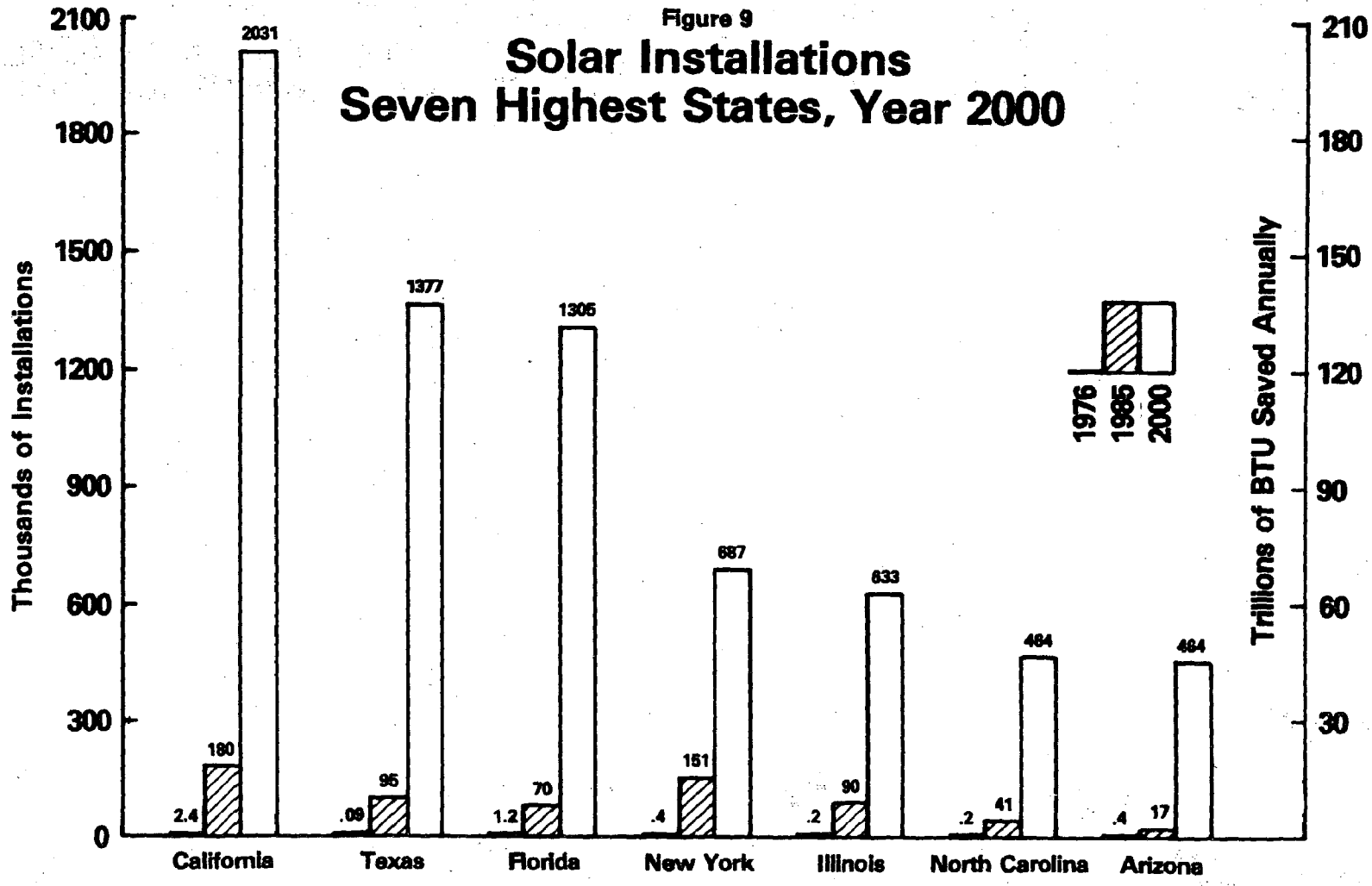


Figure 9

Solar Installations
Seven Highest States, Year 2000



One Solar Installation is Defined as Having a Capacity of 100 Million BTUs Per Year

Figure 10

Electrical Power Plant Fuel Consumption
Trillions of BTU Per Year
One KWH Requires 10,400 BTU

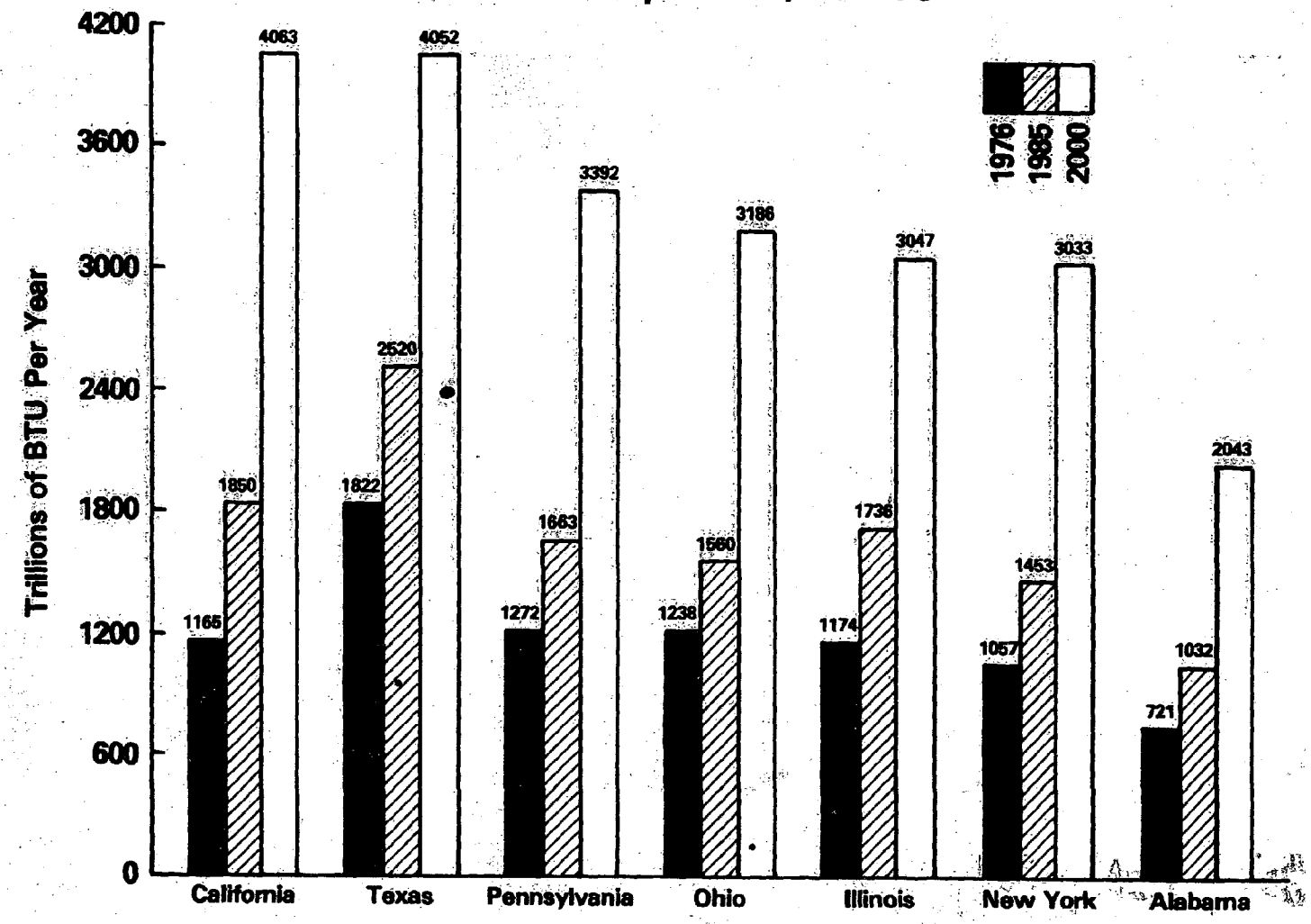


Figure 11

Approximate No. of Electric Plants of 'Nominal' Size Required in 7 Illustrative States

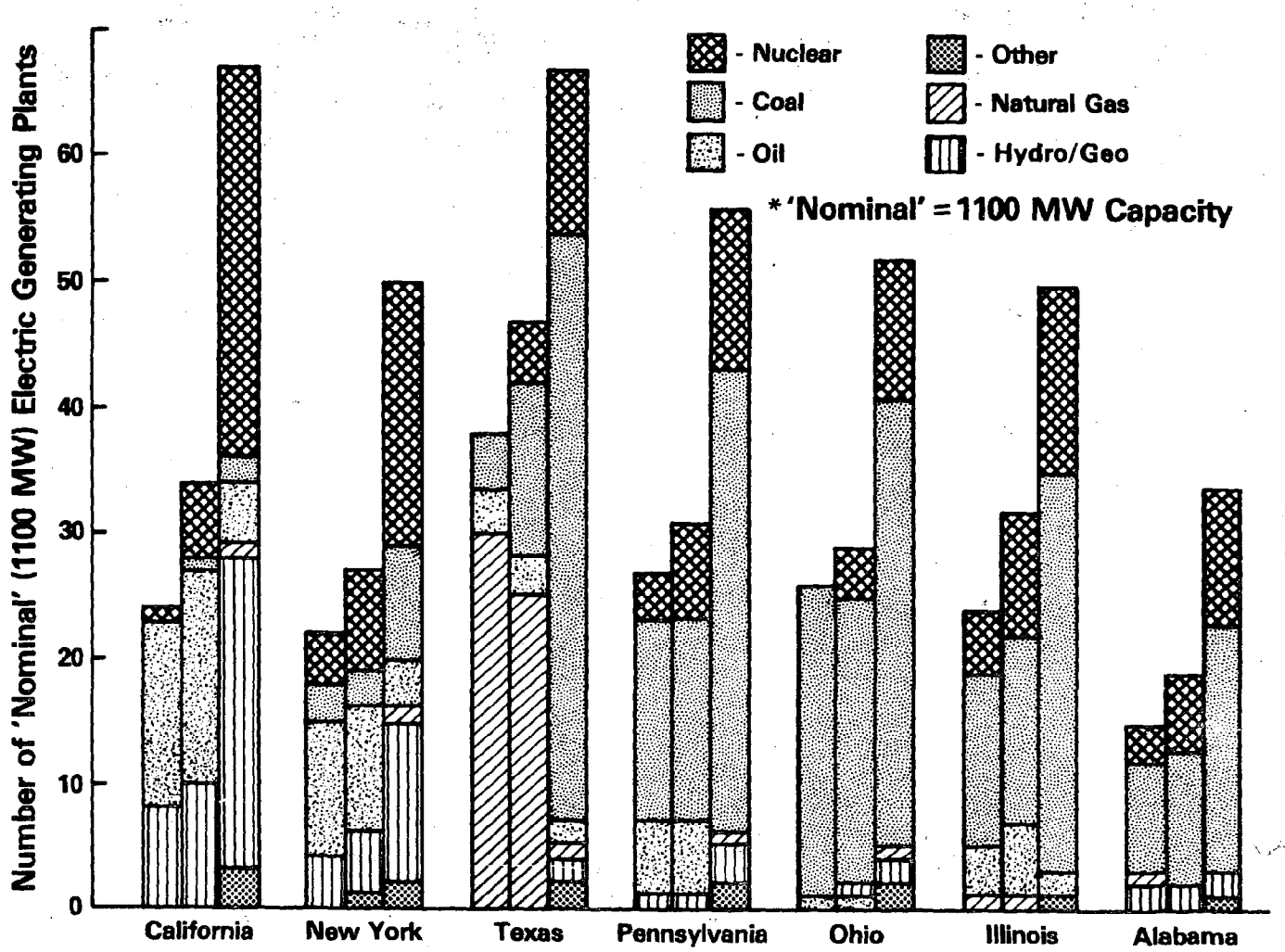


Figure 12

Nuclear Power Plants
Seven Highest States, Year 2000

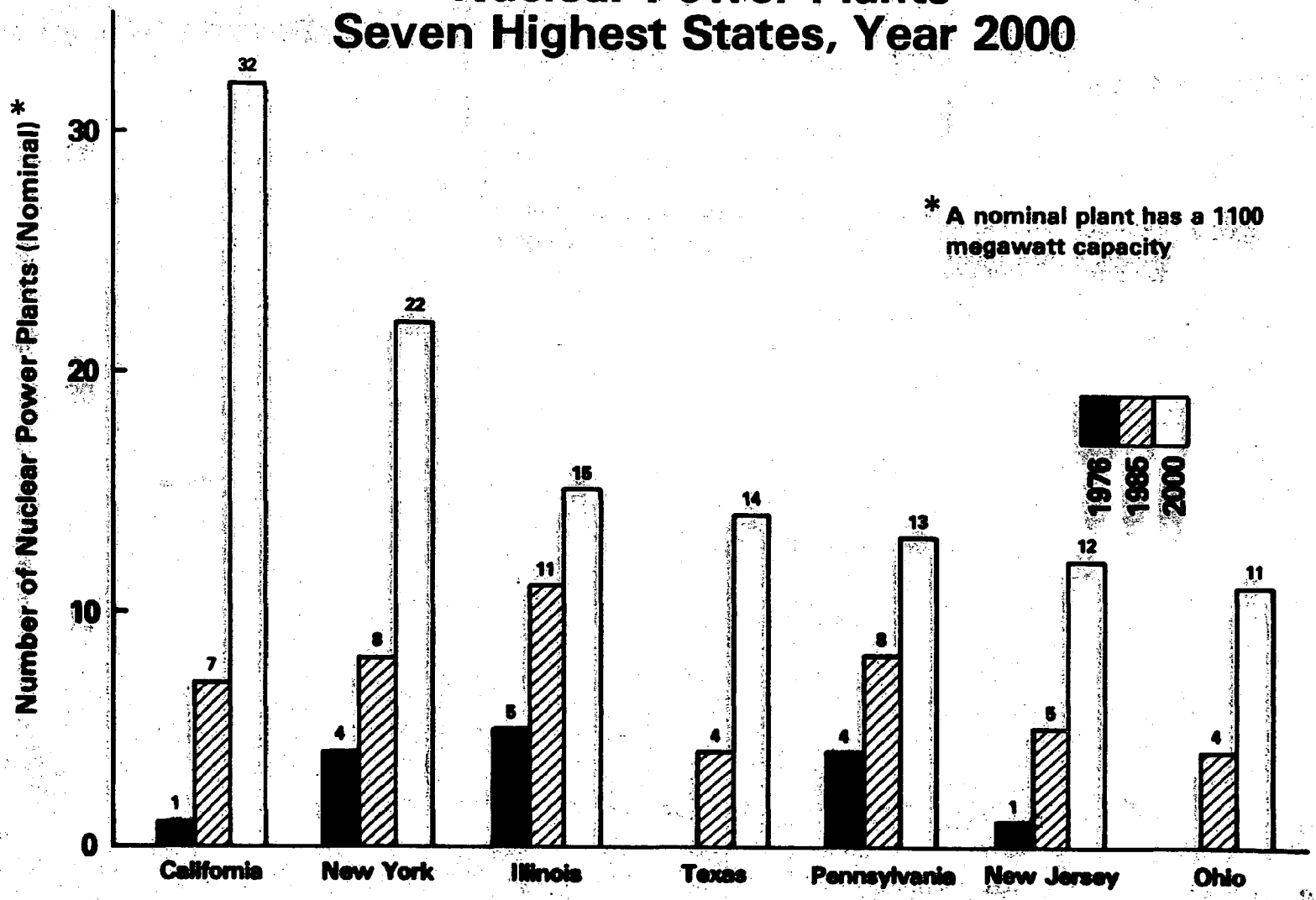


Figure 13

Water Consumed in Energy Production

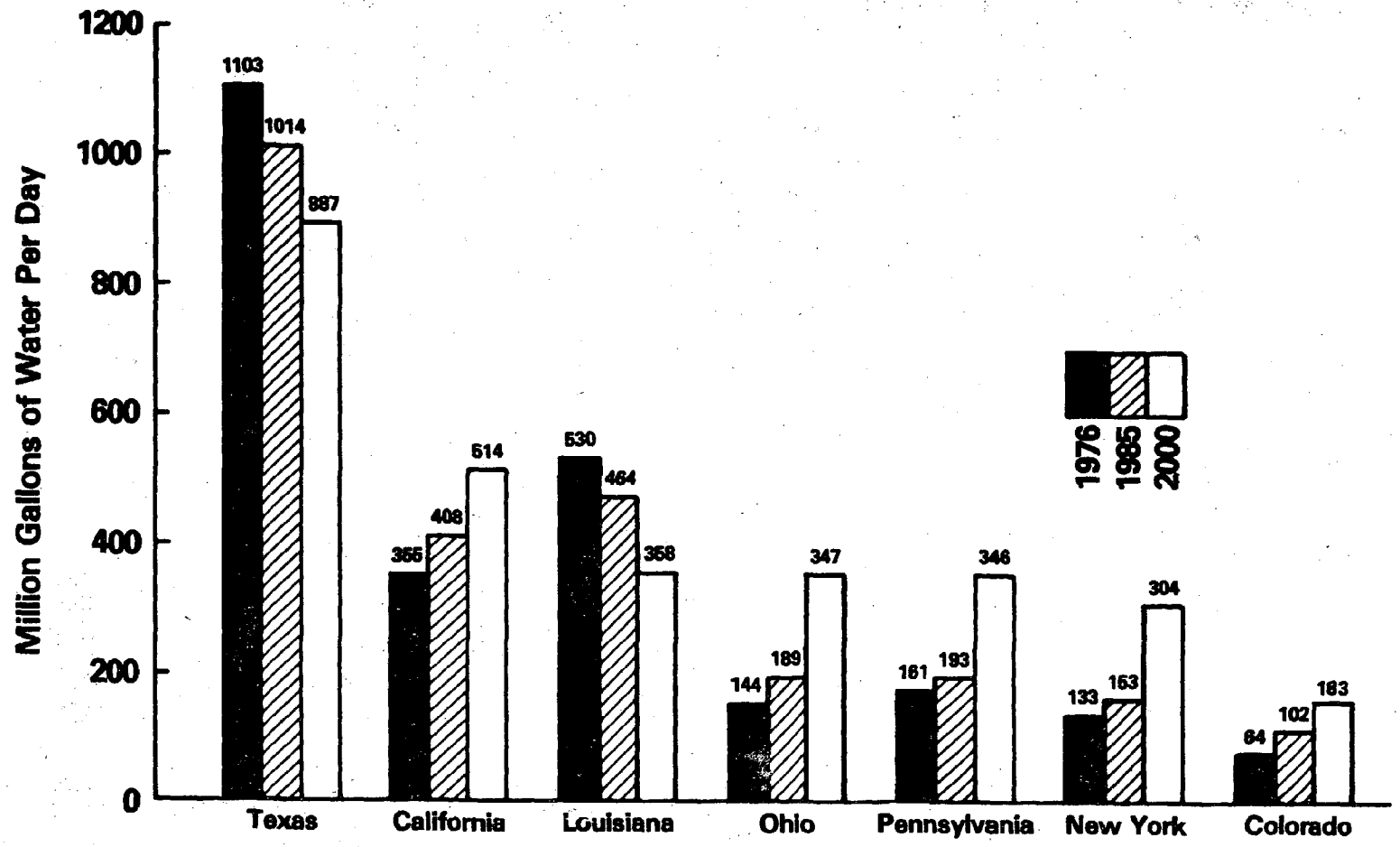


Figure 14

Uranium Extraction
Seven Largest Producers Year 2000

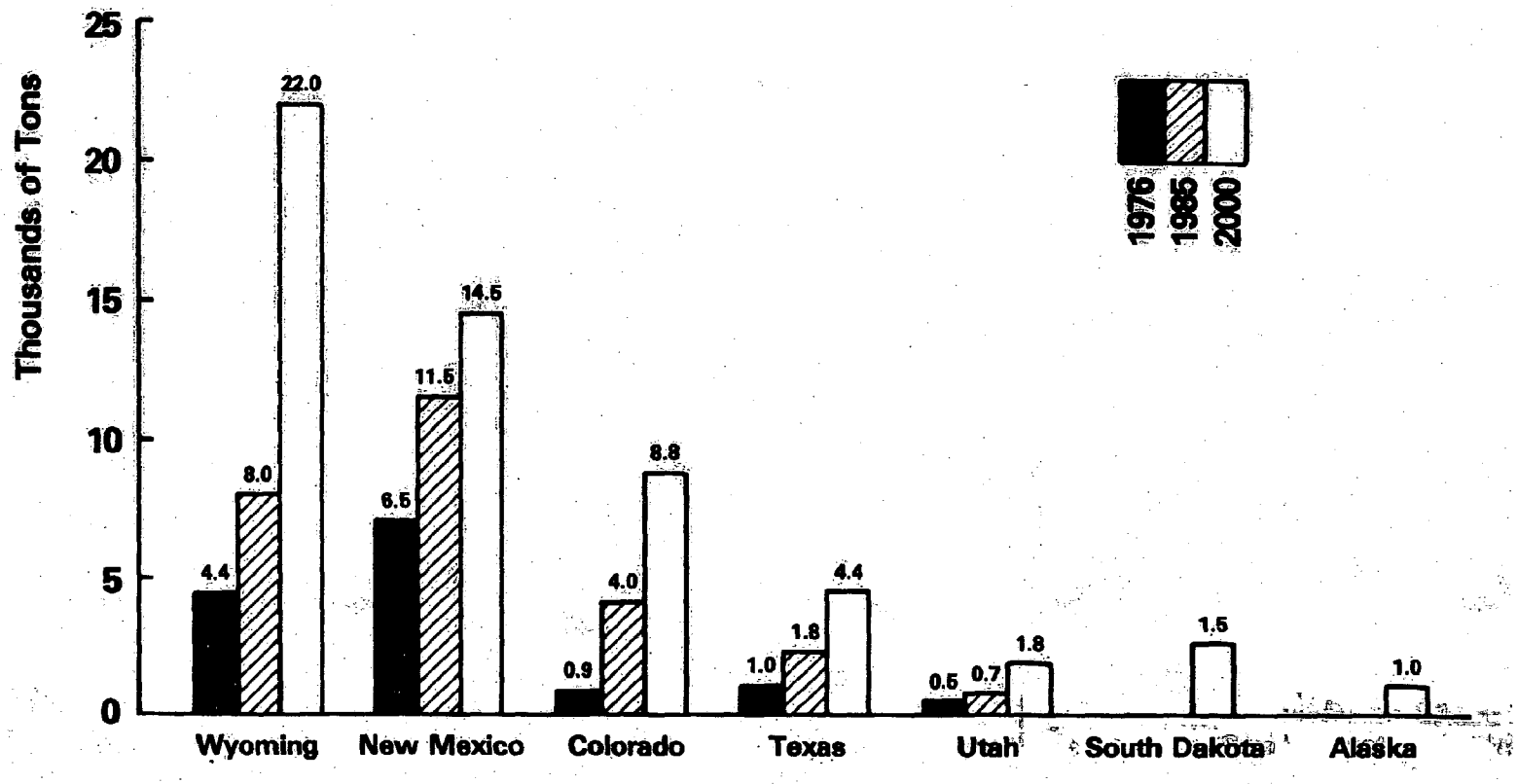


Figure 15

Water Resource Regions

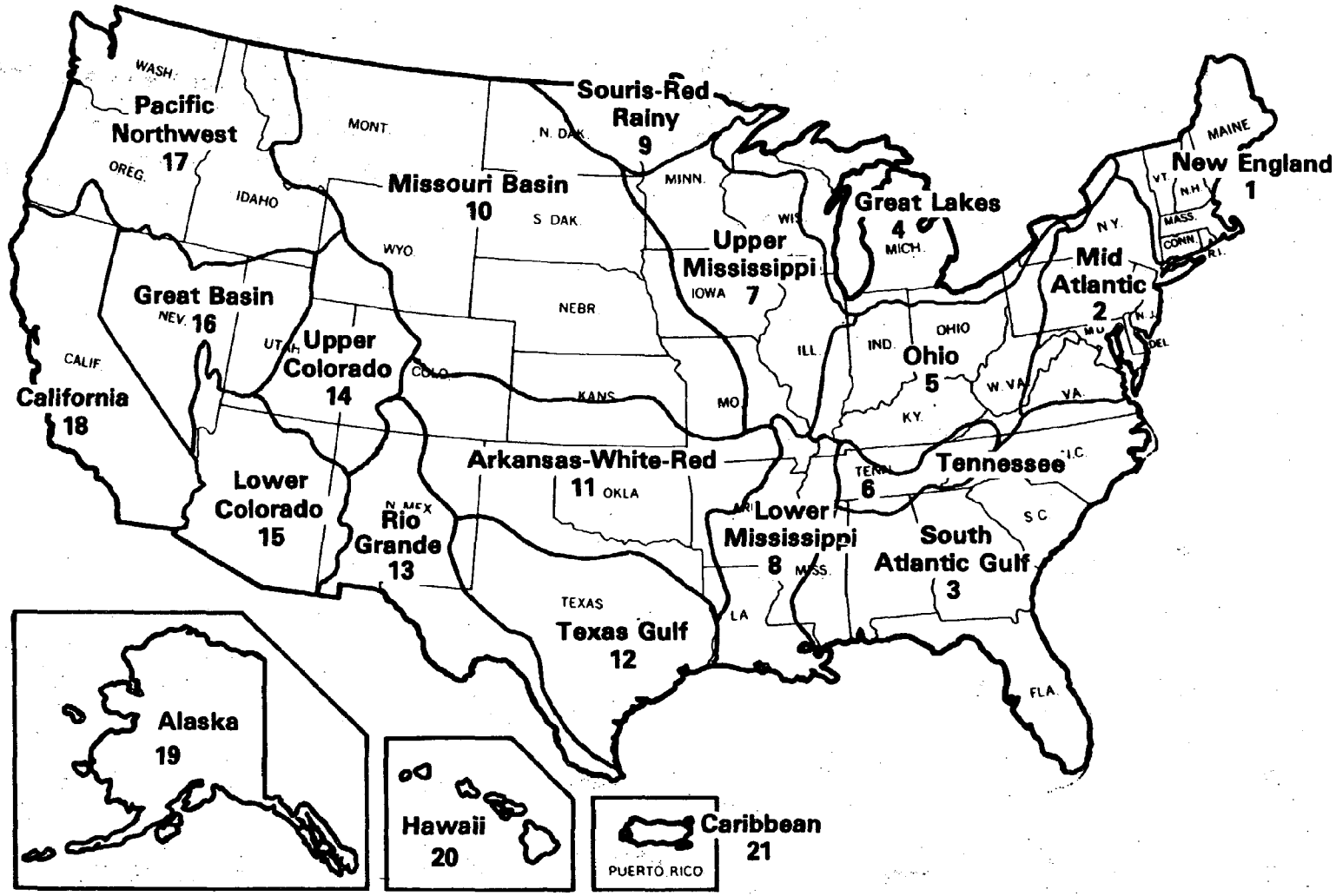
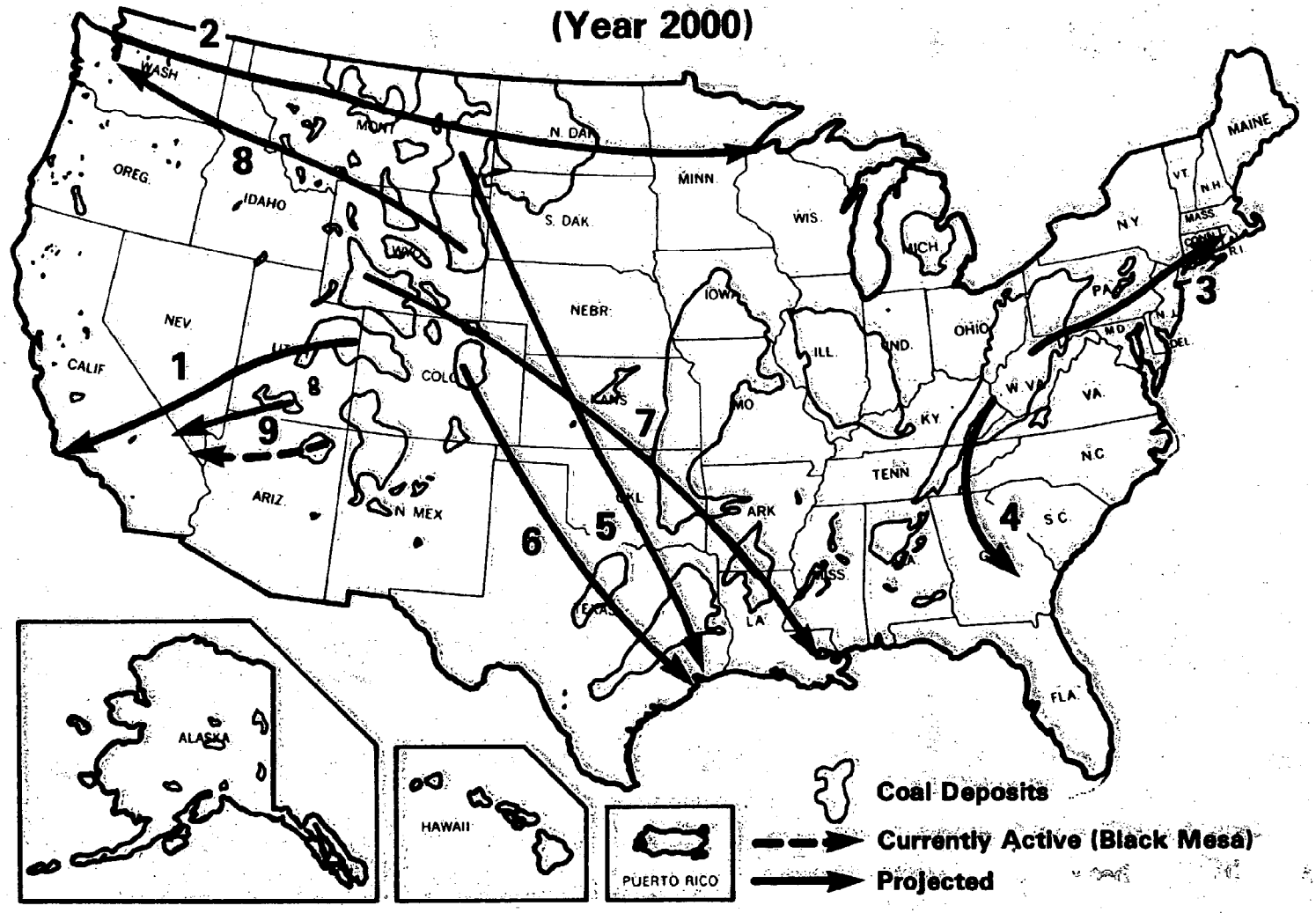


Figure 16

Major Coal Slurry Pipelines

(Year 2000)



SECTION I. INTRODUCTION

BACKGROUND

Energy development and production (both the extraction of basic energy resources and the conversion of these resources into end-use energy) require significant amounts of another important national resource -- water.

Recognizing that projected energy consumption-distribution-production patterns have changed greatly in recent years (due to the impact of the oil embargo, awareness of the limitations on the U.S. resource base for domestically produced gas and oil, the policy commitment at the national level to energy conservation, the continued concern for environmental protection, and other factors), the Department of Interior -- as part of its Second National Assessment of the Nation's Water and Related Land Resources -- undertook to lead an interagency effort to assess both current and projected water withdrawals and consumption associated with all energy uses at both the national and the regional-state levels.

To carry out the assessment in the limited time available, it was decided that existing data and existing energy projections would be used to the extent possible. It was also decided that projections of future energy production needs and associated water requirements would focus on two target years -- 1985 and the year 2000.

Among existing energy forecasts, the Department of Commerce Forecast of Likely U.S. Energy Supply/Demand Balances for 1985 and 2000 and Implications for U.S. Energy Policy* was recent enough (January 1977) to take into account current developments and trends and also provided national level estimates for the two years of interest (1985 and 2000). Moreover, the forecast included detailed breakdowns of both energy consumption (residential/commercial, industrial, transportation and electrical generation) and energy supply required to satisfy these consumption requirements (oil, gas, coal, nuclear and other fuel sources). These breakdowns also took into account the specific fuels that may exist for each energy use and the fact that energy forms are not perfectly interchangeable. Finally, the Commerce forecast estimates proved to be at the lower end of the range of U.S. energy supply/demand estimates for 1985

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*The Forecast is available from the National Technical Information Service (#PB 266 240), $8.

and 2000 as projected in other available energy forecasts. Thus a potentially "lower bound" for the range of energy development/production and associated water requirements for these two target years would be provided.

Accordingly, the Department of Commerce was asked to participate in this interagency effort, using the Commerce energy forecast as a vehicle for projecting regional energy supply/demand balances for 1985 and the year 2000 and calculating the associated energy-related water consumption requirements for the same target years.

Certain inputs were needed for this assessment: (a) a range of estimates of future U.S. energy demand; (b) estimates of the end-use/sectoral breakouts associated with this demand spectrum; and (c) estimates of how this demand picture will be reflected in requirements for different kinds of energy production (both in the extraction of basic fuel resources and in their conversion to energy end-uses). These inputs for target years 1985 and 2000 were readily extractable from the Commerce forecast as it stood.

Because water resources are measured geographically (the standard breakdown is in terms of "water regions"), the national level energy estimates contained in the Commerce forecast had to be disaggregated. Only in this way could the water requirements for energy extraction and conversion be determined and (after being added to the water needs for other uses) then be matched against the water resource base projected to be available in the area.

The end result of this effort was the development of individual State estimates of energy demand and production in 1985 and the year 2000. Because these estimates are of interest in their own right and of special interest to individuals and agencies concerned with regional and State level energy planning, it was decided they should be made available, together with supporting tabular data, in a separate paper.

APPROACH

It should be stressed that the State projections contained in Sections II and III of this paper are necessarily preliminary in nature and, of course, are conditioned by the same assumptions and judgment factors that apply to the original Commerce energy forecast.

Appendix A provides a summary of the key national-level energy values presented in the forecast and a discussion of the assumptions on which the forecast is based.

The approach used to disaggregate U.S. energy consumption and energy production requirements at the state level involved essentially three steps:

a. Projections of U.S. Population by States were developed on the basis of Commerce's Bureau of Economic Analysis population projections for the years 1976, 1985 and 2000. A year 2000 total U.S. population of 262 million is projected.

b. Projection of State Energy Consumption by Type of Energy. This was accomplished by determining the current consumption of (or demand for) energy on a State basis for each energy source and applying the per capita energy growth factors for each element of the fuel mix as developed for the Department of Commerce forecast. These factors are based on assumptions about rates of energy demand growth, effectiveness of conservation measures, energy end-use patterns, etc., that are essentially independent of variations that might occur among States or regions. Adjustments were made in special cases where it was felt that major changes in energy supply availability or major fuel substitution can be expected to occur in a particular area or region and thus modify traditional energy use patterns.

c. Projection of Energy Production Activities by State. The current distribution of energy production activities (1976) by State for both energy resource extraction and energy end-use conversion was determined and used as a baseline. Planned augmentation to present production operations and facilities were added to this base, and those operations and facilities planned for phase-out (or reduced production) were subtracted. The additional energy production capability needed to meet energy expectations as projected in Commerce's forecast for 1985 and 2000 were distributed according to the various State facilities.

Specifying the locations by State of "new" energy production activities was relatively straightforward. Extraction operations for oil, gas, coal and uranium were assumed to be limited to the geological resource base. It was assumed that the further exploitation of these resources would occur in those areas where cost of production factors and access to resource and market factors would

be minimized. Energy conversion operations based on shale (oil or gas), geothermal and hydroelectric are similarly constrained geographically. More analysis was required in the case of other energy conversion facilities such as LNG terminal and regasification facilities and oil refineries. Based on current planning and projections, these could be fixed with some confidence, however.

The location, by State, of Hi-BTU gasification facilities and electrical power generation plants, on the other hand, posed a somewhat different problem. A power plant located on a river serving as the boundary between two States, for example, could just as well be located on one side of the river as the other. Projections of such siting decisions did not attempt to take into account political or non-technical considerations that might arise and were, in such cases, necessarily arbitrary.

For this reason, and because not all factors and energy resource exploitation constraints peculiar to specific States could be taken into account, the State projections of energy production presented in this paper should be reviewed by the appropriate planning and energy offices at the State level before further refinement as a final forecast.

It should also be reiterated that the State projections presented derive from the Department of Commerce national energy forecast referred to earlier. That forecast presents results which, in the opinion of the forecast team, are most likely to occur, given present policy thrusts and trends in U.S. energy production and consumption. This is in contrast to the more common "multiple scenario" approach which offers a menu of alternate outcomes based on differing sets of assumptions. The path, or solution-mix, indicated as most likely, however, should not be considered an optimum one or even the least disruptive. Nor should the economic, social and political impacts involved in achieving the energy supply/consumption balances indicated be underestimated. Even what the authors have called the "most likely" energy future will still call for a major effort on the part of Government, industry and the people of the nation as a whole. On the other hand, it should be obvious that a shift away from the forecast path could lead to even more serious consequences and potentially drastic life style changes.

ORGANIZATION OF THE PAPER

Section II summarizes in tabular form the basic data used in the development of State level energy consumption and production estimates. Included are data on population projections for each State, estimates of energy consumption

by state and by type of energy and state energy production estimates for each major energy source. Included also as an item of possible interest are computations of regional and State water requirements (consumption) that will be associated with the production and distribution of energy projected in the earlier tables.

Section III offers a series of tables which essentially constitute a re-sorting of the data presented in Section II on a State-by-State basis. Separate tables, in short, give projected energy consumption and production for 1985 and the year 2000 for each State in alphabetical order.

Section IV, which concludes the body of the report, offers some general comments on the overall problem of generating State-level energy production/consumption balances and draws some general conclusions regarding the value of integrating State and regional energy planning factors in energy forecasting and policy formulation carried out at the national level.

A bibliography of major sources and references used in the development of the State energy projections is provided at the end of the report.

Appendix A provides the key U.S. national domestic energy production and consumption tables presented in the Commerce energy forecast and the assumptions used.

Appendix B provides a table of conversion factors which may be useful to the reader in interpreting data presented in the various tables.

SECTION II

PROJECTIONS OF U.S. ENERGY CONSUMPTION AND PRODUCTION IN 1985 & 2000 -- BY STATE

STATE POPULATION PROJECTIONS

Table 1 provides a breakdown of U.S. population data for the years 1976, 1985 and the year 2000 -- by state.

State projections for 1976 and 1985 were taken from the interim revisions of the 1974 OBERS Economic Projections published by the Bureau of Economic Analysis, Department of Commerce. These interim projections are not part of the regular OBERS program.

State population projections for the year 2000 were based on BEA estimates as well. However, the BEA numbers were slightly increased to bring them in line with the population projections used in the Commerce energy forecast referred to earlier.

The population estimates for Puerto Rico were developed separately. A 2.2 percent growth rate (per year) was assumed for 1970 through 1976, a 1.5 percent growth rate was projected for the next 9 years (through 1985) and a 1.2 percent growth rate for the remainder of the century (through 2000).

State population levels are an essential ingredient in determining State-level energy consumption, of course. They are particularly important in this analysis, which uses per capita energy growth rates as the major factor in determining ultimate energy consumption.

Also included in this section are two tables which provide projections-by-State of two major energy consumption variables: Automobiles and dwellings (Tables 2 and 3).

With respect to automobiles, the totals for 1976, 1985 and 2000 were taken from the 1977 Commerce energy forecast (97 million, 121 million and 136 million). The 1976 figure (97 million) was developed on the basis of industry and trade sources and differs from the figure appearing in the 1976 Statistical Abstract of the United States for estimated automobiles (107,371,000).* State automobile population

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* Differences between the two sources result from differing methods of estimating "junk rates."

figures (taken from the Abstract) were reduced proportionately to conform with the 1976 baseline total used in the national forecast.

Automobile projections for 1985 and 2000 were based on State population growth coefficients (Table 1) and changes in the automobile-per-person ratio, which is in part a function of the aging of the population. The forecast assumes this ratio will plateau out (or saturate at) .8 of an automobile per driver in the latter part of this century.

With respect to dwellings, the totals (74.5 million, 83.6 million and 103 million) were also taken from the 1977 Commerce energy forecast. The 1976 State numbers are again made proportional to those appearing in the 1976 Statistical Abstract of the United States under "households for 1974," the 1976 total (70,236,000) having been increased proportionately for each State.

The projections for dwellings in 1985 and 2000 were also based on State population growth: the increase in the ratio of dwellings per person for both 1985 and 2000 compared to 1976 were applied to each State persons-per-dwellings ratio for 1976.

TABLE 1

Population by State (thousands)

State	1976[1/]	1985[1/]	2000[2/]
Alabama	3,665	3,773	4,101
Alaska	382	456	635
Arizona	2,270	2,908	4,023
Arkansas	2,109	2,375	2,850
California	21,520	23,476	26,249
Colorado	2,583	3,055	3,836
Connecticut	3,117	3,411	3,747
Delaware	582	684	830
Florida	8,421	11,057	14,585
Georgia	4,970	5,536	6,801
Hawaii	875	1,014	1,313
Idaho	831	938	1,160
Illinois	11,229	11,646	12,350
Indiana	5,302	5,502	5,740
Iowa	2,870	2,964	3,108
Kansas	2,310	2,358	2,525
Kentucky	3,428	3,708	4,155
Louisiana	3,841	4,050	4,601
Maine	1,072	1,112	1,200
Maryland/D.C.	4,846	5,296	6,221
Massachusetts	5,809	6,131	6,669
Michigan	9,104	9,772	10,286
Minnesota	3,965	4,179	4,544
Mississippi	2,354	2,457	2,701
Missouri	4,778	4,927	5,181
Montana	753	767	803
Nebraska	1,553	1,614	1,741
Nevada	610	790	1,103
New Hampshire	822	1,003	1,300
New Jersey	7,336	7,844	8,802
New Mexico	1,168	1,214	1,347
New York	18,084	18,256	18,852
North Carolina	5,469	6,151	7,284
North Dakota	643	655	690
Ohio	10,690	11,216	12,058
Oklahoma	2,766	2,942	3,380
Oregon	2,329	2,638	3,219
Pennsylvania	11,862	11,999	12,405
Rhode Island	927	964	1,038
South Carolina	2,848	3,127	3,538
South Dakota	686	698	720
Tennessee	4,214	4,737	5,445
Texas	12,487	14,233	17,554
Utah	1,228	1,365	1,653
Vermont	476	538	601
Virginia	5,032	5,562	6,645
Washington	3,612	3,848	4,400
West Virginia	1,821	1,879	1,924
Wisconsin	4,609	5,001	5,600
Wyoming	390	454	487
Total	214,648	232,280	262,000
Puerto Rico[3/]	3,211	3,671	4,390

1/ Interim revisions of the OBERS program projected by the Bureau of Economic Analysis, Department of Commerce

2/ Based on the BEA projection, but increased proportionately to agree with the Commerce Department's 1977 Forecast.

3/ Estimated by OORSPC

March 13, 1978

TABLE 2

Automobiles (thousands)

	1976	1985	2000
Alabama	1,695	2,006	2,179
Alaska	122	168	233
Arizona	1,002	1,476	2,040
Arkansas	790	1,023	1,226
California	10,292	12,908	14,420
Colorado	1,291	1,755	2,202
Connecticut	1,689	2,125	2,332
Delaware	261	353	428
Florida	4,386	6,622	8,726
Georgia	2,357	3,018	3,705
Hawaii	387	516	667
Idaho	379	492	608
Illinois	4,884	5,824	6,170
Indiana	2,324	2,773	2,890
Iowa	1,380	1,639	1,717
Kansas	1,148	1,347	1,441
Kentucky	1,493	1,857	2,079
Louisiana	1,477	1,790	2,032
Maine	470	561	604
Maryland/D. C.	2,081	2,615	3,069
Massachusetts	2,518	3,055	3,321
Michigan	4,173	5,149	5,416
Minnesota	1,777	2,151	2,339
Mississippi	888	1,065	1,170
Missouri	1,969	2,335	2,452
Montana	334	391	409
Nebraska	746	892	961
Nevada	314	468	652
New Hampshire	378	531	687
New Jersey	3,468	4,264	4,780
New Mexico	499	596	661
New York	6,118	7,100	7,326
North Carolina	2,569	3,322	3,930
North Dakota	300	351	370
Ohio	5,607	6,763	7,265
Oklahoma	1,287	1,574	1,806
Oregon	1,202	1,565	1,908
Pennsylvania	5,740	6,675	6,895
Rhode Island	461	552	593
South Carolina	1,250	1,578	1,784
South Dakota	304	356	367
Tennessee	1,833	2,369	2,721
Texas	5,569	7,298	8,993
Utah	549	701	849
Vermont	212	275	307
Virginia	2,516	3,198	3,816
Washington	1,701	2,084	2,380
West Virginia	650	771	789
Wisconsin	1,982	2,472	2,766
Wyoming	174	232	250
TOTAL	97,000	121,000	136,700
Puerto Rico	1,284	1,836	2,634

TABLE 3

Dwellings (thousands)

	1976	1985	2000
Alabama	1,208	1,290	1,533
Alaska	99	123	186
Arizona	744	988	1,495
Arkansas	738	862	1,132
California	7,888	8,926	10,913
Colorado	889	1,090	1,497
Connecticut	1,071	1,215	1,460
Delaware	194	236	313
Florida	3,082	4,197	6,054
Georgia	1,635	1,890	2,537
Hawaii	254	305	433
Idaho	274	321	434
Illinois	3,930	4,228	4,903
Indiana	1,853	1,995	2,275
Iowa	1,026	1,099	1,261
Kansas	832	881	1,031
Kentucky	1,148	1,288	1,578
Louisiana	1,231	1,346	1,672
Maine	357	384	454
Maryland/D. C.	1,680	1,905	2,446
Massachusetts	2,022	2,214	2,633
Michigan	3,073	3,421	3,938
Minnesota	1,353	1,479	1,758
Mississippi	750	812	976
Missouri	1,739	1,861	2,139
Montana	262	277	316
Nebraska	555	598	706
Nevada	212	285	435
New Hampshire	277	350	497
New Jersey	2,534	2,811	3,449
New Mexico	367	396	480
New York	6,612	6,924	7,817
North Carolina	1,802	2,103	2,722
North Dakota	213	225	259
Ohio	3,728	4,057	4,769
Oklahoma	1,010	1,114	1,400
Oregon	851	1,000	1,334
Pennsylvania	4,181	4,387	4,960
Rhode Island	326	352	414
South Carolina	895	1,019	1,261
South Dakota	233	246	277
Tennessee	1,435	1,674	2,103
Texas	4,153	4,910	6,622
Utah	369	425	564
Vermont	159	186	227
Virginia	1,654	1,897	2,477
Washington	1,286	1,421	1,776
West Virginia	631	675	756
Wisconsin	1,559	1,755	2,149
Wyoming	127	153	180
TOTAL	74,500	83,600	103,000
Puerto Rico	803	918	1,098

STATE ENERGY CONSUMPTION PROJECTIONS

Tables 4 through 6 provide energy consumption projections for each of the 50 States and Puerto Rico by major fuel source (Coal, Oil, Gas, Other -- including Nuclear and Hydro -- and Electrical) for each of the three target years -- 1976, 1985 and 2000.

Data used to develop these tables came, in the first instance, from Fuels and Energy Data: United States -- by States and Census Division, 1974, published by the Department of Interior. The data from this source were used to determine the proportion of each type of energy used by each State in the overall 1974 U.S. energy mix. State energy consumption data for 1985 and the year 2000 were projected on the basis of population growth and the per capita energy growth factors developed in the original Department of Commerce forecast. These factors were based on assumptions about rates of energy demand growth, effectiveness of proposed conservation measures, energy end-use patterns, etc., that are essentially independent of variations that might occur among States and regions.

The mix of energy consumption for specific fuel sources was based on the proportionate shares of fuel use derived from the Department of Interior data referenced above. Adjustments were made in special cases where it was felt that major changes in energy supply availability or major fuel substitution could be expected to occur and thus modify traditional energy use patterns in a particular region or state.

The values in the electrical column in Tables 2, 3 and 4 are included in the total.

TABLE 4

ENERGY CONSUMPTION -- By State By Type of Energy (Trillion Btus)

1976

State	Oil	Gas	Coal	Other	Total	Elec.*
Alabama	513	265	687	207	1,668	721
Alaska	114	60	11	5	189	24
Arizona	357	186	75	119	735	335
Arkansas	394	276	3	65	736	192
California	2,986	1,763	64	676	5,472	1,165
Colorado	359	295	170	24	846	198
Connecticut	665	63	6	115	846	251
Delaware	178	19	22	0	218	67
Florida	1,522	272	164	111	2,061	767
Georgia	759	315	291	47	1,408	612
Hawaii	217	0	0	0	217	36
Idaho	138	50	12	138	337	85
Illinois	1,745	1,091	934	270	4,030	1,174
Indiana	904	500	1,111	6	2,516	731
Iowa	425	347	159	27	956	245
Kansas	354	550	44	0	946	218
Kentucky	406	220	637	41	1,301	596
Louisiana	725	1,916	0	0	2,637	487
Maine	291	0	2	66	357	109
Maryland/D.C.	917	190	270	18	1,389	383
Massachusetts	1,339	148	22	44	1,546	293
Michigan	1,200	882	810	20	2,905	801
Minnesota	638	331	210	68	1,247	344
Mississippi	405	267	42	0	712	181
Missouri	679	389	444	24	1,532	560
Montana	157	89	17	138	400	135
Nebraska	237	205	45	75	561	148
Nevada	111	62	116	23	311	123
New Hampshire	157	13	28	12	210	62
New Jersey	1,507	257	88	46	1,889	424
New Mexico	200	246	156	1	602	183
New York	3,059	595	441	550	4,627	1,057
North Carolina	776	134	574	85	1,564	727
North Dakota	121	36	90	44	290	99
Ohio	1,242	1,034	1,816	0	4,085	1,238
Oklahoma	410	633	5	48	1,094	327
Oregon	365	98	4	294	759	428
Pennsylvania	1,763	674	1,898	115	4,440	1,272
Rhode Island	170	22	2	0	193	9
South Carolina	395	129	222	208	952	462
South Dakota	114	30	8	112	263	98
Tennessee	521	247	479	132	1,376	695
Texas	3,134	4,213	135	22	7,486	1,822
Utah	207	114	121	15	455	54
Vermont	79	0	2	43	124	41
Virginia	956	140	209	96	1,396	371
Washington	519	173	74	1,184	1,947	710
West Virginia	256	192	931	6	1,384	527
Wisconsin	595	362	314	137	1,405	409
Wyoming	121	107	138	22	387	154
Puerto Rico	191	0	0	17	208	162
Total	35,590	20,200	14,100	5,517	75,407	22,300

*Input energy at 10400 BTU/KWH

TABLE 5
ENERGY CONSUMPTION BY STATE BY TYPE OF ENERGY (Trillion BTUs) 1985

State	Oil	Gas	Coal	Other	Total	Elec.*
Alabama	522	235	826	487	2,070	1,032
Alaska	135	62	16	20	233	140
Arizona	452	205	189	282	1,128	556
Arkansas	439	267	114	154	974	340
California	3,182	1,644	76	1,006	5,908	1,850
Colorado	420	300	301	160	1,181	481
Connecticut	720	59	8	176	963	326
Delaware	207	19	32	2	260	87
Florida	1,977	307	234	268	2,786	1,084
Georgia	836	302	540	307	1,985	905
Hawaii	249	0	0	9	258	71
Idaho	154	49	17	115	335	99
Illinois	1,790	973	1,107	680	4,550	1,736
Indiana	928	446	1,273	141	2,788	1,007
Iowa	434	308	210	59	1,011	339
Kansas	357	483	142	50	1,032	352
Kentucky	434	205	804	74	1,517	773
Louisiana	756	1,728	181	152	2,817	776
Maine	299	0	3	124	426	141
Maryland/D.C.	991	179	322	132	1,624	491
Massachusetts	1,398	134	49	135	1,716	387
Michigan	1,274	814	976	397	3,461	1,105
Minnesota	665	300	271	121	1,357	434
Mississippi	418	240	131	175	964	386
Missouri	693	345	531	100	1,669	722
Montana	158	78	86	157	479	207
Nebraska	244	183	101	135	663	235
Nevada	142	69	154	33	398	151
New Hampshire	190	14	42	132	378	160
New Jersey	1,594	236	115	313	2,258	632
New Mexico	206	220	189	2	617	197
New York	3,015	517	446	772	4,750	1,453
North Carolina	863	130	711	413	2,117	1,010
North Dakota	122	32	127	35	316	156
Ohio	1,289	933	2,115	260	4,597	1,560
Oklahoma	431	579	195	149	1,354	609
Oregon	409	95	21	573	1,098	562
Pennsylvania	1,764	586	2,133	533	5,016	1,663
Rhode Island	175	20	3	110	308	107
South Carolina	429	122	299	482	1,332	704
South Dakota	115	26	28	111	280	125
Tennessee	579	239	650	719	2,187	1,274
Texas	3,494	4,110	758	263	8,625	2,520
Utah	228	109	135	35	507	137
Vermont	88	0	3	63	154	48
Virginia	1,045	133	243	388	1,809	645
Washington	547	159	97	1,294	2,097	1,217
West Virginia	261	170	1,037	43	1,511	642
Wisconsin	639	338	410	174	1,561	557
Wyoming	139	107	249	44	539	265
Puerto Rico	216	0	0	41	257	230
Total	38,100	18,800	18,700	12,600	88,200	32,596

*Input energy at 10400 BTU/KWH

TABLE 6
ENERGY CONSUMPTION BY STATE BY TYPE OF ENERGY - (Trillion BTU's) 2000

State	Oil	Gas	Coal	Other	Total	Elec*
Alabama	345	221	1,539	1,039	3,144	2,043
Alaska	114	74	41	44	273	60
Arizona	380	246	423	700	1,749	1,062
Arkansas	320	278	303	303	1,204	600
California	2,118	1,555	167	4,143	7,983	4,063
Colorado	320	327	624	345	1,616	1,001
Connecticut	480	57	16	462	1,015	387
Delaware	153	20	71	73	317	140
Florida	1,534	353	937	728	3,551	1,676
Georgia	624	322	1,283	579	2,808	1,928
Hawaii	196	0	0	87	283	121
Idaho	116	52	80	510	758	447
Illinois	1,153	895	2,128	1,284	5,460	3,047
Indiana	588	404	2,526	333	3,851	2,068
Iowa	277	280	436	157	1,150	632
Kansas	232	449	405	114	1,200	561
Kentucky	296	199	1,680	145	2,320	1,504
Louisiana	522	1,663	540	471	3,196	1,059
Maine	196	2	30	304	532	242
Maryland/D.C.	707	182	735	675	2,299	832
Massachusetts	924	127	97	516	1,664	594
Michigan	815	744	1,827	947	4,333	2,091
Minnesota	439	283	601	304	1,627	875
Mississippi	279	229	328	404	1,240	742
Missouri	442	315	1,031	317	2,105	1,340
Montana	101	71	164	326	662	432
Nebraska	160	172	251	285	868	453
Nevada	121	84	395	95	695	320
New Hampshire	149	15	100	222	486	237
New Jersey	1,046	230	239	1,072	2,587	1,224
New Mexico	139	212	388	69	808	350
New York	1,916	463	942	2,627	5,948	3,033
North Carolina	621	133	1,532	964	3,250	2,037
North Dakota	78	29	260	173	540	326
Ohio	842	870	3,942	1,136	6,790	3,186
Oklahoma	301	577	494	289	1,661	833
Oregon	303	101	44	1,303	1,751	1,104
Pennsylvania	1,068	526	3,498	1,243	6,335	3,392
Rhode Island	114	18	5	187	324	166
South Carolina	295	120	595	974	1,984	1,246
South Dakota	72	23	47	393	535	264
Tennessee	404	238	1,303	1,266	3,211	2,338
Texas	2,590	4,195	2,593	1,233	10,611	4,052
Utah	167	115	369	100	751	407
Vermont	60	1	28	178	267	111
Virginia	758	138	575	733	2,204	1,125
Washington	380	157	204	2,114	2,855	2,105
West Virginia	163	151	1,929	97	2,340	962
Wisconsin	434	328	865	621	2,248	1,359
Wyoming	91	100	390	85	666	413
Puerto Rico	157	0	0	431	588	407
Total	26,100	18,400	39,000	33,200	116,700	60,998

* Input energy at 10400 BTU/KWH

STATE ENERGY PRODUCTION PROJECTIONS

Tables 7 through 25 in this section provide by-fuel projections of energy production in each of the 50 states in 1985 and the year 2000.

In general, the approach used in development of these tables was as follows: (a) the current distribution of energy production activities (1974) by State for both energy resource extraction and energy end-use conversion was determined and used as a baseline; (b) planned augmentation to present production capacity were added to this base and the operations and facilities planned for phase-out were subtracted; (c) the additional energy production capacity needed to meet U.S. energy requirements in 1985 and 2000 was computed and distributed across the fuel mix as projected in the Department of Commerce forecast.

As noted earlier, specification by State of "new" energy production activities was relatively straightforward. Extraction operations for oil, gas, coal and uranium were assumed to be limited to known resource locations. It was further assumed that exploitation of these resources would occur in those areas where cost of production factors and access to resource and market factors would be most favorable. Exploitation of shale, geothermal and hydroelectric energy resources was approached in the same way. Other energy conversion facilities such as LNG terminal and regasification facilities and oil refineries could also be fixed with a fair degree of confidence based on current planning projections.

On the other hand, as also noted earlier, the location, by state, of Hi-BTU coal gasification facilities and electric power generation plants, could not be as easily determined on the basis of past history and known present facilities. The assignment to particular states of facilities falling into this category was based primarily on judgment. No attempt was made to take into account political or other non-technical considerations that could very well arise in such cases.

Tables 7 and 8 give projected oil and gas production for specific States in 1985 and the year 2000. The projections are based on oil and gas resource data contained in Department of Interior publications. Pump rates for gas and oil were developed on the basis of historical data provided in <u>The Oil and Gas Industry in Your State</u>, published by the Independent Petroleum Association of America (IPAA). Pump rates for known but undeveloped and potentially petroleum-bearing areas were developed on the basis of M. King Hubbert's

well-known production rate forecasting work. Additional production from Alaska and from secondary and tertiary recovery methods were also taken into account. Oil and gas from the outer continental shelf are shown in this study as produced in the closest state.

Table 9 gives projected coal production by State for the years 1976, 1985 and 2000. Coal production figures are divided into surface coal and deep coal production. The 1976 coal production numbers were based on data taken from the Department of Interior Mineral Industry Surveys -- Coal, Bituminous and Lignite in 1975; the 1975 share of production for each State was applied to the 1976 total U.S. production figures used in the Commerce forecast. State totals for 1985 and the year 2000 were derived from estimates prepared by the National Coal Association in a May 2, 1977, letter to the President and from A Study of New Mine Additions and Major Expansion Plans of the Coal Industry (August 1976) also prepared by the National Coal Association.

All of the coal numbers are based on the assumption that a ton of coal for consumption has 23.07 million BTUs and a ton of coal for production has 23.73 million BTUs. Lignite and western coal have far less. Our estimates of coal tonnages therefore are somewhat understated. This averaging was done for ease in comparison. In discussing coal transportation, this factor must be taken into consideration.

Tables 10, 11 and 12 project electrical capacity by State expected to be in place by 1985 and the year 2000. The data on electrical capacity shown in Table 8 (for 1976) were taken from the FEA June 1977 issue of Inventory of Power Plants in the U.S. Megawatts of electrical capacity are divided by the fuel source used (nuclear, hydrological, oil coal, gas and other). In order to determine the electrical capacity in place for these fuel sources in 1985 and the year 2000, it was necessary first to compute each State's percentage share of the total electrical capacity by fuel source (based on the Bureau of Mines fuels and energy data for recent years) and apply these to the electrical capacity totals (for the U.S.) given in the Commerce energy forecast. These values were then adjusted where necessary to insure comparability with the FEA inventory data referred to above.

Table 13 indicates the production of electricity in billion of KWH, and the theoretical production capability if all equipment were on line and operating at rated capacity for 24 hours per day for 365 days. The electrical production is derived data obtained by dividing the energy required for electricity (last column of Tables 2, 3 and 4) by 10,400 Btu

per KWH. The theoretical 100% rated annual capability was obtained by multiplying each State's electrical capability (total column of Tables 10, 11 and 12) by 24 hours per day X 365 days per year.

It should be noted that because of inherent assumptions made in the energy calculations, the system utilization for each State equals about 48% for 1976, about 53% for 1985 and about 60% for year 2000. Assumptions underlying these estimates include: a vigorous and effective load leveling program by the electrical utilities; pumped storage in many cases; and, by the year 2000, off-peak hour recharging of batteries for the estimated 13,000,000 electrical automobiles expected to be operating by that time. It is estimated that the latter will account for 11% of total electricity generated by the end of the century.

Table 14 identifies likely sites for receiving and regasifying liquefied natural gas that may be imported during the time frame studied. The major source used in this instance was the American Gas Association's "LNG FACT BOOK" dated December 1977.

Table 15 provides an estimate of likely oil refinery capacity by State for 1985 and 2000. Figures on 1976 refinery throughput information were obtained from Twentieth Century Petroleum Statistics (1977), by DeGolyer and MacNaughton. It was assumed that significiant refinery capacity changes would not occur by 1985. Changes from 1985 to the year 2000 were estimated on the basis of regional oil production data, taking into account the trend toward larger refineries.

Table 16 provides an estimate of state coal gasification output by the year 2000. The first fourteen coal gasification projects listed in the table are based on data contained in the American Gas Association's Gas Supply Review of July-August 1977. The last eight projects are considered good possibilities based on resource availability and trends in coal gasification likely to exist in the 1990s.

Tables 17 and 18 provide an interesting example of one resource requirement -- water -- that is associated with the development of energy resources and their conversion into energy end-uses.* These tables provide data on water consumption by Water Region within the United States and the specific water consumption that will be required to meet the energy production levels projected for the two target years of the forecast -- 1985 and 2000.

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* Estimates of manpower, raw materials and capital requirements needed to meet the energy development/production levels indicated are also being developed.

Table 19 provides an indication of the small amount of shale oil production that is anticipated during this time frame (1976-2000), and Table 20 indicates the sources and amounts of uranium extraction that are expected. Table 21 identifies the nine coal slurry pipelines expected to be operational by the year 2000, in addition to the existing Black Mesa pipeline.

Finally, Tables 22-26 identify and enumerate the contributions to the energy mix of the various States that can be expected from solar, municipal sewage and trash, agricultural waste, animal waste and windmills (renewable energy sources) by 1985 and the year 2000.

With respect to solar installations, Table 22 gives the totals and breakdown by State of such installations for 1985 and 2000. The definition of a solar installation -- arbitrarily picked -- is one that has a capacity of 100 million BTUs per year. The 1976 figures were taken from industry sources. In developing the estimates for 1985 and 2000, the age of current dwellings in various parts of the country and the number of new houses expected to be built had to be taken into account. Differing State "insolation" values also had to be considered. States with high insolation values (such as California and Arizona, see Figure 17) were given higher coefficients for the introduction of solar installations (expected to provide approximately 50 percent of the water and space heating required) in new houses.

The State totals, of course, had to add to the national total given in the Commerce energy forecast. The values in Table 22 reflect the introduction of a solar installation in about one-third of all new houses by the year 2000 (specific percentages varying from State to State, of course) and retrofit for approximately ten percent of existing houses.

Table 23 gives the expected values for energy converted from municipal sewage and trash for 1985 and 2000 by state. The aggregate numbers, 18.8 billion pounds by 1985 and 134 billion pounds by the year 2000, were taken from the 1977 Commerce national energy forecast. The disaggregated State numbers for 1985 and the year 2000 were apportioned by State population estimates for the two years such that their totals would equal the aggregate numbers.

Tables 24 and 25 provide related data for energy converted from animal and agricultural (crop and forest) waste. Basic data in all cases were taken from the 1975 U.S. Statistical Abstract (e.g., numbers of cattle, agricultural acreage) and the national totals (taken from the Commerce national forecast) were apportioned by State.

Finally, Table 26 gives the expected value of electrical energy converted from windmill installations in 1985 and the year 2000. Again the totals conform with those given in the Commerce forecast. State values were apportioned on the basis of wind factors as indicated in Figure 18.

Both the 1985 and 2000 numbers were made proportional to the number of dwellings in each State for the two years multiplied by a windmill factor shown in Figure 18. The factor is .2 for the Far West, .6 for the Central Triangle and .1 for the East. Several States which bordered on more than one windmill region had such factors as .35 for Arkansas and Indiana, .4667 for Colorado and .375 for Texas.

Table 27 estimates the equivalent acreage and number of plants required to produce 500,000 barrels of alcohol (methanol and ethanol) per day. This alcohol production would reduce the demand for gasoline by approximately the same amount. A standard alcohol unit of 20 million gallons per year or 1,305 barrels per day was postulated. It was also assumed that each acre yields 60 bushels of grain (wheat and corn). Approximately 2.6 gallons of ethanol were to be extracted from each bushel of grain. On an equivalency basis, 380 alcohol units would be required and the grain produced from approximately 14 percent of the 1975 cultivated land would produce 500,000 barrels of alcohol. The equivalent acreage would be the acreage required to provide the grain for these plants if there were no surplus and if production were limited to the 60 bushels per acre.

No estimates of acreage requirements were made for methanol from wood or ethanol from sugar cane stalks.

The above 500,000 barrels include agricultural oil produced from <u>euphorbia Lathyris</u>.

Nuclear-fueled electrical generation poses special problems with respect to the disposition of residue material (i.e., spent fuel). Table 28 indicates the amount of spent nuclear residue products generated in the nuclear powered electric utilities projected in the forecast. Projections were made of annual rate of production and accumulation since operation began. It is assumed that 1,000 megawatts of nuclear electric generating capability will produce about 33 short tons of nuclear residue material annually. The actual volume of nuclear residue material expected to be produced annually (year 2000) -- about 9,600 tons (67 feet X 67

feet X 67 feet) -- is small compared to the 180 million tons of ash that will be produced by coal-fired electric generating plants (300 million tons if scrubbers are used) or the 47 million tons of solid waste from humans. However, nuclear residue, because of its hazards to health, must be either reprocessed, used in advanced reactors or disposed of in repositories capable of containing the residue for hundreds of thousands of years. The residue material is commonly in the form of rods about 1/2 inch in diameter and about 20 feet in length weighing about 20 pounds each.

TABLE 7
OIL PRODUCTION THOUSAND BARRELS PER DAY (Includes NGL)

State	1976	1985	2000
Alabama	42.0	60.0	50.0
Alaska	176.0	1300.0	1500.0
Arizona	1.4	1.4	0.2
Arkansas	51.0	40.0	21.0
California	915.0	1100.0	600.0
Colorado	236.0	300.0	325.0
Connecticut	-	-	-
Delaware	-	15.0	38.0
Florida	143.0	169.0	85.0
Georgia	-	-	-
Hawaii	-	-	-
Idaho	-	-	-
Illinois	93.5	88.0	65.0
Indiana	12.7	12.0	10.0
Iowa	-	-	-
Kansas	243.0	285.0	210.0
Kentucky	20.3	18.0	15.0
Louisiana	2000.0	1560.0	950.0
Maine	-	15.0	37.0
Maryland/D.C.	-	40.0	75.0
Massachusetts	-	30.0	75.0
Michigan	96.0	110.0	65.0
Minnesota	-	-	-
Mississippi	127.0	110.0	90.0
Missouri	-	-	-
Montana	91.0	85.0	60.0
Nebraska	17.5	14.0	10.0
Nevada	-	-	-
New Hampshire	-	-	-
New Jersey	-	30.0	75.0
New Mexico	367.0	300.0	190.0
New York	2.3	30.0	50.0
North Carolina	-	-	-
North Dakota	63.5	58.0	35.0
Ohio	27.3	23.0	15.0
Oklahoma	557.0	440.0	260.0
Oregon	-	-	-
Pennsylvania	8.4	7.0	4.0
Rhode Island	-	-	-
South Carolina	-	-	-
South Dakota	1.4	0.8	-
Tennessee	1.6	1.2	0.5
Texas	4030.0	3375.0	2000.0
Utah	100.0	85.0	70.0
Vermont	-	-	-
Virginia	-	-	-
Washington	-	-	-
West Virginia	27.7	20.0	10.0
Wisconsin	-	-	-
Wyoming	393.0	350.0	250.0
Total	9845	10072	7241
Puerto Rico	-	-	-

TABLE 8
NATURAL GAS PRODUCTION, BCF/YR

State	1970	1975	1976	1985	2000
Alabama	-	39	42	57	44
Alaska	146	171	173	195	1250
Arizona	-	-	-	-	-
Arkansas	181	117	110	90	60
California	652	320	356	350	200
Colorado	113	174	185	200	215
Connecticut	-	-	-	-	-
Delaware	-	-	-	25	60
Florida	-	44	44	55	30
Georgia	-	-	-	-	-
Hawaii	-	-	-	-	-
Idaho	-	-	-	-	-
Illinois	5	1	2	-	-
Indiana	-	-	-	-	-
Iowa	-	-	-	-	-
Kansas	900	800	800	700	550
Kentucky	78	61	66	48	30
Louisiana	7940	7120	7040	6400	4100
Maine	-	-	-	25	50
Maryland/D.C.	-	-	-	75	125
Massachusetts	-	-	-	50	110
Michigan	40	100	120	90	60
Minnesota	-	-	-	-	-
Mississippi	133	86	84	70	60
Missouri	-	-	-	-	-
Montana	48	44	45	40	35
Nebraska	6	4	3	-	-
Nevada	-	-	-	-	-
New Hampshire	-	-	-	-	-
New Jersey	-	-	-	50	110
New Mexico	1140	1220	1230	1050	650
New York	3	8	9	40	60
North Carolina	-	-	-	-	-
North Dakota	55	27	34	20	15
Ohio	50	90	90	50	-
Oklahoma	1720	1640	1760	1250	750
Oregon	-	-	-	-	-
Pennsylvania	76	84	89	60	40
Rhode Island	-	-	-	-	-
South Carolina	-	-	-	-	-
South Dakota	-	-	-	-	-
Tennessee	-	-	-	-	-
Texas	8460	7520	7220	6020	4150
Utah	45	57	58	50	41
Vermont	-	-	-	-	-
Virginia	3	7	7	-	-
Washington	-	-	-	-	-
West Virginia	242	154	153	100	70
Wisconsin	-	-	-	-	-
Wyoming	357	319	331	300	200
Total	22400	20200	20100	17460	13000
Puerto Rico	-	-	-	-	-

TABLE 9

COAL PRODUCTION (thousand short tons)

	1975[1/]			1976			1985			2000		
	Surface	Deep	Total	Surface	Deep	Total	Surface	Deep	Total	Surface	Deep	Total
Alabama	15,029	7,614	22,644	15,561	7,717	23,278	19,785	9,334	29,119	43,638	17,200	60,838
Alaska	766	-	766	793	-	793	955	-	955	1,995	-	1,995
Arizona	6,986	-	6,986	7,233	-	7,233	9,941	-	9,941	20,770	-	20,770
Arkansas	488	-	488	505	-	505	608	-	608	1,270	-	1,270
California	-	-	-	-	-	-	-	-	-	-	-	-
Colorado	4,773	3,446	8,219	4,942	3,493	8,435	8,247	5,828	14,075	18,668	10,739	29,407
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-
Delaware	-	-	-	-	-	-	-	-	-	-	-	-
Florida	-	-	-	-	-	-	-	-	-	-	-	-
Georgia	74	-	74	77	-	77	93	-	93	194	-	194
Hawaii	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	-	-	-	-	-	-
Illinois	27,661	31,875	59,537	28,641	32,304	60,945	41,366	39,072	80,438	96,061	71,998	168,059
Indiana	24,935	188	25,124	25,819	191	26,010	32,314	231	32,545	67,570	426	67,996
Iowa	259	363	622	268	368	636	323	443	766	784	816	1,600
Kansas	479	-	479	496	-	496	675	-	675	1,410	-	1,410
Kentucky	77,981	65,632	143,613	80,744	66,517	147,261	89,875	74,041	163,916	207,035	135,435	342,470
Louisiana	-	-	-	-	-	-	-	-	-	-	-	-
Maine	-	-	-	-	-	-	-	-	-	-	-	-
Maryland/D.C.	2,502	104	2,606	2,591	105	2,696	3,598	127	3,725	7,549	234	7,783
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-
Michigan	-	-	-	-	-	-	-	-	-	221	303	524
Minnesota	-	-	-	-	-	-	-	-	-	-	-	-
Mississippi	-	-	-	-	-	-	-	-	-	-	-	-
Missouri	5,638	-	5,638	5,838	-	5,838	6,263	-	6,263	13,085	-	13,085
Montana	22,054	-	22,054	22,836	-	22,836	40,807	-	40,807	85,258	-	85,258
Nebraska	-	-	-	-	-	-	-	-	-	-	-	-
Nevada	-	-	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-
New Jersey	-	-	-	-	-	-	-	-	-	-	-	-
New Mexico	8,785	-	8,785	9,096	-	9,096	15,340	-	15,340	32,050	-	32,050
New York	-	-	-	-	-	-	-	-	-	-	-	-
North Carolina	-	-	-	-	-	-	-	-	-	-	-	-
North Dakota	8,515	-	8,515	8,816	-	8,816	16,447	-	16,447	34,363	-	34,363
Ohio	31,315	15,455	46,770	32,425	15,664	48,089	36,305	17,536	53,841	80,176	32,314	112,490
Oklahoma	2,872	-	2,872	2,974	-	2,974	3,489	-	3,489	7,290	-	7,290
Oregon	-	-	-	-	-	-	-	-	-	-	-	-
Pennsylvania	39,507	44,631	84,137	40,907	45,232	86,139	43,886	53,443	97,329	105,806	97,543	203,349
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-
South Carolina	-	-	-	-	-	-	-	-	-	-	-	-
South Dakota	-	-	-	-	-	-	-	-	-	-	-	-
Tennessee	4,400	3,806	8,206	4,556	3,857	8,413	4,307	4,665	8,972	10,149	8,596	18,745
Texas	11,002	-	11,002	11,391	-	11,391	20,835	-	20,835	43,531	-	43,531
Utah	-	6,961	6,961	-	7,055	7,055	-	12,516	12,516	-	26,150	26,150
Vermont	-	-	-	-	-	-	-	-	-	-	-	-
Virginia	12,329	23,181	35,510	12,765	23,494	36,259	11,357	28,416	39,773	30,736	52,362	83,098
Washington	3,730	13	3,743	3,862	13	3,875	4,651	16	4,667	9,722	29	9,751
West Virginia	20,926	88,357	109,283	21,668	89,548	111,216	31,417	108,308	139,725	94,348	197,579	291,927
Wisconsin	-	-	-	-	-	-	-	-	-	-	-	-
Wyoming	23,369	436	23,804	24,196	442	24,638	92,605	535	93,140	193,611	986	194,597
Total	355,612	292,826	648,438	369,000	296,000	665,000	532,000	358,000	890,000	1,200,000	660,000	1,860,000

1/ Source:
Bureau Mines, Mineral-Industry Surveys, Coal--Bituminous and Lignite in 1975

TABLE 10
ELECTRICAL CAPACITY-1976 (megawatts)

3/29/78

State	Nuclear	Hydro/Geo	Coal	Gas	Oil	Peak Shaving	Other	Total
Alabama	3,236	2,415	10,073	504	24	302	0	16,554
Alaska	0	19	200	0	100	153	69	541
Arizona	0	2,729	2,452	0	1,973	545	0	7,699
Arkansas	845	994	147	2,117	140	174	0	4,417
California	1,384	8,113	0	270	11,764	5,043	176	26,750
Colorado	321	684	2,795	278	271	198	0	4,547
Connecticut	2,033	117	0	0	2,032	1,578	0	5,760
Delaware	0	0	361	25	574	571	5	1,536
Florida	3,020	178	3,387	638	8,327	2,048	17	17,615
Georgia	796	1,461	10,135	308	175	1,179	0	14,054
Hawaii	0	5	0	0	684	144	0	833
Idaho	0	1,658	0	44	0	239	0	1,941
Illinois	5,329	43	16,611	691	1,866	2,412	0	26,952
Indiana	0	98	14,695	96	559	1,342	0	16,790
Iowa	529	135	3,297	268	457	948	0	5,634
Kansas	0	0	970	3,628	132	281	0	5,011
Kentucky	0	829	12,350	112	55	350	0	13,696
Louisiana	0	0	0	9,314	738	1,099	26	11,177
Maine	758	1,334	0	0	249	173	0	2,514
Maryland/D.C.	1,713	485	1,892	147	2,981	1,505	66	8,789
Massachusetts	808	745	1,087	0	2,976	1,121	2	6,739
Michigan	1,909	2,349	10,324	697	1,784	1,315	13	18,391
Minnesota	1,643	179	4,676	21	615	733	22	7,889
Mississippi	0	0	1,248	1,900	473	540	0	4,161
Missouri	0	831	9,905	975	430	707	0	12,848
Montana	0	1,941	942	26	34	146	10	3,099
Nebraska	1,253	146	1,214	245	237	302	0	3,397
Nevada	0	1	1,964	694	48	111	0	2,818
New Hampshire	0	427	489	0	358	144	0	1,418
New Jersey	1,611	404	2,183	97	4,071	1,219	161	9,746
New Mexico	0	24	3,025	838	204	122	0	4.213
New York	4,024	4,886	2,723	98	8,849	3,406	284	24,270
North Carolina	1,624	2,092	11,270	0	757	941	0	16,684
North Dakota	0	393	1,745	2	46	94	0	2,280
Ohio	0	330	23,814	253	894	3,095	40	28,426
Oklahoma	0	711	0	6,056	105	599	31	7,502
Oregon	1,139	7,361	0	31	427	881	0	9,839
Pennsylvania	3,931	886	17,883	21	3,818	2,620	41	29,200
Rhode Island	0	0	0	0	72	139	0	211
South Carolina	3,212	1,738	3,561	49	1,194	847	0	10,601
South Dakota	0	1,463	624	0	72	99	0	2,258
Tennessee	0	2,096	10,672	1,705	0	1,479	0	15,952
Texas	0	3 83	4,271	33,462	657	3,002	65	41,840
Utah	0	185	958	0	12	96	0	1,251
Vermont	527	230	32	0	72	89	2	952
Virginia	1,588	659	3,068	189	1,939	1,079	0	8,522
Washington	805	13,060	1,413	0	136	881	0	16,295
West Virginia	0	0	12,025	0	0	77	5	12,107
Wisconsin	1,562	477	5,659	202	621	871	0	9,392
Wyoming	0	219	3,263	0	0	63	0	3,545
Puerto Rico	0	91	0	0	2,098	1,500	35	3,724
Total	45,600	65,600	219,400	66,000	66,100	48,600	1,069	512,369

Numbers adapted from Inventory of Power Plants in the U.S., June 1977, FEA (now DOE).

TABLE 11
ELECTRICAL CAPACITY - YR 1985 (in megawatts)

State	Nuclear	Hydro/Geoth.	Coal	Gas	Oil	Peak Shaving	Other	Total
Alabama	6,600	2,362	11,459	399	24	296	53	21,193
Alaska	197	100	200	0	100	150	69	816
Arizona	2,104	2,913	3,912	0	1,920	535	36	11,420
Arkansas	1,595	1,005	2,367	1,675	143	171	32	6,988
California	7,178	10,626	800	214	14,013	4,950	231	38,012
Colorado	297	2,609	6,223	220	326	194	18	9,887
Connecticut	2,876	119	0	0	2,068	1,549	83	6,695
Delaware	0	0	594	20	584	560	29	1,787
Florida	4,467	206	4,105	505	10,913	2,010	55	22,261
Georgia	3,346	2,236	11,170	244	384	1,157	55	18,592
Hawaii	0	5	0	0	1,162	141	160	1,468
Idaho	0	1,748	0	35	0	235	23	2,041
Illinois	12,447	44	16,783	547	3,370	2,367	102	35,660
Indiana	2,424	100	16,107	76	569	1,317	89	20,682
Iowa	791	137	4,350	212	514	930	36	6,970
Kansas	894	0	2,935	2,870	230	276	32	7,237
Kentucky	0	844	14,467	88	89	344	48	15,880
Louisiana	2,698	0	3,745	7,598	751	1,079	73	15,944
Maine	810	1,359	0	0	552	170	12	2,903
Maryland/D.C.	1,829	494	2,070	116	4,008	1,477	85	10,079
Massachusetts	1,766	661	1,023	0	3,334	1,100	73	7,957
Michigan	4,782	2,393	10,991	569	2,570	1,291	110	22,706
Minnesota	1,755	182	5,497	17	693	719	49	8,912
Mississippi	3,175	0	2,709	1,503	481	530	36	7,934
Missouri	894	905	10,020	771	1,496	694	51	14,831
Montana	0	2,204	1,834	21	34	143	17	4,253
Nebraska	1,338	641	2,098	194	241	296	20	4,828
Nevada	0	1	2,386	549	49	109	14	3,108
New Hampshire	1,964	435	369	0	365	141	10	3,284
New Jersey	5,292	411	1,648	77	4,263	1,196	88	12,975
New Mexico	0	24	3,023	663	208	120	12	4,050
New York	8,516	5,206	3,229	177	8,189	3,343	1,181	29,841
North Carolina	5,424	2,131	11,405	0	771	924	97	20,752
North Dakota	0	400	2,638	1	60	92	6	3,197
Ohio	4,250	336	23,408	200	909	3,038	176	32,047
Oklahoma	1,988	724	4,031	5,038	107	588	40	12,516
Oregon	2,141	7,497	441	25	519	865	59	11,547
Pennsylvania	8,808	902	17,827	17	3,886	2,571	155	34,166
Rhode Island	1,988	0	0	0	73	136	9	2,206
South Carolina	6,933	1,860	3,567	0	1,215	831	56	14,462
South Dakota	0	1,671	587	0	200	97	7	2,562
Tennessee	10,360	2,837	10,042	1,349	0	1,452	126	26,166
Texas	4,262	409	15,691	27,301	971	2,946	193	51,773
Utah	0	278	2,415	0	12	94	9	2,808
Vermont	563	234	30	0	73	87	6	993
Virginia	4,603	2,501	2,887	149	1,973	1,059	72	13,244
Washington	7,179	15,377	1,330	0	154	865	88	24,993
West Virginia	0	771	12,315	0	0	76	23	13,185
Wisconsin	2,466	486	6,613	160	798	855	58	11,436
Wyoming	0	223	5,159	0	0	62	6	5,450
Puerto Rico	0	593	0	0	2,536	1,472	132	4,733
Total	141,000	79,200	266,000	53,500	78,000	48,600	3,300	669,600

Numbers adapted from Inventory of Power Plants in the U.S., June 1977, FEA

TABLE 12
ELECTRICAL CAPACITY - YR. 2000 (Megawatts)

Jan. 25, 1978

State	Nuclear	Hydro/Geoth.	Coal	Gas	Oil	Peak Shav.	Other	Total
Alabama	12,772	3,127	20,210	177	-	296	691	37,273
Alaska	300	200	224	26	100	150	100	1,100
Arizona	4,102	5,753	8,441	146	-	535	398	19,375
Arkansas	2,401	1,566	6,038	429	-	171	351	10,956
California	35,253	28,130	1,600	1,106	-	4,950	3,091	74,130
Colorado	446	4,860	12,456	108	-	194	193	18,257
Connecticut	4,329	119	0	150	-	1,549	909	7,056
Delaware	0	300	1,335	44	-	560	319	2,558
Florida	6,933	1,092	18,699	423	-	2,010	1,423	30,580
Georgia	4,037	3,419	25,608	287	-	1,157	662	35,170
Hawaii	1,100	15	0	0	800	141	144	2,200
Idaho	0	6,002	1,594	121	-	235	211	8,163
Illinois	16,089	64	34,664	748	-	2,367	1,663	55,595
Indiana	3,299	145	31,734	260	-	1,317	981	37,736
Iowa	1,191	199	8,706	115	-	930	395	11,536
Kansas	1,196	0	8,075	330	-	276	355	10,232
Kentucky	0	1,073	25,313	190	-	344	527	27,447
Louisiana	5,662	0	10,774	995	-	1,079	804	19,314
Maine	1,610	1,871	600	42	-	170	127	4,420
Maryland/D.C.	7,506	900	4,143	217	-	1,477	928	15,171
Massachusetts	5,843	1,150	1,943	0	-	1,100	800	10,836
Michigan	10,320	3,467	21,253	617	-	1,291	1,208	38,156
Minnesota	2,283	264	12,003	157	-	719	536	15,962
Mississippi	5,536	0	6,545	535	-	530	395	13,541
Missouri	2,593	1,506	18,652	345	-	694	666	24,456
Montana	0	4,217	3,271	66	-	143	181	7,878
Nebraska	1,441	1,233	5,000	31	-	296	221	8,272
Nevada	0	731	4,782	57	-	109	156	5,835
New Hampshire	2,607	700	739	39	-	141	105	4,331
New Jersey	13,443	2,033	4,383	305	-	1,196	967	22,327
New Mexico	0	935	5,050	149	-	120	134	6,388
New York	24,101	14,419	9,929	718	-	3,843	2,318	55,328
North Carolina	12,007	2,631	20,537	0	-	924	1,061	37,160
North Dakota	0	580	5,181	25	-	92	69	5,947
Ohio	12,345	545	39,241	701	-	3,038	2,262	58,132
Oklahoma	2,793	1,049	9,868	461	-	588	438	15,197
Oregon	3,861	13,651	883	237	-	865	644	20,141
Pennsylvania	13,883	3,755	38,953	604	-	2,971	1,715	61,881
Rhode Island	2,760	0	0	37	-	136	101	3,034
South Carolina	11,066	2,860	7,139	127	-	831	719	22,742
South Dakota	0	3,710	943	0	-	97	72	4,822
Tennessee	13,940	5,053	20,125	707	-	1,452	1,379	42,656
Texas	15,026	1,731	51,760	900	-	2,446	2,059	73,922
Utah	0	762	6,467	0	-	94	94	7,417
Vermont	863	434	560	24	-	87	65	2,033
Virginia	6,927	3,860	7,636	260	-	1,059	789	20,531
Washington	10,535	23,307	2,936	0	-	865	766	38,409
West Virginia	0	1,349	15,867	0	-	76	255	17,547
Wisconsin	5,301	704	17,160	234	-	855	537	24,791
Wyoming	0	429	6,980	0	-	62	63	7,534
Puerto Rico	2,300	900	0	0	900	1,972	1,353	7,425
Total	290,000	157,000	566,000	13,300	1,800	48,600	36,200	1,112,900

TABLE 13
PRODUCTION OF ELECTRICITY AND RATED SYSTEM CAPABILITY

State	ELECTRICAL PRODUCTION Billion KWH 1976	1985	2000	100% RATED ANNUAL PRODUCTION Capability BKWH 1976	1985	2000
Alabama	69.3	99.2	196.4	145.0	185.7	326.5
Alaska	2.3	3.8	5.8	4.7	7.1	9.6
Arizona	32.2	53.5	102.1	67.4	100.0	169.7
Arkansas	18.5	32.7	57.7	38.7	61.2	96.0
California	112.0	177.9	390.7	234.3	333.0	649.4
Colorado	19.0	46.3	96.3	39.8	86.6	159.9
Connecticut	24.1	31.3	37.2	50.5	58.6	61.8
Delaware	6.4	8.4	13.5	13.5	15.7	22.4
Florida	73.8	104.2	161.2	154.3	195.0	267.9
Georgia	58.8	87.0	185.4	123.1	162.9	308.1
Hawaii	3.5	6.8	11.6	7.3	12.9	19.3
Idaho	8.2	9.5	43.0	17.0	17.9	71.5
Illinois	112.9	166.9	293.0	236.1	312.4	487.0
Indiana	70.3	96.8	198.8	147.1	181.2	330.6
Iowa	23.6	32.6	60.8	49.4	61.1	101.1
Kansas	21.0	33.8	53.9	43.9	63.4	89.6
Kentucky	57.3	74.3	144.6	120.0	139.1	240.4
Louisiana	46.8	74.6	101.8	97.9	139.7	169.2
Maine	10.5	13.6	23.3	22.0	25.4	38.7
Maryland/D.C.	36.8	47.2	80.0	77.0	88.3	132.9
Massachusetts	28.2	37.2	57.1	59.0	69.7	94.9
Michigan	77.0	106.3	201.1	161.1	198.9	334.2
Minnesota	33.1	41.7	84.1	69.1	78.1	139.8
Mississippi	17.4	37.1	71.3	36.5	69.5	118.6
Missouri	53.8	69.4	128.8	112.5	129.9	214.2
Montana	13.0	19.9	41.5	27.1	37.3	69.0
Nebraska	14.2	22.6	43.6	29.8	42.3	72.5
Nevada	11.8	14.5	30.8	24.7	27.2	51.1
New Hampshire	6.0	15.4	22.8	12.4	28.8	37.9
New Jersey	40.8	60.8	117.7	85.4	113.7	195.6
New Mexico	17.6	18.9	33.7	36.9	35.5	56.0
New York	101.6	139.7	291.6	212.6	261.4	484.7
North Carolina	69.9	97.1	195.9	146.2	181.8	325.5
North Dakota	9.5	15.0	31.3	20.0	28.0	52.1
Ohio	119.0	150.00	306.3	249.0	280.7	509.2
Oklahoma	31.4	58.6	80.1	65.7	109.6	133.1
Oregon	41.2	54.0	106.2	86.2	101.2	176.4
Pennsylvania	122.3	159.9	326.2	255.8	299.3	542.1
Rhode Island	.9	10.3	16.0	1.8	19.3	26.6
South Carolina	44.4	67.7	119.8	92.9	126.7	199.2
South Dakota	9.4	12.0	25.4	19.8	22.4	42.2
Tennessee	66.8	122.5	224.8	139.7	229.2	373.7
Texas	175.1	242.3	389.6	366.5	453.5	647.6
Utah	5.2	13.2	39.1	11.0	24.6	65.0
Vermont	3.9	4.6	10.7	8.3	8.7	17.8
Virginia	35.7	62.0	108.2	74.7	116.0	179.9
Washington	68.3	117.0	202.4	142.7	218.9	33[illegible]
West Virginia	50.7	61.7	92.5	106.1	115.5	15[illegible]
Wisconsin	39.3	53.6	130.7	82.3	100.2	217.2
Wyoming	14.8	25.5	39.7	31.1	47.7	66.0
TOTAL	2,129.6	3,110.9	5,826.1	4,455.9	5,822.8	9,683.9
Puerto Rico	15.6	22.1	39.1	32.6	41.5	65.0

TABLE 14

EXPECTED IMPORT OF LIQUEFIED NATURAL GAS

		Year 2000
(1)	Everett, Mass	100 BCF
(2)	Cove Pt, Md.	400 BCF
(3)	Elba Is., Ga.	400 BCF
(4)	LaCharles, La.	350 BCF
(5)	Pt. Conception, Cal.	800 BCF
(6)	Pt. O'Connor, Tex.	400 BCF
(7)	St. John, New Brunswick Canada	400 BCF
(8)	West Deptford, N.J.	400 BCF
(9)	Ingleside, Texas	400 BCF
(10)	California	350 BCF
		4000 BCF

BY STATES

	1985	2000
Mass.	50 BCF	100 BCF
Maryland	150	400
Georgia	150	400
Louisiana	350	350
California	300	1,150
Texas	-	800
New Jersey	-	400
Canada(Maine)	400	400
	1.4 TCF	4.0 TCF

TABLE 15

Oil Refinery Thru-Put by State

	Number Refineries 1976	Capacity Thousand Bbls/D 1976	Thru-Put Thousand Bbls/D 1976	Thru-Put Thousand Bbls/D 1985	Thru-Put Thousand Bbls/D 2000
Alabama	4	54.9	48.8		-
Alaska	3	73.0	65.0		50.0
Arizona	1	4.0	3.6		-
Arkansas	4	60.8	54.1		-
California	36	1,904.0	1,695.0		1,485.0
Colorado	3	62.1	55.3		55.3
Connecticut	-	-	-		-
Delaware	1	140.0	124.6		124.6
Florida	1	5.7	5.1		-
Georgia	2	18.0	16.0		-
Hawaii	2	101.0	90.6		80.0
Idaho	-	-	-		-
Illinois	11	1,176.0	1,047.0		846.7
Indiana	7	561.2	499.4		349.4
Iowa	-	-	-		-
Kansas	11	451.2	401.5		361.5
Kentucky	3	164.0	146.0		136.0
Louisiana	19	1,753.0	1,560.0		1,175.0
Maine	-	-	-		-
Maryland/D.C.	2	28.5	25.4		-
Massachusetts	-	-	-		-
Michigan	6	147.2	131.0		121.0
Minnesota	3	216.8	193.0		153.0
Mississippi	5	329.5	293.3		250.0
Missouri	1	107.0	95.2		75.0
Montana	7	156.2	139.0		100.0
Nebraska	1	5.0	4.5		-
Nevada	-	-	-		-
New Hampshire	-	-	-		-
New Jersey	4	539.0	479.7		450.0
New Mexico	7	104.2	92.8		72.8
New York	2	111.4	99.1		-
North Carolina	-	-	-		-
North Dakota	3	58.7	52.5		
Ohio	7	589.8	524.9		424.9
Oklahoma	12	545.8	485.7		385.7
Oregon	1	14.0	12.5		-
Pennsylvania	11	757.0	673.7		573.7
Rhode Island	-	-	-		-
South Carolina	-	-	-		-
South Dakota	-	-	-		-
Tennessee	1	43.9	39.1		-
Texas	47	3,977.0	3,539.0		2,839.0
Utah	7	152.0	135.3		-
Vermont	-	-	-		-
Virginia	1	53.0	47.2		-
Washington	6	362.4	322.5		232.5
West Virginia	3	19.5	17.3		-
Wisconsin	1	45.4	40.4		-
Wyoming	10	187.3	166.7		-
SUB-TOTAL	256	15,079,500	13,421,800		10,341,100
Puerto Rico	3	255.0	207.7		200.0
TOTAL	259	15,334,500	13,629,500		10,541,100

--NO SIGNIFICANT CHANGES FROM 1976 to 1985--

TABLE 16

Coal Gasification Projects

	Date Begin Construction	Plant Output Mill. CF/Day	Location
1.	1978	275	Mercer County, North Dakota
2.	1982	(2 plants) 250,250	Four Corners Area, New Mexico
3.	1983	288	Four Corners Area, New Mexico
4.	1984	270	Eastern Wyoming
5.	1985	250	Dunn County, North Dakota
6.	1986	(2 plants) 250,250	Powder River Basin, Montana
7.	1987	300	Illinois
8.	1988	250	Wichita, Kansas
9.	1989	--	Southern Illinois
10.	1990	250	Colorado
11.	1991	360	Kaiparowits Plateau, Utah
12.	1992	--	Northern Wyoming
13.	1993	--	Southwestern North Dakota
14.	1994	--	Southwest Pennsylvania
15.	1995	--	Alabama
16.	1996	--	Southern Arkansas
17.	1997	--	Southern Wyoming
18.	1998	--	Eastern Texas
19.	1999	--	Western Missouri
20.	2000	--	Eastern Utah

TABLE 17

WATER CONSUMPTION FOR ENERGY PRODUCTION
(million gallons/day)

	1976	1985	2000
Alabama	83.84	121.00	228.45
Alaska	37.05	229.93	274.70
Arizona	30.29	46.20	82.17
Arkansas	33.14	44.70	56.71
California	354.59	408.18	513.79
Colorado	64.22	102.54	183.25
Connecticut	35.36	38.12	45.86
Delaware	12.40	13.42	14.79
Florida	146.56	144.24	179.76
Georgia	60.77	85.77	168.99
Hawaii	10.30	9.87	18.27
Idaho	0.23	1.26	9.62
Illinois	201.70	263.12	401.69
Indiana	96.37	126.98	213.47
Iowa	30.18	38.50	65.47
Kansas	89.74	101.68	117.96
Kentucky	77.15	88.80	160.56
Louisiana	529.82	463.70	357.66
Maine	8.35	9.35	18.12
Maryland/D.C.	52.14	63.36	117.49
Massachusetts	39.41	38.48	66.24
Michigan	107.91	131.57	220.97
Minnesota	49.90	53.35	58.21
Mississippi	55.45	76.87	111.98
Missouri	58.73	71.44	113.44
Montana	27.62	32.59	59.03
Nebraska	24.33	25.66	40.86
Nevada	12.76	14.41	24.32
New Hampshire	5.54	18.61	27.39
New Jersey	81.63	118.40	221.34
New Mexico	100.00	89.44	97.99
New York	132.92	152.93	304.07
North Carolina	69.42	101.14	211.11
North Dakota	23.04	32.17	48.48
Ohio	144.41	188.88	347.04
Oklahoma	163.25	166.07	145.84
Oregon	13.74	24.98	43.64
Pennsylvania	160.82	193.52	346.40
Rhode Island	0.68	15.68	25.05
South Carolina	52.58	77.43	136.95
South Dakota	3.65	4.26	5.89
Tennessee	58.27	138.82	234.90
Texas	1,103.16	1,013.61	886.87
Utah	28.16	33.41	68.11
Vermont	4.98	5.05	10.88
Virginia	49.52	66.57	111.63
Washington	27.92	78.36	121.42
West Virginia	65.77	70.65	97.61
Wisconsin	45.81	59.18	138.17
Wyoming	94.82	102.60	135.71
TOTAL	4779	5,597	7690.32
Puerto Rico	19.93	18.67	34.32

TABLE 18
WATER CONSUMPTION FOR ENERGY PRODUCTION
COMPARISON BY REGIONS

MILLION GAL/DAY

WATER REGION	1976	1985	2000
001	59	87	148
002	465	574	1025
003	456	589	1015
004	184	226	400
005	405	508	857
006	47	111	188
007	279	349	568
008	574	532	455
009	17	19	30
010	253	302	443
011	441	456	459
012	882	811	710
013	136	121	104
014	55	77	171
015	33	49	87
016	24	28	45
017	47	111	182
018	355	408	514
019	37	230	275
020	10	10	18
021	20	19	34
	4779	5618	7728

TABLE 19

Oil Shale Production
(MMBD)

	1976	1985	2000
Alabama			
Alaska			
Arizona			
Arkansas			
California			
Colorado	-	0.08	0.22
Connecticut			
Delaware			
Florida			
Georgia			
Hawaii			
Idaho			
Illinois			
Indiana			
Iowa			
Kansas			
Kentucky			
Louisiana			
Maine			
Maryland/D. C.			
Massachusetts			
Michigan			
Minnesota			
Mississippi			
Missouri			
Montana			
Nebraska			
Nevada			
New Hampshire			
New Jersey			
New Mexico			
New York			
North Carolina			
North Dakota			
Ohio			
Oklahoma			
Oregon			
Pennsylvania			
Rhode Island			
South Carolina			
South Dakota			
Tennessee			
Texas			
Utah	-	-	0.08
Vermont			
Virginia			
Washington			
West Virginia			
Wisconsin			
Wyoming			
TOTAL	-	0.08	0.3
Puerto Rico			

TABLE 20

Uranium Extraction
(tons)

	1976	1985	2000
Alabama			
Alaska			1,000
Arizona			
Arkansas			
California			
Colorado	900	4,000	8,800
Connecticut			
Delaware			
Florida			
Georgia			
Hawaii			
Idaho			
Illinois			
Indiana			
Iowa			
Kansas			
Kentucky			
Louisiana			
Maine			
Maryland/D. C.			
Massachusetts			
Michigan			
Minnesota			
Mississippi			
Missouri			
Montana			
Nebraska			
Nevada			
New Hampshire			
New Jersey			
New Mexico	6,500	11,500	14,500
New York			
North Carolina			
North Dakota			
Ohio			
Oklahoma			
Oregon			
Pennsylvania			
Rhode Island			
South Carolina			
South Dakota			1,500
Tennessee			
Texas	1,000	1,800	4,400
Utah	500	700	1,800
Vermont			
Virginia			
Washington	600	1,000	1,000
West Virginia			
Wisconsin			
Wyoming	4,400	8,000	22,000
TOTAL	14,000	27,000	55,000
Puerto Rico			

TABLE 21

COAL SLURRY PIPELINES
YEAR 2000

Pipeline No.	Originates (region)		Terminates (region)		Water Reqmts. Million Gal./Day
1	Colorado	(14)	So. Calif.	(18)	10.3
2	Washington	(NA)	Minnesota	(NA)	None (oil)
3	West Va.	(5)	New York and New Jersey	(2)	10.3
4	Kentucky	(5)	Georgia	(3)	10.3
5	Montana	(10)	Texas	(12)	10.3
6	Colorado	(10)	Texas	(12)	10.3
7	Wyoming	(10)	Louisiana	(8)	10.3
8	Wyoming	(10)	Washington	(17)	10.5
9	Utah	(14)	Nevada	(16)	6.6
Existing Pipeline (Black Mesa)	Arizona	(15)	Arizona	(15)	3.15

TABLE 22

Solar Installations
(No. in Each State)

State	1978	1985	2000
Alabama	30	28,000	204,000
Alaska	2	2,000	23,000
Arizona	418	17,000	464,000
Arkansas	48	17,000	196,000
California	2,382	180,000	2,031,000
Colorado	895	20,000	322,000
Connecticut	119	24,000	146,000
Delaware	24	4,000	58,000
Florida	1,193	70,000	1,305,000
Georgia	60	37,000	445,000
Hawaii	119	6,000	84,000
Idaho	12	6,000	77,000
Illinois	239	90,000	633,000
Indiana	89	42,000	247,000
Iowa	119	23,000	137,000
Kansas	42	19,000	131,000
Kentucky	18	26,000	238,000
Louisiana	36	28,000	248,000
Maine	24	8,000	43,000
Maryland/D.C.	125	38,000	370,000
Massachusetts	358	46,000	254,000
Michigan	60	70,000	375,000
Minnesota	60	31,000	169,000
Mississippi	89	17,000	135,000
Missouri	36	40,000	269,000
Montana	48	6,000	36,000
Nebraska	42	13,000	94,000
Nevada	60	5,000	124,000
New Hampshire	36	6,000	61,000
New Jersey	358	58,000	402,000
New Mexico	418	8,000	88,000
New York	358	151,000	687,000
North Carolina	239	41,000	464,000
North Dakota	48	5,000	30,000
Ohio	84	85,000	453,000
Oklahoma	30	23,000	214,000
Oregon	358	19,000	222,000
Pennsylvania	477	95,000	438,000
Rhode Island	89	7,000	39,000
South Carolina	179	20,000	197,000
South Dakota	48	5,000	32,000
Tennessee	30	33,000	346,000
Texas	89	95,000	1,377,000
Utah	36	8,000	112,000
Vermont	36	4,000	23,000
Virginia	60	38,000	418,000
Washington	119	29,000	211,000
West Virginia	18	14,000	84,000
Wisconsin	119	36,000	218,000
Wyoming	24	3,000	29,000
TOTAL	10,000	1,700,000	15,000,000
Puerto Rico	24	18,000	165,000
Total Quads Saved	0.001	0.17	1.5

Each solar installation saves 100 million btu's/year and averages about 1100 square feet. Thus in the year 2000, the United States will have about 16.5 billion square feet of solar collectors or approximately 585 square miles of solar collectors. (See Figure 17)

Figure 17

Mean Daily Insolation

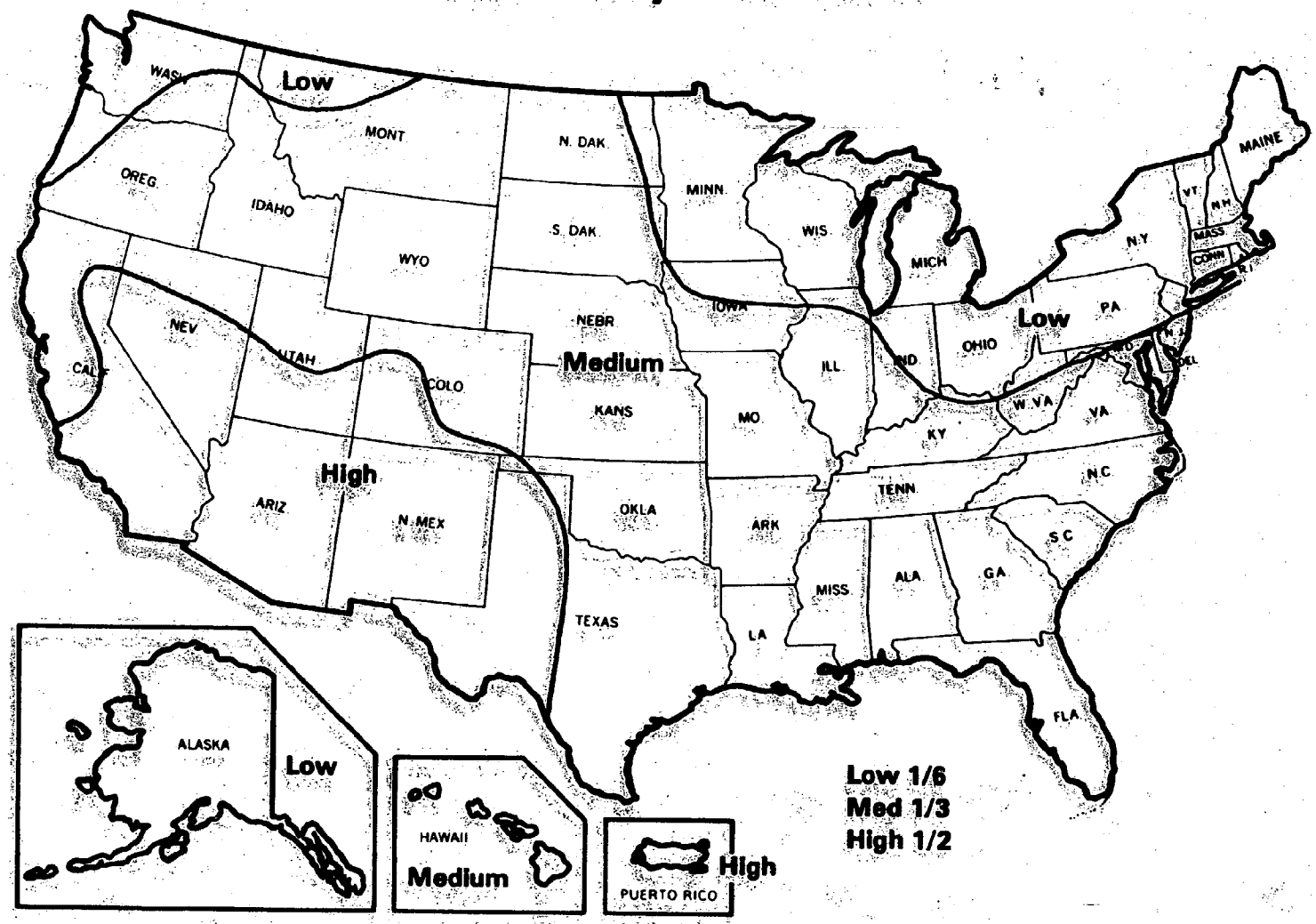

TABLE 23
Municipal Sewage and Trash Converted to Energy
(billion pounds)

	1976	1985	2000
Alabama		0.31	2.10
Alaska		0.04	0.32
Arizona		0.24	2.06
Arkansas		0.19	1.46
California		1.90	13.43
Colorado		0.25	1.96
Connecticut		0.28	1.92
Delaware		0.06	0.42
Florida		0.89	7.46
Georgia		0.45	3.48
Hawaii		0.08	0.67
Idaho		0.08	0.59
Illinois		0.94	6.32
Indiana		0.45	2.94
Iowa		0.24	1.59
Kansas		0.19	1.29
Kentucky		0.30	2.13
Louisiana		0.33	2.35
Maine		0.09	0.61
Maryland/D.C.		0.43	3.18
Massachusetts		0.50	3.41
Michigan		0.79	5.26
Minnesota		0.34	2.32
Mississippi		0.20	1.38
Missouri		0.40	2.65
Montana		0.06	0.41
Nebraska		0.13	0.89
Nevada		0.06	0.56
New Hampshire		0.08	0.66
New Jersey		0.63	4.50
New Mexico		0.10	0.69
New York		1.48	9.64
North Carolina		0.50	3.73
North Dakota		0.05	0.35
Ohio		0.91	6.17
Oklahoma		0.24	1.73
Oregon		0.21	1.65
Pennsylvania		0.97	6.34
Rhode Island		0.08	0.53
South Carolina		0.25	1.81
South Dakota		0.06	0.37
Tennessee		0.38	2.78
Texas		1.15	8.98
Utah		0.11	0.85
Vermont		0.04	0.31
Virginia		0.45	3.40
Washington		0.31	2.25
West Virginia		0.15	0.98
Wisconsin		0.40	2.86
Wyoming		0.04	0.25
TOTAL	negligible	18.8	134
Puerto Rico		0.30	2.25

In 1985 the United States will save .10 quads, and in the year 2000 it will save .8 quads of energy through utilization of municipal sewage and trash. (One billion pounds of municipal sewage and trash will produce .0060 quads of energy.)

TABLE 24

Agricultural Waste Converted to Energy
(billion pounds)

	1976	1985	2000
Alabama		0.4	27.5
Alaska		0.0	0.1
Arizona		0.1	9.9
Arkansas		0.9	62.7
California		0.7	51.7
Colorado		0.7	48.5
Connecticut		0.0	1.3
Delaware		0.1	4.0
Florida		0.2	11.0
Georgia		0.6	40.2
Hawaii		0.0	0.9
Idaho		0.5	35.1
Illinois		2.6	184.8
Indiana		1.4	100.4
Iowa		2.8	196.0
Kansas		2.5	176.7
Kentucky		0.5	38.1
Louisiana		0.5	32.5
Maine		0.1	3.6
Maryland/D. C.		0.2	12.1
Massachusetts		0.0	1.3
Michigan		0.7	51.1
Minnesota		2.4	166.9
Mississippi		0.6	45.0
Missouri		1.5	105.7
Montana		1.1	73.6
Nebraska		2.1	146.1
Nevada		0.1	4.0
New Hampshire		0.0	0.9
New Jersey		0.1	3.4
New Mexico		0.1	7.8
New York		0.5	33.4
North Carolina		0.6	39.2
North Dakota		2.3	158.1
Ohio		1.3	87.7
Oklahoma		1.2	83.5
Oregon		0.3	22.1
Pennsylvania		0.5	36.7
Rhode Island		0.0	0.1
South Carolina		0.3	22.9
South Dakota		1.8	127.6
Tennessee		0.5	36.6
Texas		2.3	161.9
Utah		0.1	9.4
Vermont		0.1	4.7
Virginia		0.3	23.3
Washington		0.6	39.5
West Virginia		0.1	6.2
Wisconsin		1.1	75.2
Wyoming		0.2	14.1
TOTAL	negligible	37.5	2,625
Puerto Rico		0.0	0.6

In 1985 the United States will save .2 quads, and in the year 2000 it will save 1.4 quads of energy through utilization of agricultural waste. (One billion pounds of agricultural waste will produce .00053 quads of energy.)

TABLE 25

Animal Waste Converted to Energy
(billion pounds)

	1976	1985	2000
Alabama		1.6	4.9
Alaska		0.0	0.0
Arizona		0.7	2.1
Arkansas		1.6	4.9
California		3.2	9.5
Colorado		2.1	6.1
Connecticut		0.1	0.2
Delaware		0.0	0.1
Florida		1.8	5.4
Georgia		1.5	4.4
Hawaii		0.2	0.5
Idaho		1.3	3.9
Illinois		2.0	5.8
Indiana		1.3	3.9
Iowa		4.5	13.4
Kansas		3.9	11.6
Kentucky		2.3	6.8
Louisiana		1.1	3.3
Maine		0.1	0.3
Maryland/D. C.		0.3	0.8
Massachusetts		0.1	0.2
Michigan		1.0	3.0
Minnesota		2.7	8.1
Mississippi		1.8	5.5
Missouri		4.1	12.4
Montana		2.0	6.1
Nebraska		4.2	12.6
Nevada		0.4	1.2
New Hampshire		0.0	0.1
New Jersey		0.1	0.2
New Mexico		1.0	3.1
New York		1.1	3.4
North Carolina		0.7	2.0
North Dakota		1.6	4.8
Ohio		1.4	4.3
Oklahoma		4.0	11.8
Oregon		0.9	2.7
Pennsylvania		1.2	3.6
Rhode Island		0.0	0.0
South Carolina		0.4	1.3
South Dakota		3.0	9.0
Tennessee		2.0	6.0
Texas		10.1	30.2
Utah		0.5	1.6
Vermont		0.2	0.6
Virginia		1.1	3.2
Washington		0.9	2.6
West Virginia		0.3	1.0
Wisconsin		2.8	8.4
Wyoming		1.0	3.1
TOTAL	negligible	80	240
Puerto Rico		0.0	0.2

In 1985 the United States will save .16 quads, and in the year 2000 it will save .48 quads of energy through utilization of animal waste. (One billion pounds of animal waste will produce .002 quads of energy.)

TABLE 26

Windmills
(100 Kw. Gen.)

	1976 1/	1985	2000
Alabama		1	596
Alaska		0	144
Arizona		1	1,165
Arkansas		2	1,543
California		9	8,507
Colorado		2	2,724
Connecticut		1	569
Delaware		0	121
Florida		2	2,358
Georgia		1	990
Hawaii		1	1,013
Idaho		0	339
Illinois		12	11,465
Indiana		3	3,102
Iowa		3	2,950
Kansas		3	2,412
Kentucky		1	616
Louisiana		1	651
Maine		0	175
Maryland/D. C.		1	955
Massachusetts		1	1,025
Michigan		10	9,209
Minnesota		4	4,111
Mississippi		0	382
Missouri		5	5,000
Montana		1	740
Nebraska		2	1,652
Nevada		0	339
New Hampshire		0	195
New Jersey		1	1,345
New Mexico		0	374
New York		3	3,048
North Carolina		1	1,060
North Dakota		1	604
Ohio		2	1,859
Oklahoma		3	3,274
Oregon		1	1,041
Pennsylvania		2	1,933
Rhode Island		0	160
South Carolina		1	491
South Dakota		1	647
Tennessee		1	818
Texas		9	9,677
Utah		0	440
Vermont		0	90
Virginia		1	966
Washington		1	1,383
West Virginia		0	296
Wisconsin		5	5,023
Wyoming		0	421
TOTAL	negligible	100	100,000
Puerto Rico		1	857

1/ Negligible, several in Ohio, Maine and Midwestern states.

Figure 18

Windmills

(Year 2000 Factors)

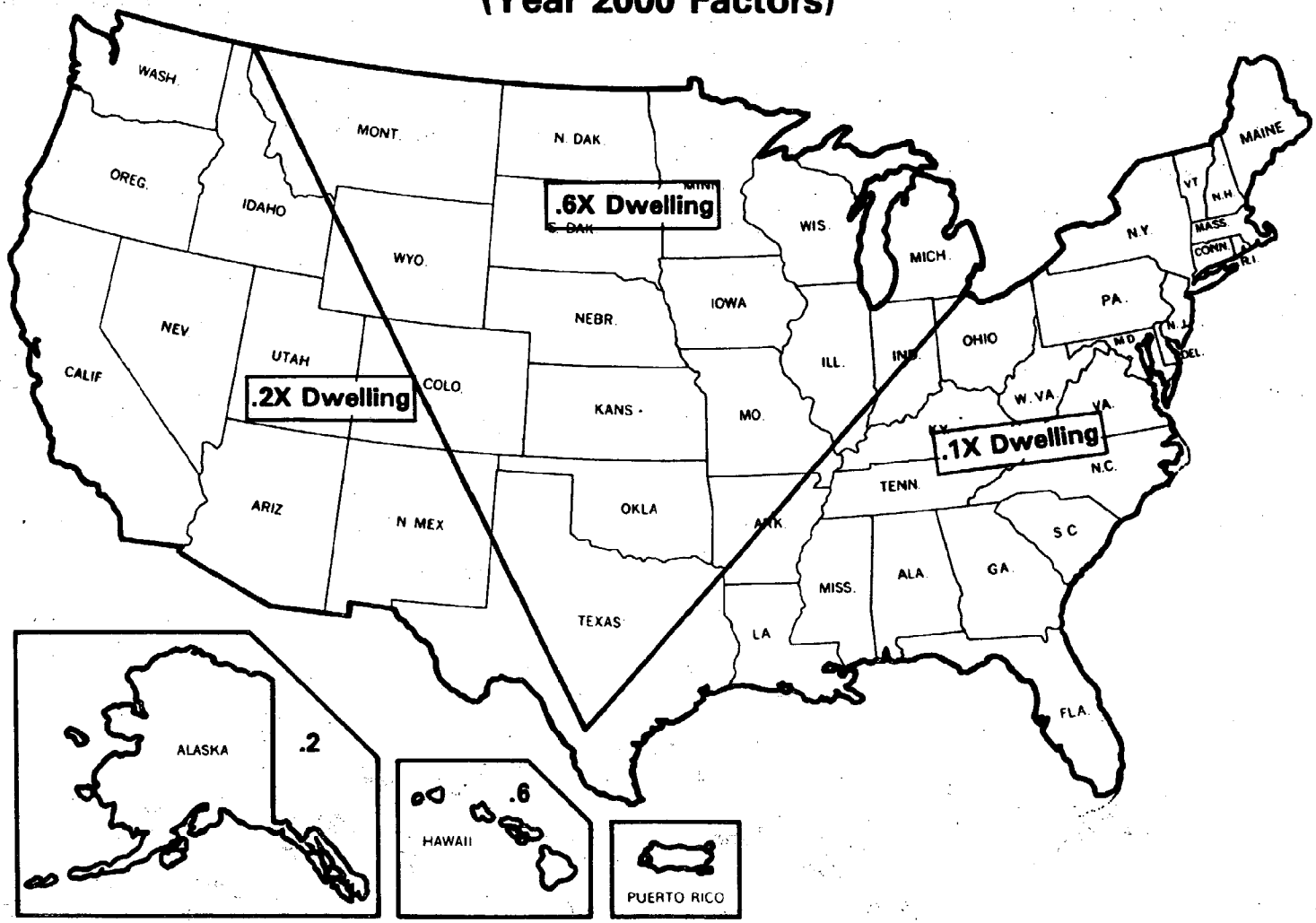

TABLE 27

GASOHOL -- (ETHANOL AND/OR METHANOL)
AS 10% ADDITIVE TO GASOLINE
YEAR 2000

	Fuel Source	Thousand Equivalent Acres	Units
Alabama	Grain/Wood	513	4
Alaska	--	--	--
Arizona	Grain	128	1
Arkansas	Grain	641	5
California	--	--	--
Colorado	Grain/Wood	513	5
Connecticut	--	--	--
Delaware	--	--	--
Florida	Grain/Wood	256	3
Georgia	Grain/Wood	384	5
Hawaii	Cane	--	4
Idaho	Grain/Wood	256	3
Illinois	Grain	8,590	67
Indiana	Grain	3,845	30
Iowa	Grain	7,692	60
Kansas	Grain	5,128	40
Kentucky	--	--	--
Louisiana	Cane/Wood	256	8
Maine	Wood	--	1
Maryland/D. C.	--	--	--
Massachusetts	--	--	--
Michigan	Grain	512	4
Minnesota	Grain/Wood	128	2
Mississippi	--	--	--
Missouri	--	--	--
Montana	Grain/Wood	1,025	10
Nebraska	Grain	2,564	20
Nevada	--	--	--
New Hampshire	--	--	--
New Jersey	--	--	--
New Mexico	--	--	--
New York	--	--	--
North Carolina	Grain	1,538	12
North Dakota	Grain	1,794	14
Ohio	Grain	2,051	16
Oklahoma	Grain	1,025	8
Oregon	Wood	--	2
Pennsylvania	Grain/Wood	513	5
Rhode Island	--	--	--
South Carolina	Grain/Wood	384	5
South Dakota	Grain	641	5
Tennessee	Grain	513	2
Texas	Grain	1,667	13
Utah	--	--	--
Vermont	Wood	--	1
Virginia	--	--	--
Washington	Grain/Wood	512	14
West Virginia	--	--	--
Wisconsin	Grain	1,410	11
Wyoming	--	--	--
TOTAL		44,479	380

See Page 20 for explanation of table.

TABLE 28

PRODUCTION OF HEAVY METAL NUCLEAR RESIDUE
(short tons)

	1985		2000	
	Annual Rate	Cumulative	Annual Rate	Cumulative
Alabama	220	889	423	3,492
Alaska	7	27	10	82
Arizona	70	284	136	1,122
Arkansas	53	215	79	656
California	239	967	1,168	9,637
Colorado	10	40	15	122
Connecticut	96	388	143	1,184
Delaware	0	0	0	0
Florida	149	602	230	1,896
Georgia	112	451	134	1,104
Hawaii	0	0	36	301
Idaho	0	0	0	0
Illinois	415	1,677	533	4,398
Indiana	81	327	109	902
Iowa	26	107	39	326
Kansas	30	120	40	327
Kentucky	0	0	0	0
Louisiana	90	364	187	1,548
Maine	27	109	53	440
Maryland/D.C.	61	246	248	2,052
Massachusetts	59	238	193	1,598
Michigan	159	644	342	2,822
Minnesota	58	236	76	624
Mississippi	106	428	183	1,514
Missouri	30	120	86	709
Montana	0	0	0	0
Nebraska	45	180	48	394
Nevada	0	0	0	0
New Hampshire	66	265	86	713
New Jersey	176	713	445	3,676
New Mexico	0	0	0	0
New York	284	1,148	798	6,589
North Carolina	181	731	397	3,283
North Dakota	0	0	0	0
Ohio	142	573	409	3,375
Oklahoma	66	268	93	764
Oregon	71	289	128	1,056
Pennsylvania	294	1,187	460	3,796
Rhode Island	66	268	91	755
South Carolina	231	934	366	3,026
South Dakota	0	0	0	0
Tennessee	345	1,396	461	3,811
Texas	142	574	497	4,108
Utah	0	0	0	0
Vermont	19	76	29	236
Virginia	153	620	229	1,894
Washington	239	967	349	2,880
West Virginia	0	0	0	0
Wisconsin	82	332	175	1,449
Wyoming	0	0	0	0
Puerto Rico	0	0	76	629
TOTAL	4,700	19,000	9,600	79,290

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SECTION III. STATE TABLES

This section contains a series of tables which summarize and re-sort -- for the Nation and for each individual State -- the projection data provided in Section II. The tables are ordered alphabetically, by State.

DATE _____

STATE United States No. _____ AREA (sq. mi.) 3,615,122

	Units	1976	1985	2000
Population	thousands	214,648	232,280	262,000
Energy Consumption	trillion BTU's			
Oil	"	35,590	38,100	26,100
Natural Gas	"	20,200	18,800	18,400
Coal	"	14,100	18,700	39,000
Other - Nuclear, Hydro, Geo, Solar, etc.	"	5,517	12,600	33,200
Total	"	75,407	88,200	116,700
Electric Power Input (10,400 BTU/KWH)	"	22,300	32,596	60,998
Energy Produced				
Oil, Includes NGL	thousand B/D	9,845	10,071	7,240
Natural Gas	billion cubic ft/yr	20,100	17,460	13,000
Coal	thousand short tons	665,000	890,000	1,860,000
Electric Power Energy Source	Megawatts	512,369	669,600	1,112,900
Oil	"	66,100	78,000	1,800
Natural Gas	"	66,000	53,500	13,300
Coal	"	219,400	266,000	566,000
Nuclear	"	45,600	141,000	290,000
Hydro/Geo	"	65,600	79,200	157,000
Peak Shaving/Unknown	"	48,600	48,600	48,600
Other	"	1,069	3,300	36,200
Water	Million Gals/Day	4,799	5,616	7,725
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		1 (400)	6 (1400)	10 (4000)
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts except "is" is a smaller plant)				
Oil	"	61	71	2
Natural Gas	"	60	49	12
Coal	"	199	242	515
Nuclear	"	41	129	264
Hydro/Geo	"	60	72	143
Other	"	1	3	33
Petroleum Refining	Barrels Per Day	13,629,500	13,629,500	10,541,100
Coal Gasification -- High BTU	billion cubic ft/yr	0 (0)	1 (100)	12 (1,184)

STATE United States NO.

Item	Units	1976	1985	2000
Automobiles	thousands	97,000	121,000	136,700
Dwellings	thousands	803	918	1,098
Oil Shale Production	MMBD	--	0.08	0.3
Uranium Extraction	tons	14,000	27,000	55,000
Coal Slurry Pipeline	Originates or terminates	Black Mesa	Black Mesa	Black Mesa plus nine additional
Solar Installations	No. in State	10,000	1,700,000	15,000,000
Municipal Sewage and Trash	billion pounds 1/	negligible	18.8	134
Agricultural Waste	billion pounds 2/	negligible	37.5	2,625
Animal Waste	billion pounds 3/	negligible	80	240
Windmills	No. of windmills 4/	negligible	100	100,000

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Alabama No. 1 AREA (sq. mi.) 51,609

	Units	1976	1985	2000
Population	thousands	3,665	3,773	4,101
Energy Consumption	trillion BTU's			
Oil	"	513	522	345
Natural Gas	"	265	235	221
Coal	"	686	826	1,539
Other - Nuclear, Hydro, Geo, Solar, etc.	"	207	487	1,039
Total	"	1,668	2,070	3,144
Electric Power Input (10,400 BTU/KWH)	"	721	1,032	2,043
Energy Produced				
Oil, Includes NGL	thousand B/D	42	60	50
Natural Gas	billion cubic ft/yr	42	57	44
Coal	thousand short tons	23,278	29,119	60,838
Electric Power Energy Source	Megawatts	16,554	21,193	37,273
Oil	"	24	24	-
Natural Gas	"	504	399	177
Coal	"	10,073	11,459	20,210
Nuclear	"	3,236	6,600	12,772
Hydro/Geo	"	2,415	2,362	3,127
Peak Shaving/Unknown	"	302	296	296
Other	"	0	53	691
Water	Million Gals/Day	83.84	121	228.45
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		0	0	0
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts except "1s" is a smaller plant)				
Oil	"	1s	1s	-
Natural Gas	"	1	1s	1s
Coal	"	9	11	18
Nuclear	"	3	6	12
Hydro/Geo	"	2	2	3
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	48,839	48,839	
Coal Gasification -- High BTU	billion cubic ft/yr	0	0	0

STATE Alabama NO. 1

Item	Units	1976	1985	2000
Automobiles	thousands	1,695	2,006	2,179
Dwellings	thousands	1,208	1,290	1,533
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	30	28,000	204,000
Municipal Sewage and Trash	billion pounds1/	--	0.31	2.10
Agricultural Waste	billion pounds2/	--	0.4	27.5
Animal Waste	billion pounds3/	--	1.6	4.9
Windmills	No. of windmills4/	--	1	596

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Alaska No. 2 AREA (sq. mi.) 586,412

	Units	1976	1985	2000
Population	thousands	382	456	635
Energy Consumption	trillion BTU's			
Oil	"	114	135	114
Natural Gas	"	60	62	74
Coal	"	11	16	41
Other - Nuclear, Hydro, Geo, Solar, etc.	"	5	20	44
Total	"	189	233	273
Electric Power Input (10,400 BTU/KWH)	"	24	40	60
Energy Produced				
Oil, Includes NGL	thousand B/D	176	1,300	1,500
Natural Gas	billion cubic ft/yr	173	195	1,250
Coal	thousand short tons	793	955	1,995
Electric Power Energy Source	Megawatts	541	816	1,100
Oil	"	100	100	100
Natural Gas	"	0	0	26
Coal	"	200	200	224
Nuclear	"	0	197	300
Hydro/Geo	"	19	100	200
Peak Shaving/Unknown	"	153	150	150
Other	"	69	69	100
Water	Million Gals/Day	37.05	229.93	274.7
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	1s
Natural Gas	"	-	-	1s
Coal	"	1	1s	1s
Nuclear	"	-	1s	1s
Hydro/Geo	"	1s	1s	1s
Other	"	1s	1s	1s
Petroleum Refining	Barrels Per Day	64,790	64,970	50,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Alaska NO. 2

Item	Units	1976	1985	2000
Automobiles	thousands	122	168	233
Dwellings	thousands	99	123	186
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	1,000
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	2	2,000	23,000
Municipal Sewage and Trash	billion pounds1/	--	0.04	0.32
Agricultural Waste	billion pounds2/	--	0.0	0.1
Animal Waste	billion pounds3/	--	0.0	0.0
Windmills	No. of windmills4/	--	0	144

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Arizona No. 3 AREA (sq. mi.) 113,909

	Units	1976	1985	2000
Population	thousands	2,270	2,908	4,023
Energy Consumption	trillion BTU's			
Oil	"	357	452	380
Natural Gas	"	186	205	246
Coal	"	75	189	423
Other - Nuclear, Hydro, Geo, Solar, etc.	"	119	282	700
Total	"	735	1,128	1,749
Electric Power Input (10,400 BTU/KWH)	"	335	556	1,062
Energy Produced				
Oil, Includes NGL	thousand B/D	1.4	1.4	.2
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	7,233	9,941	20,770
Electric Power Energy Source	Megawatts	7,699	11,420	19,375
Oil	"	1,973	1,920	-
Natural Gas	"	0	0	146
Coal	"	2,452	3,912	8,441
Nuclear	"	0	2,104	4,102
Hydro/Geo	"	2,729	2,913	5,753
Peak Shaving/Unknown	"	545	535	535
Other	"	0	36	398
Water	Million Gals/Day	30.29	46.2	82.17
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	2	-
Natural Gas	"	-	-	1s
Coal	"	2	4	8
Nuclear	"	-	2	4
Hydro/Geo	"	2	3	5
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	3,560	3,560	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Arizona NO. 3

Item	Units	1976	1985	2000
Automobiles	thousands	1,002	1,476	2,040
Dwellings	thousands	744	988	1,495
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	Black Mesa originates and terminates	Black Mesa originates and terminates	Black Mesa originates and terminates
Solar Installations	No. in State	418	17,000	464,000
Municipal Sewage and Trash	billion pounds1/	--	0.24	2.06
Agricultural Waste	billion pounds2/	--	0.1	9.9
Animal Waste	billion pounds3/	--	0.7	2.1
Windmills	No. of windmills4/	--	1	1,165

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Arkansas No. 4 AREA (sq. mi.) 53,104

	Units	1976	1985	2000
Population	thousands	2,109	2,375	2,850
Energy Consumption	trillion BTU's			
Oil	"	394	439	320
Natural Gas	"	276	267	278
Coal	"	3	114	303
Other - Nuclear, Hydro, Geo, Solar, etc.	"	65	154	303
Total	"	736	974	1,204
Electric Power Input (10,400 BTU/KWH)	"	192	340	600
Energy Produced				
Oil, Includes NGL	thousand B/D	51	40	21
Natural Gas	billion cubic ft/yr	110	90	60
Coal	thousand short tons	505	608	1,270
Electric Power Energy Source	Megawatts	4,417	6,988	10,956
Oil	"	140	143	-
Natural Gas	"	2,117	1,675	429
Coal	"	147	2,367	6,038
Nuclear	"	845	1,595	2,401
Hydro/Geo	"	994	1,005	1,566
Peak Shaving/Unknown	"	174	171	171
Other	"	0	32	351
Water	Million Gals/Day	33.14	44.7	56.71
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1 s	1	-
Natural Gas	"	2	2	1 s
Coal	"	1 s	2	5
Nuclear	"	1	1	2
Hydro/Geo	"	1	1	1
Other	"	-	1 s	1 s
Petroleum Refining	Barrels Per Day	54,100	54,100	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Arkansas NO. 4

Item	Units	1976	1985	2000
Automobiles	thousands	790	1,023	1,226
Dwellings	thousands	738	862	1,132
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	48	17,000	196,000
Municipal Sewage and Trash	billion pounds1/	--	0.19	1.46
Agricultural Waste	billion pounds2/	--	0.9	62.7
Animal Waste	billion pounds3/	--	1.6	4.9
Windmills	No. of windmills4/	--	2	1,543

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE California No. 5 AREA (sq. mi.) 158,693

	Units	1976	1985	2000
Population	thousands	21,520	23,476	26,249
Energy Consumption	trillion BTU's			
Oil	"	2,986	3,182	2,118
Natural Gas	"	1,763	1,644	1,555
Coal	"	64	76	167
Other - Nuclear, Hydro, Geo, Solar, etc.	"	676	1,006	4,143
Total	"	5,472	5,908	7,983
Electric Power Input (10,400 BTU/KWH)	"	1,165	1,850	4,063
Energy Produced				
Oil, Includes NGL	thousand B/D	915	1,100	600
Natural Gas	billion cubic ft/yr	356	350	200
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	26,750	38,012	74,130
Oil	"	11,764	14,013	-
Natural Gas	"	270	214	1,106
Coal	"	0	800	1,600
Nuclear	"	1,384	7,178	35,253
Hydro/Geo	"	8,113	10,626	28,130
Peak Shaving/Unknown	"	5,043	4,950	4,950
Other	"	176	231	3,091
Water	Million Gals/Day	354.59	408.18	513.79
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	1 + 300	2 + 1,150
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	11	13	-
Natural Gas	"	1s	1s	1
Coal	"	-	1	1
Nuclear	"	1	7	32
Hydro/Geo	"	7	10	26
Other	"	1s	1s	3
Petroleum Refining	Barrels Per Day	1,694,502	1,694,502	1,485,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE California NO. 5

Item	Units	1976	1985	2000
Automobiles	thousands			
Dwellings	thousands	10,292	12,908	14,420
Oil Shale Production	MMBD	7,888	8,926	10,913
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#1 terminates
Solar Installations	No. in State	2,382	180,000	2,031,000
Municipal Sewage and Trash	billion pounds 1/	--	1.90	13.43
Agricultural Waste	billion pounds 2/	--	0.7	51.7
Animal Waste	billion pounds 3/	--	3.2	9.5
Windmills	No. of windmills 4/	--	9	8,507

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Colorado No. 6 AREA (sq. mi.) 104,247

	Units	1976	1985	2000
Population	thousands	2,583	3,055	3,836
Energy Consumption	trillion BTU's			
Oil	"	359	420	320
Natural Gas	"	295	300	327
Coal	"	170	301	624
Other - Nuclear, Hydro, Geo, Solar, etc.	"	24	160	345
Total	"	846	1,181	1,616
Electric Power Input (10,400 BTU/KWH)	"	198	481	1,001
Energy Produced				
Oil, Includes NGL and Oil from Shale	thousand B/D	236	300	445
Natural Gas	billion cubic ft/yr	185	200	215
Coal	thousand short tons	8,435	14,075	29,407
Electric Power Energy Source	Megawatts	4,547	9,887	18,257
Oil	"	271	326	-
Natural Gas	"	278	220	108
Coal	"	2,795	6,223	12,456
Nuclear	"	321	297	446
Hydro/Geo	"	684	2,609	4,860
Peak Shaving/Unknown	"	198	194	194
Other	"	0	18	193
Water	Million Gals/Day	64.22	102.54	183.25
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1s	1s	1s
Coal	"	3	6	11
Nuclear	"	1s	1	1s
Hydro/Geo	"	1	2	4
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	55,291	55,291	55,291
Coal Gasification -- High BTU	billion cubic ft/yr	0	0	1 (82)

STATE Colorado NO. 6

Item	Units	1976	1985	2000
Automobiles	thousands	1,291	1,755	2,202
Dwellings	thousands	889	1,090	1,497
Oil Shale Production	MMBD	--	0.08	0.3
Uranium Extraction	tons	900	4,000	8,800
Coal Slurry Pipeline	Originates or terminates	--	--	#1 and #6 originate
Solar Installations	No. in State	895	20,000	322,000
Municipal Sewage and Trash	billion pounds1/	--	0.25	1.96
Agricultural Waste	billion pounds2/	--	0.7	48.5
Animal Waste	billion pounds3/	--	2.1	6.1
Windmills	No. of windmills4/	--	2	2,724

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Connecticut No. 7 AREA (sq. mi.) 5,009

	Units	1976	1985	2000
Population	thousands	3,117	3,411	3,747
Energy Consumption	trillion BTU's			
Oil	"	665	720	480
Natural Gas	"	63	59	57
Coal	"	6	8	16
Other - Nuclear, Hydro, Geo, Solar, etc.	"	115	176	462
Total	"	846	963	1,015
Electric Power Input (10,400 BTU/KWH)	"	251	326	387
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	5,760	6,695	7,056
Oil	"	2,032	2,068	-
Natural Gas	"	0	0	150
Coal	"	0	0	-
Nuclear	"	2,033	2,876	4,329
Hydro/Geo	"	117	119	119
Peak Shaving/Unknown	"	1,578	1,549	1,549
Other	"	0	83	909
Water	Million Gals/Day	35.36	38.12	45.86
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)				
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	2	-
Natural Gas	"	-	-	1 s
Coal	"	-	-	-
Nuclear	"	2	3	4
Hydro/Geo	"	1s	1s	1 s
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day		-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Connecticut NO. 7

Item	Units	1976	1985	2000
Automobiles	thousands	1,689	2,125	2,332
Dwellings	thousands	1,071	1,215	1,460
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	119	24,000	146,000
Municipal Sewage and Trash	billion pounds1/	--	0.28	1.92
Agricultural Waste	billion pounds2/	--	0.0	1.3
Animal Waste	billion pounds3/	--	0.1	0.2
Windmills	No. of windmills4/	--	1	569

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Delaware No. 8 AREA (sq. mi.) 2,057

	Units	1976	1985	2000
Population	thousands	582	684	830
Energy Consumption	trillion BTU's			
Oil	"	178	207	153
Natural Gas	"	19	19	20
Coal	"	22	32	71
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	2	73
Total	"	218	260	317
Electric Power Input (10,400 BTU/KWH)	"	67	87	140
Energy Produced				
Oil, Includes NGL	thousand B/D	-	15	38
Natural Gas	billion cubic ft/yr	-	25	60
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	1,536	1,787	2,558
Oil	"	574	584	-
Natural Gas	"	25	20	44
Coal	"	361	594	1,335
Nuclear	"	0	0	-
Hydro/Geo	"	0	0	300
Peak Shaving/Unknown	"	571	560	560
Other	"	5	29	319
Water	Million Gals/Day	12.40	13.42	14.79
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	1s	1s
Coal	"	1s	1	1
Nuclear	"	-	-	-
Hydro/Geo	"	-	-	1s
Other	"	1s	1s	1s
Petroleum Refining	Barrels Per Day	124,600	124,600	124,600
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Delaware NO. 8

Item	Units	1976	1985	2000
Automobiles	thousands	261	353	428
Dwellings	thousands	194	236	313
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	24	4,000	58,000
Municipal Sewage and Trash	billion pounds1/	--	0.06	0.42
Agricultural Waste	billion pounds2/	--	0.1	4.0
Animal Waste	billion pounds3/	--	0.0	0.1
Windmills	No. of windmills4/		0	121

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Florida No. 9 AREA (sq. mi.) 58,560

	Units	1976	1985	2000
Population	thousands	8,421	11,057	14,585
Energy Consumption	trillion BTU's			
Oil	"	1,522	1,977	1,534
Natural Gas	"	272	307	352
Coal	"	164	234	937
Other - Nuclear, Hydro, Geo, Solar, etc.	"	111	268	728
Total	"	2,061	2,786	3,551
Electric Power Input (10,400 BTU/KWH)	"	767	1,084	1,676
Energy Produced				
Oil, Includes NGL	thousand B/D	143	169	85
Natural Gas	billion cubic ft/yr	44	55	30
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	17,615	22,261	30,580
Oil	"	8,327	10,913	-
Natural Gas	"	638	505	423
Coal	"	3,387	4,105	18,699
Nuclear	"	3,020	4,467	6,933
Hydro/Geo	"	178	206	1,092
Peak Shaving/Unknown	"	2,048	2,010	2,010
Other	"	17	55	1,423
Water	Million Gals/Day	146.56	144.24	179.76
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	8	10	-
Natural Gas	"	1	1	1s
Coal	"	3	4	17
Nuclear	"	3	4	6
Hydro/Geo	"	1s	1s	1
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	5,073	5,073	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Florida NO. 9

Item	Units	1976	1985	2000
Automobiles	thousands	4,386	6,622	8,726
Dwellings	thousands	3,082	4,197	6,054
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	1,193	70,000	1,305,000
Municipal Sewage and Trash	billion pounds1/	--	0.89	7.46
Agricultural Waste	billion pounds2/	--	0.2	11.0
Animal Waste	billion pounds3/	--	1.8	5.4
Windmills	No. of windmills4/	--	2	2,358

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Georgia No. 10 AREA (sq. mi.) 58,876

	Units	1976	1985	2000
Population	thousands	4,970	5,536	6,801
Energy Consumption	trillion BTU's			
Oil	"	759	836	624
Natural Gas	"	315	302	322
Coal	"	291	540	1,283
Other - Nuclear, Hydro, Geo, Solar, etc.	"	47	307	579
Total	"	1,408	1,985	2,808
Electric Power Input (10,400 BTU/KWH)	"	612	905	1,928
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	77	93	194
Electric Power Energy Source	Megawatts	14,054	18,592	35,170
Oil	"	175	384	-
Natural Gas	"	308	244	287
Coal	"	10,135	11,170	25,608
Nuclear	"	796	3,346	4,037
Hydro/Geo	"	1,461	2,236	3,419
Peak Shaving/Unknown	"	1,179	1,157	1,157
Other	"	0	55	662
Water	Million Gals/Day	60.774	85.77	168.99
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)			1 + 150	1 + 400
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1s	1s	1s
Coal	"	9	10	23
Nuclear	"	1	3	4
Hydro/Geo	"	1	2	3
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	16,020	16,020	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Georgia NO. 10

Item	Units	1976	1985	2000
Automobiles	thousands	2,357	3,018	3,705
Dwellings	thousands	1,635	1,890	2,537
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#4 terminates
Solar Installations	No. in State	60	37,000	445,000
Municipal Sewage and Trash	billion pounds1/	--	0.45	3.48
Agricultural Waste	billion pounds2/	--	0.6	40.2
Animal Waste	billion pounds3/	--	1.5	4.4
Windmills	No. of windmills4/	--	1	990

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Hawaii No. 11 AREA (sq. mi.) 6,450

	Units	1976	1985	2000
Population	thousands	875	1,014	1,313
Energy Consumption	trillion BTU's			
Oil	"	217	249	196
Natural Gas	"	0	0	0
Coal	"	0	0	0
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	9	87
Total	"	217	258	283
Electric Power Input (10,400 BTU/KWH)	"	36	71	121
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	833	1,468	2,200
Oil	"	684	1,162	800
Natural Gas	"	0	0	0
Coal	"	0	0	0
Nuclear	"	0	0	1,100
Hydro/Geo	"	5	5	15
Peak Shaving/Unknown	"	144	141	141
Other	"	0	160	144
Water	Million Gals/Day	10.30	9.87	18.27
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	1
Natural Gas	"	-	-	-
Coal	"	-	-	-
Nuclear	"	-	-	1
Hydro/Geo	"	1s	1s	1s
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	101,000	90,558	80,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Hawaii NO. 11

Item	Units	1976	1985	2000
Automobiles	thousands	387	516	667
Dwellings	thousands	254	305	433
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	119	6,000	84,000
Municipal Sewage and Trash	billion pounds1/	--	0.08	0.67
Agricultural Waste	billion pounds2/	--	0.0	0.9
Animal Waste	billion pounds3/	--	0.2	0.5
Windmills	No. of windmills4/	--	1	1,013

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Idaho No. 12 AREA (sq. mi.) 83,557

	Units	1976	1985	2000
Population	thousands	831	938	1,160
Energy Consumption	trillion BTU's			
Oil	"	138	154	116
Natural Gas	"	50	49	52
Coal	"	12	17	80
Other - Nuclear, Hydro, Geo, Solar, etc.	"	138	115	510
Total	"	337	335	758
Electric Power Input (10,400 BTU/KWH)	"	85	99	447
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	1,941	2,041	8,163
Oil	"	0	0	-
Natural Gas	"	44	35	121
Coal	"	0	0	1,594
Nuclear	"	0	0	0
Hydro/Geo	"	1,658	1,748	6,002
Peak Shaving/Unknown	"	239	235	235
Other	"	0	23	211
Water	Million Gals/Day	0.23	1.26	9.62
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	1s
Natural Gas	"	1s	1s	1s
Coal	"	-	-	1
Nuclear	"	-	-	-
Hydro/Geo	"	2	2	5
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Idaho NO. 12

Item	Units	1976	1985	2000
Automobiles	thousands	379	492	608
Dwellings	thousands	274	321	434
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	12	6,000	77,000
Municipal Sewage and Trash	billion pounds 1/	--	0.08	0.59
Agricultural Waste	billion pounds 2/	--	0.5	35.1
Animal Waste	billion pounds 3/	--	1.3	3.9
Windmills	No. of windmills 4/	--	0	339

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Illinois No. 13 AREA (sq. mi.) 56,400

	Units	1976	1985	2000
Population	thousands	11,229	11,646	12,350
Energy Consumption	trillion BTU's			
Oil	"	1,745	1,790	1,153
Natural Gas	"	1,091	973	895
Coal	"	934	1,107	2,128
Other - Nuclear, Hydro, Geo, Solar, etc.	"	270	680	1,284
Total	"	4,030	4,550	5,460
Electric Power Input (10,400 BTU/KWH)	"	1,174	1,736	3,047
Energy Produced				
Oil, Includes NGL	thousand B/D	93.5	88	65
Natural Gas	billion cubic ft/yr	2	-	-
Coal	thousand short tons	60,945	80,438	168,059
Electric Power Energy Source	Megawatts	26,952	35,660	55,595
Oil	"	1,866	3,370	-
Natural Gas	"	691	547	748
Coal	"	16,611	16,783	34,664
Nuclear	"	5,329	12,447	16,089
Hydro/Geo	"	43	44	64
Peak Shaving/Unknown	"	2,412	2,367	2,367
Other	"	0	102	1,663
Water	Million Gals/Day	201.70	263.12	401.69
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	3	-
Natural Gas	"	1	1	1
Coal	"	15	15	32
Nuclear	"	5	11	15
Hydro/Geo	"	1s	1s	1s
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	1,046,685	1,046,685	846,685
Coal Gasification -- High BTU	billion cubic ft/yr	-	0	1 (98)

STATE Illinois NO. 13

Item	Units	1976	1985	2000
Automobiles	thousands	4,884	5,824	6,170
Dwellings	thousands	3,930	4,228	4,903
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	239	90,000	633,000
Municipal Sewage and Trash	billion pounds1/	--	0.94	6.32
Agricultural Waste	billion pounds2/	--	2.6	184.8
Animal Waste	billion pounds3/	--	2.0	5.8
Windmills	No. of windmills4/	--	12	11,465

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Indiana No. 14 AREA (sq. mi.) 36,291

	Units	1976	1985	2000
Population	thousands	5,302	5,502	5,740
Energy Consumption	trillion BTU's			
Oil	"	904	928	588
Natural Gas	"	500	446	404
Coal	"	1,111	1,273	2,526
Other - Nuclear, Hydro, Geo, Solar, etc.	"	6	141	333
Total	"	2,516	2,788	3,851
Electric Power Input (10,400 BTU/KWH)	"	731	1,007	2,068
Energy Produced				
Oil, Includes NGL	thousand B/D	12.7	12	10
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	26,010	32,545	67,997
Electric Power Energy Source	Megawatts	16,790	20,682	37,736
Oil	"	559	569	-
Natural Gas	"	96	76	260
Coal	"	14,695	16,107	31,734
Nuclear	"	0	2,424	3,299
Hydro/Geo	"	98	100	145
Peak Shaving/Unknown	"	1,342	1,317	1,317
Other	"	0	89	981
Water	Million Gals/Day	96.37	126.98	213.47
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	1s	1s
Coal	"	13	15	29
Nuclear	"	-	2	3
Hydro/Geo	"	1s	1s	1s
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	499,432	499,432	349,432
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Indiana NO. 14

Item	Units	1976	1985	2000
Automobiles	thousands	2,324	2,773	2,890
Dwellings	thousands	1,853	1,995	2,275
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	89	42,000	247,000
Municipal Sewage and Trash	billion pounds1/	--	0.45	2.94
Agricultural Waste	billion pounds2/	--	1.4	100.4
Animal Waste	billion pounds3/	--	1.3	3.9
Windmills	No. of windmills4/	--	3	3,102

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Iowa No. 15 AREA (sq. mi.) 56,290

	Units	1976	1985	2000
Population	thousands	2,870	2,964	3,108
Energy Consumption	trillion BTU's			
Oil	"	425	434	277
Natural Gas	"	347	308	280
Coal	"	159	210	436
Other - Nuclear, Hydro, Geo, Solar, etc.	"	27	59	157
Total	"	956	1,011	1,150
Electric Power Input (10,400 BTU/KWH)	"	245	339	632
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	636	766	1,600
Electric Power Energy Source	Megawatts	5,634	6,970	11,536
Oil	"	457	514	-
Natural Gas	"	268	212	115
Coal	"	3,297	4,350	8,706
Nuclear	"	529	791	1,191
Hydro/Geo	"	135	137	199
Peak Shaving/Unknown	"	948	930	930
Other	"	0	36	395
Water	Million Gals/Day	30.18	38.5	65.47
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1	-
Natural Gas	"	1s	1s	1s
Coal	"	3	4	8
Nuclear	"	1	1	1
Hydro/Geo	"	1s	1s	1s
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Iowa NO. 15

Item	Units	1976	1985	2000
Automobiles	thousands	1,380	1,639	1,717
Dwellings	thousands	1,026	1,099	1,261
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	119	23,000	137,000
Municipal Sewage and Trash	billion pounds1/	--	0.24	1.59
Agricultural Waste	billion pounds2/	--	2.8	196.0
Animal Waste	billion pounds3/	--	4.5	13.4
Windmills	No. of windmills4/	--	3	2,950

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Kentucky No. 17 AREA (sq. mi.) 40,395

	Units	1976	1985	2000
Population	thousands	3,428	3,708	4,155
Energy Consumption	trillion BTU's			
Oil	"	406	434	296
Natural Gas	"	220	205	199
Coal	"	637	804	1,680
Other - Nuclear, Hydro, Geo, Solar, etc.	"	41	74	145
Total	"	1,301	1,517	2,320
Electric Power Input (10,400 BTU/KWH)	"	596	773	1,504
Energy Produced				
Oil, Includes NGL	thousand B/D	20.3	18	15
Natural Gas	billion cubic ft/yr	66	48	35
Coal	thousand short tons	147,261	163,916	342,470
Electric Power Energy Source	Megawatts	13,696	15,880	27,447
Oil	"	55	89	-
Natural Gas	"	112	88	190
Coal	"	12,350	14,467	25,313
Nuclear	"	0	0	-
Hydro/Geo	"	829	844	1,073
Peak Shaving/Unknown	"	350	344	344
Other	"	0	48	527
Water	Million Gals/Day	77.15	88.80	160.56
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1s	1s	1s
Coal	"	11	13	23
Nuclear	"	-	-	-
Hydro/Geo	"	1	1	1
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	145,960	145,960	135,960
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Kentucky NO. 17

Item	Units	1976	1985	2000
Automobiles	thousands	1,493	1,857	2,079
Dwellings	thousands	1,148	1,288	1,578
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	4 originates
Solar Installations	No. in State	18	26,000	238,000
Municipal Sewage and Trash	billion pounds1/	--	0.30	2.13
Agricultural Waste	billion pounds2/	--	0.5	38.1
Animal Waste	billion pounds3/	--	2.3	6.8
Windmills	No. of windmills4/	--	1	616

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Louisiana No. 18 AREA (sq. mi.) 48,523

	Units	1976	1985	2000
Population	thousands	3,841	4,050	4,601
Energy Consumption	trillion BTU's			
Oil	"	725	756	522
Natural Gas	"	1,916	1,728	1,663
Coal	"	0	181	540
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	152	471
Total	"	2,637	2,817	3,196
Electric Power Input (10,400 BTU/KWH)	"	487	776	1,059
Energy Produced				
Oil, Includes NGL	thousand B/D	2,000	1,560	950
Natural Gas	billion cubic ft/yr	7,040	6,400	4,100
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	11,177	15,944	19,314
Oil	"	738	751	-
Natural Gas	"	9,314	7,598	995
Coal	"	0	3,745	10,774
Nuclear	"	0	2,698	5,662
Hydro/Geo	"	0	0	-
Peak Shaving/Unknown	"	1,099	1,079	1,079
Other	"	26	73	804
Water	Million Gals/Day	529.82	463.70	357.66
Facilities				
LNG (Includes number and amount of GAS/YR (Bcf)			1 + 350	1 + 350
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1	-
Natural Gas	"	8	7	1s
Coal	"	-	3	10
Nuclear	"	-	2	5
Hydro/Geo	"	-	-	-
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	1,560,255	1,560,255	1,174,918
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Louisiana NO. 18

Item	Units	1976	1985	2000
Automobiles	thousands	1,477	1,790	2,032
Dwellings	thousands	1,231	1,346	1,672
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#7 terminates
Solar Installations	No. in State	36	28,000	248,000
Municipal Sewage and Trash	billion pounds1/	--	0.33	2.35
Agricultural Waste	billion pounds2/	--	0.5	32.5
Animal Waste	billion pounds3/	--	1.1	3.3
Windmills	No. of windmills4/	--	1	651

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Maine No. 19 AREA (sq. mi.) 33,215

	Units	1976	1985	2000
Population	thousands	1,072	1,112	1,200
Energy Consumption	trillion BTU's			
Oil	"	291	299	196
Natural Gas	"	0	0	2
Coal	"	2	3	30
Other - Nuclear, Hydro, Geo, Solar, etc.	"	66	124	304
Total	"	357	426	532
Electric Power Input (10,400 BTU/KWH)	"	109	141	242
Energy Produced				
Oil, Includes NGL	thousand B/D	-	15	37
Natural Gas	billion cubic ft/yr	-	25	50
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	2,514	2,903	4,420
Oil	"	249	552	-
Natural Gas	"	0	0	42
Coal	"	0	0	600
Nuclear	"	758	810	1,610
Hydro/Geo	"	1,334	1,359	1,871
Peak Shaving/Unknown	"	173	170	170
Other	"	0	12	127
Water	Million Gals/Day	8.35	9.35	18.12
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		0	1 + 400	1 + 400
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1	-
Natural Gas	"	-	-	1s
Coal	"	-	-	1
Nuclear	"	1	1	1
Hydro/Geo	"	1	1	2
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Maine NO. 19

Item	Units	1976	1985	2000
Automobiles	thousands	470	561	604
Dwellings	thousands	357	384	454
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	24	8,000	43,000
Municipal Sewage and Trash	billion pounds 1/	--	0.09	0.61
Agricultural Waste	billion pounds 2/	--	0.1	3.6
Animal Waste	billion pounds 3/	--	0.1	0.3
Windmills	No. of windmills 4/	--	0	175

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Maryland/D.C. No. 20 AREA (sq. mi.) 10,577

	Units	1976	1985	2000
Population	thousands	4,846	5,296	6,221
Energy Consumption	trillion BTU's			
Oil	"	917	991	707
Natural Gas	"	190	179	182
Coal	"	270	322	735
Other - Nuclear, Hydro, Geo, Solar, etc.	"	18	132	675
Total	"	1,389	1,624	2,299
Electric Power Input (10,400 BTU/KWH)	"	383	491	832
Energy Produced				
Oil, Includes NGL	thousand B/D	-	40	75
Natural Gas	billion cubic ft/yr	-	75	125
Coal	thousand short tons	2,696	3,725	7,783
Electric Power Energy Source	Megawatts	8,789	10,079	15,171
Oil	"	2,981	4,008	-
Natural Gas	"	147	116	217
Coal	"	1,892	2,070	4,143
Nuclear	"	1,713	1,829	7,506
Hydro/Geo	"	485	494	900
Peak Shaving/Unknown	"	1,505	1,477	1,477
Other	"	66	85	928
Water	Million Gals/Day	52.14	63.36	117.49
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)			1 + 150	1 + 400
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	3	4	-
Natural Gas	"	1s	1s	1s
Coal	"	2	2	4
Nuclear	"	2	2	7
Hydro/Geo	"	1s	1s	1
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	25,365	25,365	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Maryland/D. C. NO. 20

Item	Units	1976	1985	2000
Automobiles	thousands	2,081	2,615	3,069
Dwellings	thousands	1,680	1,905	2,446
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	125	38,000	370,000
Municipal Sewage and Trash	billion pounds 1/	--	0.43	3.18
Agricultural Waste	billion pounds 2/	--	0.2	12.1
Animal Waste	billion pounds 3/	--	0.3	0.8
Windmills	No. of windmills 4/	--	1	955

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Massachusetts No. 21 AREA (sq. mi.) 8,257

	Units	1976	1985	2000
Population	thousands	5,809	6,131	6,669
Energy Consumption	trillion BTU's			
Oil	"	1,339	1,398	924
Natural Gas	"	148	134	127
Coal	"	22	49	97
Other - Nuclear, Hydro, Geo, Solar, etc.	"	44	135	516
Total	"	1,546	1,716	1,664
Electric Power Input (10,400 BTU/KWH)	"	293	387	594
Energy Produced				
Oil, Includes NGL	thousand B/D	-	30	75
Natural Gas	billion cubic ft/yr	-	50	110
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	6,739	7,957	10,836
Oil	"	2,976	3,334	-
Natural Gas	"	0	0	-
Coal	"	1,087	1,023	1,943
Nuclear	"	808	1,766	5,843
Hydro/Geo	"	745	661	1,150
Peak Shaving/Unknown	"	1,121	1,100	1,100
Other	"	2	73	800
Water	Million Gals/Day	39.41	38.48	66.24
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		1 + 15	1 + 50	1 + 100
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	3	3	-
Natural Gas	"	-	-	-
Coal	"	1	1	2
Nuclear	"	1	2	5
Hydro/Geo	"	1	1	1
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Massachusetts NO. 21

Item	Units	1976	1985	2000
Automobiles	thousands	2,518	3,055	3,321
Dwellings	thousands	2,022	2,214	2,633
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	358	46,000	254,000
Municipal Sewage and Trash	billion pounds1/	--	0.50	3.41
Agricultural Waste	billion pounds2/	--	0.0	1.3
Animal Waste	billion pounds3/	--	0.1	0.2
Windmills	No. of windmills4/	--	1	1,025

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Michigan No. 22 AREA (sq. mi.) 58,216

	Units	1976	1985	2000
Population	thousands	9,104	9,772	10,286
Energy Consumption	trillion BTU's			
Oil	"	1,200	1,274	815
Natural Gas	"	882	814	744
Coal	"	810	976	1,827
Other - Nuclear, Hydro, Geo, Solar, etc.	"	20	397	947
Total	"	2,905	3,461	4,333
Electric Power Input (10,400 BTU/KWH)	"	801	1,105	2,091
Energy Produced				
Oil, Includes NGL	thousand B/D	96	110	65
Natural Gas	billion cubic ft/yr	120	90	60
Coal	thousand short tons	-	-	524
Electric Power Energy Source	Megawatts	18,391	22,706	38,156
Oil	"	1,784	2,570	-
Natural Gas	"	697	569	617
Coal	"	10,324	10,991	21,253
Nuclear	"	1,909	4,782	10,320
Hydro/Geo	"	2,349	2,393	3,467
Peak Shaving/Unknown	"	1,315	1,291	1,291
Other	"	13	110	1,208
Water	Million Gals/Day	107.91	131.57	220.97
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	2	-
Natural Gas	"	1	1	1
Coal	"	9	10	19
Nuclear	"	2	4	9
Hydro/Geo	"	2	2	3
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	131,008	131,008	121,008
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Michigan NO. 22

Item	Units	1976	1985	2000
Automobiles	thousands	4,173	5,149	5,416
Dwellings	thousands	3,073	3,421	3,938
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	60	70,000	375,000
Municipal Sewage and Trash	billion pounds1/	--	0.79	5.26
Agricultural Waste	billion pounds2/	--	0.7	51.1
Animal Waste	billion pounds3/	--	1.0	3.0
Windmills	No. of windmills4/	--	10	9,209

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Minnesota No. 23 AREA (sq. mi.) 84,068

	Units	1976	1985	2000
Population	thousands	3,965	4,175	4,544
Energy Consumption	trillion BTU's			
Oil	"	638	665	439
Natural Gas	"	331	300	283
Coal	"	210	271	601
Other - Nuclear, Hydro, Geo, Solar, etc.	"	68	121	304
Total	"	1,247	1,357	1,627
Electric Power Input (10,400 BTU/KWH)	"	344	434	875
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	7,889	8,912	15,962
Oil	"	615	693	-
Natural Gas	"	21	17	157
Coal	"	4,676	5,497	12,003
Nuclear	"	1,643	1,755	2,283
Hydro/Geo	"	179	182	264
Peak Shaving/Unknown	"	733	719	719
Other	"	22	49	536
Water	Million Gals/Day	49.90	53.35	58.21
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	1s	1s
Coal	"	4	5	11
Nuclear	"	1	2	2
Hydro/Geo	"	1s	1s	1
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	192,952	192,952	152,952
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Minnesota NO. 23

Item	Units	1976	1985	2000
Automobiles	thousands	1,777	2,151	2,339
Dwellings	thousands	1,353	1,479	1,758
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#2 terminates
Solar Installations	No. in State	60	31,000	169,000
Municipal Sewage and Trash	billion pounds 1/	--	0.34	2.32
Agricultural Waste	billion pounds 2/	--	2.4	166.9
Animal Waste	billion pounds 3/	--	2.7	8.1
Windmills	No. of windmills 4/	--	4	4,111

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Mississippi No. 24 AREA (sq. mi.) 47,716

	Units	1976	1985	2000
Population	thousands	2,354	2,457	2,701
Energy Consumption	trillion BTU's			
Oil	"	405	418	279
Natural Gas	"	267	240	229
Coal	"	42	131	328
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	175	404
Total	"	712	964	1,240
Electric Power Input (10,400 BTU/KWH)	"	181	386	742
Energy Produced				
Oil, Includes NGL	thousand B/D	127	110	90
Natural Gas	billion cubic ft/yr	84	70	60
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	4,161	7,934	13,541
Oil	"	473	481	-
Natural Gas	"	1,900	1,503	535
Coal	"	1,248	2,709	6,545
Nuclear	"	0	3,175	5,536
Hydro/Geo	"	0	0	-
Peak Shaving/Unknown	"	540	530	530
Other	"	0	36	395
Water	Million Gals/Day	55.45	76.87	111.98
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1 s	-
Natural Gas	"	2	1	1
Coal	"	1	2	6
Nuclear	"	-	3	5
Hydro/Geo	"	-	-	-
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	293,255	293,255	250,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Mississippi NO. 24

Item	Units	1976	1985	2000
Automobiles	thousands	888	1,065	1,170
Dwellings	thousands	750	812	976
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	89	17,000	135,000
Municipal Sewage and Trash	billion pounds1/	--	0.20	1.38
Agricultural Waste	billion pounds2/	--	0.6	45.0
Animal Waste	billion pounds3/	--	1.8	5.5
Windmills	No. of windmills4/	--	0	382

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Missouri No. 25 AREA (sq. mi.) 69,686

	Units	1976	1985	2000
Population	thousands	4,778	4,927	5,181
Energy Consumption	trillion BTU's			
Oil	"	679	693	442
Natural Gas	"	389	345	315
Coal	"	444	531	1,031
Other - Nuclear, Hydro, Geo, Solar, etc.	"	24	100	317
Total	"	1,532	1,669	2,105
Electric Power Input (10,400 BTU/KWH)	"	560	722	1,340
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	5,838	6,263	13,085
Electric Power Energy Source	Megawatts	12,848	14,831	24,456
Oil	"	430	1,496	-
Natural Gas	"	975	771	345
Coal	"	9,905	10,020	18,652
Nuclear	"	0	894	2,593
Hydro/Geo	"	831	905	1,506
Peak Shaving/Unknown	"	707	694	694
Other	"	0	51	666
Water	Million Gals/Day	58.73	71.44	113.44
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1	-
Natural Gas	"	1	1	1s
Coal	"	9	9	17
Nuclear	"	-	1	2
Hydro/Geo	"	1	1	1
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	95,230	95,230	75,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Missouri NO. 25

Item	Units	1976	1985	2000
Automobiles	thousands	1,969	2,335	2,452
Dwellings	thousands	1,739	1,861	2,139
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	36	40,000	269,000
Municipal Sewage and Trash	billion pounds1/	--	0.40	2.65
Agricultural Waste	billion pounds2/	--	1.5	105.7
Animal Waste	billion pounds3/	--	4.1	12.4
Windmills	No. of windmills4/	--	5	5,000

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Montana No. 26 AREA (sq. mi.) 147,138

	Units	1976	1985	2000
Population	thousands	753	767	803
Energy Consumption	trillion BTU's			
Oil	"	157	158	101
Natural Gas	"	89	78	71
Coal	"	17	86	164
Other - Nuclear, Hydro, Geo, Solar, etc.	"	138	157	326
Total	"	400	479	662
Electric Power Input (10,400 BTU/KWH)	"	135	207	432
Energy Produced				
Oil, Includes NGL	thousand B/D	91	85	60
Natural Gas	billion cubic ft/yr	45	40	35
Coal	thousand short tons	22,836	40,807	85,258
Electric Power Energy Source	Megawatts	3,099	4,253	7,878
Oil	"	34	34	-
Natural Gas	"	26	21	66
Coal	"	942	1,834	3,271
Nuclear	"	0	0	-
Hydro/Geo	"	1,941	2,204	4,217
Peak Shaving/Unknown	"	146	143	143
Other	"	10	17	181
Water	Million Gals/Day	27.62	32.59	59.03
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1s	1s	1s
Coal	"	1	2	3
Nuclear	"	-	-	-
Hydro/Geo	"	2	2	4
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	139,001	139,001	100,000
Coal Gasification -- High BTU	billion cubic ft/yr	- 0	0	2 (164)

STATE Montana NO. 26

Item	Units	1976	1985	2000
Automobiles	thousands	334	391	409
Dwellings	thousands	262	277	316
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#5 originates
Solar Installations	No. in State	48	6,000	36,000
Municipal Sewage and Trash	billion pounds 1/	--	0.06	0.41
Agricultural Waste	billion pounds 2/	--	1.1	73.6
Animal Waste	billion pounds 3/	--	2.0	6.1
Windmills	No. of windmills 4/	--	1	740

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Nebraska No. 27 AREA (sq. mi.) 77,227

	Units	1976	1985	2000
Population	thousands	1,553	1,614	1,741
Energy Consumption	trillion BTU's			
Oil	"	237	244	160
Natural Gas	"	205	183	172
Coal	"	45	101	251
Other - Nuclear, Hydro, Geo, Solar, etc.	"	75	135	285
Total	"	561	663	868
Electric Power Input (10,400 BTU/KWH)	"	148	235	453
Energy Produced				
Oil, Includes NGL	thousand B/D	17.5	14	10
Natural Gas	billion cubic ft/yr	3	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	3,397	4,828	8,272
Oil	"	237	241	-
Natural Gas	"	245	194	81
Coal	"	1,214	2,098	5,000
Nuclear	"	1,253	1,338	1,441
Hydro/Geo	"	146	641	1,233
Peak Shaving/Unknown	"	302	296	296
Other	"	0	20	221
Water	Million Gals/Day	24.33	25.66	40.86
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1 s	1s	-
Natural Gas	"	1 s	1s	1s
Coal	"	1	2	5
Nuclear	"	1	1	1
Hydro/Geo	"	1s	1	1
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	4,450	4,450	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Nebraska NO. 27

Item	Units	1976	1985	2000
Automobiles	thousands	746	892	961
Dwellings	thousands	555	598	706
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	42	13,000	94,000
Municipal Sewage and Trash	billion pounds 1/	--	0.13	0.89
Agricultural Waste	billion pounds 2/	--	2.1	146.1
Animal Waste	billion pounds 3/	--	4.2	12.6
Windmills	No. of windmills 4/	--	2	1,652

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Nevada No. 28 AREA (sq. mi.) 110,540

	Units	1976	1985	2000
Population	thousands	610	790	1,103
Energy Consumption	trillion BTU's			
Oil	"	111	142	121
Natural Gas	"	62	69	84
Coal	"	116	154	395
Other - Nuclear, Hydro, Geo, Solar, etc.	"	23	33	95
Total	"	311	398	695
Electric Power Input (10,400 BTU/KWH)	"	123	151	320
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	2,818	3,108	5,835
Oil	"	48	49	-
Natural Gas	"	694	549	57
Coal	"	1,964	2,386	4,782
Nuclear	"	0	0	-
Hydro/Geo	"	1	1	731
Peak Shaving/Unknown	"	111	109	109
Other	"	0	14	156
Water	Million Gals/Day	12.76	14.41	24.32
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1	1	1s
Coal	"	2	2	4
Nuclear	"	-	-	-
Hydro/Geo	"	1s	1s	1
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Nevada NO. 28

Item	Units	1976	1985	2000
Automobiles	thousands	314	468	652
Dwellings	thousands	212	285	435
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#9 terminates
Solar Installations	No. in State	60	5,000	124,000
Municipal Sewage and Trash	billion pounds1/	--	0.06	0.56
Agricultural Waste	billion pounds2/	--	0.1	4.0
Animal Waste	billion pounds3/	--	0.4	1.2
Windmills	No. of windmills4/	--	0	339

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE New Hampshire No. 29 AREA (sq. mi.) 9,304

	Units	1976	1985	2000
Population	thousands	822	1,003	1,300
Energy Consumption	trillion BTU's			
Oil	"	157	190	149
Natural Gas	"	13	14	15
Coal	"	28	42	100
Other - Nuclear, Hydro, Geo, Solar, etc.	"	12	132	222
Total	"	210	378	486
Electric Power Input (10,400 BTU/KWH)	"	62	160	237
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	1,418	3,284	4,331
Oil	"	358	365	-
Natural Gas	"	0	0	39
Coal	"	489	369	739
Nuclear	"	0	1,964	2,607
Hydro/Geo	"	427	435	700
Peak Shaving/Unknown	"	144	141	141
Other	"	0	10	105
Water	Million Gals/Day	5.54	18.61	27.39
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1 s	1 s	-
Natural Gas	"	-	-	1 s
Coal	"	1 s	1 s	1
Nuclear	"	-	2	2
Hydro/Geo	"	1 s	1 s	1
Other	"	-	1 s	1 s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE New Hampshire NO. 29

Item	Units	1976	1985	2000
Automobiles	thousands	378	531	687
Dwellings	thousands	277	350	497
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	36	6,000	61,000
Municipal Sewage and Trash	billion pounds 1/	--	0.08	0.66
Agricultural Waste	billion pounds 2/	--	0.0	0.9
Animal Waste	billion pounds 3/	--	0.0	0.1
Windmills	No. of windmills 4/	--	0	195

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE New Jersey No. 30 AREA (sq. mi.) 7,836

	Units	1976	1985	2000
Population	thousands	7,336	7,844	8,802
Energy Consumption	trillion BTU's			
Oil	"	1,507	1,594	1,046
Natural Gas	"	257	236	230
Coal	"	88	115	239
Other - Nuclear, Hydro, Geo, Solar, etc.	"	46	313	1,072
Total	"	1,889	2,258	2,587
Electric Power Input (10,400 BTU/KWH)	"	424	632	1,224
Energy Produced				
Oil, Includes NGL	thousand B/D	-	30	75
Natural Gas	billion cubic ft/yr	-	50	110
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	9,746	12,975	22,327
Oil	"	4,071	4,263	-
Natural Gas	"	97	77	305
Coal	"	2,183	1,648	4,383
Nuclear	"	1,611	5,292	13,443
Hydro/Geo	"	404	411	2,033
Peak Shaving/Unknown	"	1,219	1,196	1,196
Other	"	161	88	967
Water	Million Gals/Day	81.63	118.40	221.34
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-		1 + 400
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	4	4	-
Natural Gas	"	1s	1s	1s
Coal	"	2	2	4
Nuclear	"	1	5	12
Hydro/Geo	"	1s	1s	2
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	479,710	479,710	450,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE New Jersey NO. 30

Item	Units	1976	1985	2000
Automobiles	thousands	3,468	4,264	4,780
Dwellings	thousands	2,534	2,811	3,449
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#3 terminates
Solar Installations	No. in State	358	58,000	402,000
Municipal Sewage and Trash	billion pounds1/	--	0.63	4.50
Agricultural Waste	billion pounds2/	--	0.1	3.4
Animal Waste	billion pounds3/	--	0.1	0.2
Windmills	No. of windmills4/	--	1	1,345

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE New Mexico No. 31 AREA (sq. mi.) 121,666

	Units	1976	1985	2000
Population	thousands	1,168	1,214	1,347
Energy Consumption	trillion BTU's			
Oil	"	200	206	139
Natural Gas	"	246	220	212
Coal	"	156	189	388
Other - Nuclear, Hydro, Geo, Solar, etc.	"	1	2	69
Total	"	602	617	808
Electric Power Input (10,400 BTU/KWH)	"	183	197	350
Energy Produced				
Oil, Includes NGL	thousand B/D	367	300	190
Natural Gas	billion cubic ft/yr	1,230	1,050	650
Coal	thousand short tons	9,096	15,340	32,050
Electric Power Energy Source	Megawatts	4,213	4,050	6,388
Oil	"	204	208	-
Natural Gas	"	838	663	149
Coal	"	3,025	3,023	5,050
Nuclear	"	0	0	-
Hydro/Geo	"	24	24	935
Peak Shaving/Unknown	"	122	120	120
Other	"	0	12	134
Water	Million Gals/Day	100.00	89.44	97.99
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	1	1	1s
Coal	"	3	3	5
Nuclear	"	-	-	-
Hydro/Geo	"	1s	1s	1
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	92,765	92,765	72,765
Coal Gasification -- High BTU	billion cubic ft/yr	0	0	3 (258)

STATE New Mexico NO. 31

Item	Units	1976	1985	2000
Automobiles	thousands	499	596	661
Dwellings	thousands	367	396	480
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	6,500	11,500	14,500
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	418	8,000	88,000
Municipal Sewage and Trash	billion pounds1/	--	0.10	0.69
Agricultural Waste	billion pounds2/	--	0.1	7.8
Animal Waste	billion pounds3/	--	1.0	3.1
Windmills	No. of windmills4/	--	0	374

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE New York No. 32 AREA (sq. mi.) 49,576

	Units	1976	1985	2000
Population	thousands	18,084	18,256	18,852
Energy Consumption	trillion BTU's			
Oil	"	3,059	3,015	1,916
Natural Gas	"	595	517	463
Coal	"	441	446	942
Other - Nuclear, Hydro, Geo, Solar, etc.	"	550	772	2,627
Total	"	4,627	4,750	5,948
Electric Power Input (10,400 BTU/KWH)	"	1,057	1,453	3,033
Energy Produced				
Oil, Includes NGL	thousand B/D	2.3	30	50
Natural Gas	billion cubic ft/yr	9	40	60
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	24,270	29,841	55,328
Oil	"	8,849	8,189	-
Natural Gas	"	98	177	718
Coal	"	2,723	3,229	9,929
Nuclear	"	4,024	8,516	24,101
Hydro/Geo	"	4,886	5,206	14,419
Peak Shaving/Unknown	"	3,406	3,343	3,843
Other	"	284	1,181	2,318
Water	Million Gals/Day	132.92	152.93	304.07
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)			-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	8	7	-
Natural Gas	"	1s	1s	1
Coal	"	2	3	9
Nuclear	"	4	8	22
Hydro/Geo	"	4	5	13
Other	"	1s	1	2
Petroleum Refining	Barrels Per Day	99,133	99,133	
Coal Gasification -- High BTU	billion cubic ft/yr		-	-

STATE New York NO. 32

Item	Units	1976	1985	2000
Automobiles	thousands	6,118	7,100	7,326
Dwellings	thousands	6,612	6,924	7,817
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#3 terminates
Solar Installations	No. in State	358	151,000	687,000
Municipal Sewage and Trash	billion pounds1/	--	1.48	9.64
Agricultural Waste	billion pounds2/	--	0.5	33.4
Animal Waste	billion pounds3/	--	1.1	3.4
Windmills	No. of windmills4/	--	3	3,048

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE North Carolina No. 33 AREA (sq. mi.) 52,586

	Units	1976	1985	2000
Population	thousands	5,469	6,151	7,284
Energy Consumption	trillion BTU's			
Oil	"	776	863	621
Natural Gas	"	134	130	133
Coal	"	574	711	1,532
Other - Nuclear, Hydro, Geo, Solar, etc.	"	85	413	964
Total	"	1,564	2,117	3,250
Electric Power Input (10,400 BTU/KWH)	"	727	1,010	2,037
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	16,684	20,752	37,160
Oil	"	757	771	-
Natural Gas	"	0	0	-
Coal	"	11,270	11,405	20,537
Nuclear	"	1,624	5,424	12,007
Hydro/Geo	"	2,092	2,131	2,631
Peak Shaving/Unknown	"	941	924	924
Other	"	0	97	1,061
Water	Million Gals/Day	69.42	101.14	211.11
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	-	-	-
Coal	"	10	10	19
Nuclear	"	1	5	11
Hydro/Geo	"	2	2	2
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE North Carolina NO. 33

Item	Units	1976	1985	2000
Automobiles	thousands	2,569	3,322	3,930
Dwellings	thousands	1,802	2,103	2,722
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	239	41,000	464,000
Municipal Sewage and Trash	billion pounds1/	--	0.50	3.73
Agricultural Waste	billion pounds2/	--	0.6	39.2
Animal Waste	billion pounds3/	--	0.7	2.0
Windmills	No. of windmills4/	--	1	1,060

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Ohio No. 35 AREA (sq. mi.) 41,222

	Units	1976	1985	2000
Population	thousands	10,690	11,216	12,058
Energy Consumption	trillion BTU's			
Oil	"	1,242	1,289	842
Natural Gas	"	1,034	933	870
Coal	"	1,816	2,115	3,942
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	260	1,136
Total	"	4,085	4,597	6,790
Electric Power Input (10,400 BTU/KWH)	"	1,238	1,560	3,186
Energy Produced				
Oil, Includes NGL	thousand B/D	27.3	23	15
Natural Gas	billion cubic ft/yr	90	50	-
Coal	thousand short tons	48,089	53,841	112,490
Electric Power Energy Source	Megawatts	28,426	32,047	58,132
Oil	"	894	909	17
Natural Gas	"	253	200	701
Coal	"	23,814	23,408	39,241
Nuclear	"	0	4,250	12,345
Hydro/Geo	"	330	336	545
Peak Shaving/Unknown	"	3,095	3,038	3,038
Other	"	40	176	2,262
Water	Million Gals/Day	144.41	188.88	347.04
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	1s	1
Coal	"	22	21	36
Nuclear	"	-	4	11
Hydro/Geo	"	1s	1s	1
Other	"	1s	1s	2
Petroleum Refining	Barrels Per Day	524,895	524,895	424,895
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

8TT

STATE Ohio NO. 35

Item	Units	1976	1985	2000
Automobiles	thousands	5,607	6,763	7,265
Dwellings	thousands	3,728	4,057	4,769
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	84	85,000	453,000
Municipal Sewage and Trash	billion pounds 1/	--	0.91	6.17
Agricultural Waste	billion pounds 2/	--	1.3	87.7
Animal Waste	billion pounds 3/	--	1.4	4.3
Windmills	No. of windmills 4/	--	2	1,859

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Oklahoma No. 36 AREA (sq. mi.) 69,919

	Units	1976	1985	2000
Population	thousands	2,766	2,942	3,380
Energy Consumption	trillion BTU's			
Oil	"	410	431	301
Natural Gas	"	633	579	577
Coal	"	5	195	494
Other - Nuclear, Hydro, Geo, Solar, etc.	"	48	149	289
Total	"	1,094	1,354	1,661
Electric Power Input (10,400 BTU/KWH)	"	327	609	833
Energy Produced				
Oil, Includes NGL	thousand B/D	557	440	260
Natural Gas	billion cubic ft/yr	1,760	1,250	750
Coal	thousand short tons	2,974	3,489	7,290
Electric Power Energy Source	Megawatts	7,502	12,516	15,197
Oil	"	105	107	-
Natural Gas	"	6,056	5,038	461
Coal	"	0	4,031	9,868
Nuclear	"	0	1,988	2,793
Hydro/Geo	"	711	724	1,049
Peak Shaving/Unknown	"	599	588	588
Other	"	31	40	438
Water	Million Gals/Day	163.25	166.07	145.84
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	6	5	1s
Coal	"	-	4	9
Nuclear	"	-	2	3
Hydro/Geo	"	1	1	1
Other	"	1s	1s	1s
Petroleum Refining	Barrels Per Day	485,740	485,740	385,740
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Oklahoma NO. 36

Item	Units	1976	1985	2000
Automobiles	thousands	1,287	1,574	1,806
Dwellings	thousands	1,010	1,114	1,400
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	30	23,000	214,000
Municipal Sewage and Trash	billion pounds1/	--	0.24	1.73
Agricultural Waste	billion pounds2/	--	1.2	83.5
Animal Waste	billion pounds3/	--	4.0	11.8
Windmills	No. of windmills4/	--	3	3,274

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Oregon No. 37 AREA (sq. mi.) 96,981

	Units	1976	1985	2000
Population	thousands	2,329	2,638	3,219
Energy Consumption	trillion BTU's			
Oil	"	365	409	303
Natural Gas	"	98	95	101
Coal	"	4	21	44
Other - Nuclear, Hydro, Geo, Solar, etc.	"	294	573	1,303
Total	"	759	1,098	1,751
Electric Power Input (10,400 BTU/KWH)	"	428	562	1,104
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	9,839	11,547	20,141
Oil	"	427	519	-
Natural Gas	"	31	25	237
Coal	"	0	441	883
Nuclear	"	1,139	2,141	3,861
Hydro/Geo	"	7,361	7,497	13,651
Peak Shaving/Unknown	"	881	365	865
Other	"	0	59	644
Water	Million Gals/Day	13.74	24.98	43.64
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1	-
Natural Gas	"	1s	1s	1 s
Coal	"	-	1 s	1
Nuclear	"	1	2	4
Hydro/Geo	"	7	7	12
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	12,460	12,460	-
Coal Gasification -- High BTU	billion cubic ft/yr	-		

STATE Oregon NO. 37

Item	Units	1976	1985	2000
Automobiles	thousands	1,202	1,565	1,908
Dwellings	thousands	851	1,000	1,334
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	358	19,000	222,000
Municipal Sewage and Trash	billion pounds1/	--	0.21	1.65
Agricultural Waste	billion pounds2/	--	0.3	22.1
Animal Waste	billion pounds3/	--	0.9	2.7
Windmills	No. of windmills4/	--	1	1,041

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Rhode Island No. 39 AREA (sq. mi.) 1,214

	Units	1976	1985	2000
Population	thousands	927	964	1,038
Energy Consumption	trillion BTU's			
Oil	"	170	175	114
Natural Gas	"	22	20	18
Coal	"	2	3	5
Other - Nuclear, Hydro, Geo, Solar, etc.	"	0	110	187
Total	"	193	308	324
Electric Power Input (10,400 BTU/KWH)	"	9	107	166
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	211	2,206	3,034
Oil	"	72	73	-
Natural Gas	"	0	-	37
Coal	"	0	-	0
Nuclear	"	0	1,988	2,760
Hydro/Geo	"	0	-	0
Peak Shaving/Unknown	"	139	136	136
Other	"	0	9	101
Water	Million Gals/Day	0.68	15.68	25.05
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	-	-	1s
Coal	"	-	-	-
Nuclear	"	-	2	3
Hydro/Geo	"	-	-	-
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Rhode Island NO. 39

Item	Units	1976	1985	2000
Automobiles	thousands	461	552	593
Dwellings	thousands	326	352	414
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	89	7,000	39,000
Municipal Sewage and Trash	billion pounds 1/	--	0.08	0.53
Agricultural Waste	billion pounds 2/	--	0.0	0.1
Animal Waste	billion pounds 3/	--	0.0	0.0
Windmills	No. of windmills 4/	--	0	160

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE South Carolina No. 40 AREA (sq. mi.) 31,055

	Units	1976	1985	2000
Population	thousands	2,848	3,127	3,538
Energy Consumption	trillion BTU's			
Oil	"	395	429	1,295
Natural Gas	"	129	122	120
Coal	"	222	299	595
Other - Nuclear, Hydro, Geo, Solar, etc.	"	208	482	974
Total	"	952	1,332	1,984
Electric Power Input (10,400 BTU/KWH)	"	462	704	1,246
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	10,601	14,462	22,742
Oil	"	1,194	1,215	-
Natural Gas	"	49	-	127
Coal	"	3,561	3,567	7,139
Nuclear	"	3,212	6,933	11,066
Hydro/Geo	"	1,738	1,860	2,860
Peak Shaving/Unknown	"	847	831	831
Other	"	0	56	719
Water	Million Gals/Day	52.58	77.43	136.95
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	-	1s
Coal	"	3	3	6
Nuclear	"	3	6	10
Hydro/Geo	"	2	2	3
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE South Carolina NO. 40

Item	Units	1976	1985	2000
Automobiles	thousands	1,250	1,578	1,784
Dwellings	thousands	895	1,019	1,261
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	179	20,000	197,000
Municipal Sewage and Trash	billion pounds1/	--	0.25	1.81
Agricultural Waste	billion pounds2/	--	0.3	22.9
Animal Waste	billion pounds3/	--	0.4	1.3
Windmills	No. of windmills4/	--	1	491

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE South Dakota No. 41 AREA (sq. mi.) 77,047

	Units	1976	1985	2000
Population	thousands	686	698	720
Energy Consumption	trillion BTU's			
Oil	"	114	115	72
Natural Gas	"	30	26	23
Coal	"	8	28	47
Other - Nuclear, Hydro, Geo, Solar, etc.	"	112	111	393
Total	"	263	280	535
Electric Power Input (10,400 BTU/KWH)	"	98	125	264
Energy Produced				
Oil, Includes NGL	thousand B/D	1.4	.8	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	2,258	2,562	4,822
Oil	"	72	200	-
Natural Gas	"	0	-	-
Coal	"	624	587	943
Nuclear	"	0	-	-
Hydro/Geo	"	1,463	1,671	3,710
Peak Shaving/Unknown	"	99	97	97
Other	"	0	7	72
Water	Million Gals/Day	3.65	4.26	5.89
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	-	-	-
Coal	"	1	1	1
Nuclear	"	-	-	-
Hydro/Geo	"	1	2	3
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE South Dakota NO. 41

Item	Units	1976	1985	2000
Automobiles	thousands	304	356	367
Dwellings	thousands	233	246	277
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	1,500
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	48	5,000	32,000
Municipal Sewage and Trash	billion pounds1/	--	0.06	0.37
Agricultural Waste	billion pounds2/	--	1.8	127.6
Animal Waste	billion pounds3/	--	3.0	9.0
Windmills	No. of windmills4/	--	1	647

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Tennessee No. 42 AREA (sq. mi.) 42,244

	Units	1976	1985	2000
Population	thousands	4,214	4,737	5,445
Energy Consumption	trillion BTU's			
Oil	"	521	579	404
Natural Gas	"	247	239	238
Coal	"	479	650	1,303
Other - Nuclear, Hydro, Geo, Solar, etc.	"	132	719	1,266
Total	"	1,376	2,187	3,211
Electric Power Input (10,400 BTU/KWH)	"	695	1,274	2,338
Energy Produced				
Oil, Includes NGL	thousand B/D	1.6	1.2	.5
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	8,413	8,972	18,745
Electric Power Energy Source	Megawatts	15,952	26,166	42,656
Oil	"	0	-	-
Natural Gas	"	1,705	1,349	707
Coal	"	10,672	10,042	20,125
Nuclear	"	0	10,360	13,940
Hydro/Geo	"	2,096	2,837	5,053
Peak Shaving/Unknown	"	1,479	1,452	1,452
Other	"	0	126	1,379
Water	Million Gals/Day	58.27	138.82	234.9
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	-	-	-
Natural Gas	"	2	1	1s
Coal	"	10	9	18
Nuclear	"	-	9	13
Hydro/Geo	"	2	3	5
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	39,071	39,071	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Tennessee NO. 42

Item	Units	1976	1985	2000
Automobiles	thousands	1,833	2,369	2,721
Dwellings	thousands	1,435	1,674	2,103
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	30	33,000	346,000
Municipal Sewage and Trash	billion pounds1/	--	0.38	2.78
Agricultural Waste	billion pounds2/	--	0.5	36.6
Animal Waste	billion pounds3/	--	2.0	6.0
Windmills	No. of windmills4/	--	1	818

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Texas No. 43 AREA (sq. mi.) 267,338

	Units	1976	1985	2000
Population	thousands	12,487	14,233	17,554
Energy Consumption	trillion BTU's			
Oil	"	3,134	3,494	2,590
Natural Gas	"	4,213	4,110	4,195
Coal	"	135	758	2,593
Other - Nuclear, Hydro, Geo, Solar, etc.	"	22	263	1,233
Total	"	7,486	8,625	10,611
Electric Power Input (10,400 BTU/KWH)	"	1,822	2,520	4,052
Energy Produced				
Oil, Includes NGL	thousand B/D	4,030	3,375	2,000
Natural Gas	billion cubic ft/yr	7,220	6,020	4,150
Coal	thousand short tons	11,391	20,835	43,531
Electric Power Energy Source	Megawatts	41,840	51,773	73,922
Oil	"	657	971	-
Natural Gas	"	33,462	27,301	900
Coal	"	4,271	15,691	51,760
Nuclear	"	0	4,262	15,026
Hydro/Geo	"	383	409	1,731
Peak Shaving/Unknown	"	3,002	2,946	2,446
Other	"	65	193	2,059
Water	Million Gals/Day	1,103.16	1,013.61	886.87
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)				2 + 800
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	30	25	1
Coal	"	4	14	47
Nuclear	"	-	4	14
Hydro/Geo	"	1	1 s	2
Other	"	1s	1 s	2
Petroleum Refining	Barrels Per Day	3,539,379	3,539,379	2,839,379
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Texas NO. 43

Item	Units	1976	1985	2000
Automobiles	thousands	5,569	7,298	8,993
Dwellings	thousands	4,153	4,910	6,622
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	1,000	1,800	4,400
Coal Slurry Pipeline	Originates or terminates	--	--	#5 and #6 terminate
Solar Installations	No. in State	89	95,000	1,377,000
Municipal Sewage and Trash	billion pounds1/	--	1.15	8.98
Agricultural Waste	billion pounds2/	--	2.3	161.9
Animal Waste	billion pounds3/	--	10.1	30.2
Windmills	No. of windmills4/	--	9	9,677

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Utah No. 44 AREA (sq. mi.) 84,916

	Units	1976	1985	2000
Population	thousands	1,228	1,365	1,653
Energy Consumption	trillion BTU's			
Oil	"	207	228	167
Natural Gas	"	114	109	115
Coal	"	121	135	369
Other - Nuclear, Hydro, Geo, Solar, etc.	"	15	35	100
Total	"	455	507	751
Electric Power Input (10,400 BTU/KWH)	"	54	137	407
Energy Produced				
Oil, Includes NGL and Oil from Shale	thousand B/D	100	85	150
Natural Gas	billion cubic ft/yr	58	50	41
Coal	thousand short tons	7,055	12,516	26,150
Electric Power Energy Source	Megawatts	1,251	2,808	7,417
Oil	"	12	12	-
Natural Gas	"	0	-	-
Coal	"	958	2,415	6,467
Nuclear	"	0	-	-
Hydro/Geo	"	185	278	762
Peak Shaving/Unknown	"	96	94	94
Other	"	0	9	94
Water	Million Gals/Day	28.16	33.41	68.11
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	-	-	-
Coal	"	1	2	6
Nuclear	"	-	-	-
Hydro/Geo	"	1s	1s	1
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	135,280	135,280	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	1 (118)

STATE Utah NO. 44

Item	Units	1976	1985	2000
Automobiles	thousands	549	701	849
Dwellings	thousands	369	425	564
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	500	700	1,800
Coal Slurry Pipeline	Originates or terminates	--	--	#9 originates
Solar Installations	No. in State	36	8,000	112,000
Municipal Sewage and Trash	billion pounds1/	--	0.11	0.85
Agricultural Waste	billion pounds2/	--	0.1	9.4
Animal Waste	billion pounds3/	--	0.5	1.6
Windmills	No. of windmills4/	--	0	440

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Vermont No. 45 AREA (sq. mi.) 9,609

	Units	1976	1985	2000
Population	thousands	476	538	601
Energy Consumption	trillion BTU's			
Oil	"	79	88	60
Natural Gas	"	0	0	1
Coal	"	2	3	28
Other - Nuclear, Hydro, Geo, Solar, etc.	"	43	63	178
Total	"	124	154	267
Electric Power Input (10,400 BTU/KWH)	"	41	48	111
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	952	993	2,033
Oil	"	72	73	-
Natural Gas	"	0	-	24
Coal	"	32	30	560
Nuclear	"	527	563	863
Hydro/Geo	"	230	234	434
Peak Shaving/Unknown	"	89	87	87
Other	"	2	6	65
Water	Million Gals/Day	4.98	5.05	10.88
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1s	1s	-
Natural Gas	"	-	-	1s
Coal	"	1s	1s	1
Nuclear	"	1	1	1
Hydro/Geo	"	1s	1s	1s
Other	"	1s	1s	1s
Petroleum Refining	Barrels Per Day	-	-	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Vermont NO. 45

Item	Units	1976	1985	2000
Automobiles	thousands	212	275	307
Dwellings	thousands	159	186	227
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	36	4,000	23,000
Municipal Sewage and Trash	billion pounds 1/	--	0.04	0.31
Agricultural Waste	billion pounds 2/	--	0.1	4.7
Animal Waste	billion pounds 3/	--	0.2	0.6
Windmills	No. of windmills 4/	--	0	90

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Virginia No. 46 AREA (sq. mi.) 40,817

	Units	1976	1985	2000
Population	thousands	5,032	5,562	6,645
Energy Consumption	trillion BTU's			
Oil	"	956	1,045	758
Natural Gas	"	140	133	138
Coal	"	209	243	575
Other - Nuclear, Hydro, Geo, Solar, etc.	"	96	388	733
Total	"	1,396	1,809	2,204
Electric Power Input (10,400 BTU/KWH)	"	371	645	1,125
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	7	-	-
Coal	thousand short tons	36,259	39,773	83,098
Electric Power Energy Source	Megawatts	8,522	13,244	20,531
Oil	"	1,939	1,973	-
Natural Gas	"	189	149	260
Coal	"	3,068	2,887	7,636
Nuclear	"	1,588	4,603	6,927
Hydro/Geo	"	659	2,501	3,860
Peak Shaving/Unknown	"	1,079	1,059	1,059
Other	"	0	72	789
Water	Million Gals/Day	49.525	66.57	111.63
Facilities				
LNG (includes number and amount of GAS/YR.(Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	2	-
Natural Gas	"	1 s	1 s	1s
Coal	"	3	3	7
Nuclear	"	1	4	6
Hydro/Geo	"	1	2	4
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	47,170	47,170	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Virginia NO. 46

Item	Units	1976	1985	2000
Automobiles	thousands	2,516	3,198	3,816
Dwellings	thousands	1,654	1,897	2,477
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	60	38,000	418,000
Municipal Sewage and Trash	billion pounds 1/	--	0.45	3.40
Agricultural Waste	billion pounds 2/	--	0.3	23.3
Animal Waste	billion pounds 3/	--	1.1	3.2
Windmills	No. of windmills 4/	--	1	966

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Washington No. 47 AREA (sq. mi.) 68,192

	Units	1976	1985	2000
Population	thousands	3,612	3,848	4,400
Energy Consumption	trillion BTU's			
Oil	"	519	547	380
Natural Gas	"	173	159	157
Coal	"	74	97	204
Other - Nuclear, Hydro, Geo, Solar, etc.	"	1,184	1,294	2,114
Total	"	1,947	2,097	2,855
Electric Power Input (10,400 BTU/KWH)	"	710	1,217	2,105
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	3,875	4,667	9,751
Electric Power Energy Source	Megawatts	16,295	24,993	38,409
Oil	"	136	154	-
Natural Gas	"	0	-	-
Coal	"	1,413	1,330	2,936
Nuclear	"	805	7,179	10,535
Hydro/Geo	"	13,060	15,577	23,307
Peak Shaving/Unknown	"	881	865	865
Other	"	0	88	766
Water	Million Gals/Day	27.92	78.36	121.42
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1 s	1 s	-
Natural Gas	"	-	-	-
Coal	"	1	1	3
Nuclear	"	1	7	10
Hydro/Geo	"	12	14	21
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	322,536	322,536	232,536
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Washington NO. 47

Item	Units	1976	1985	2000
Automobiles	thousands	1,701	2,084	2,380
Dwellings	thousands	1,286	1,421	1,776
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	600	1,000	1,000
Coal Slurry Pipeline	Originates or terminates	--	--	#2 originates and #8 terminates
Solar Installations	No. in State	119	29,000	211,000
Municipal Sewage and Trash	billion pounds1/	--	0.31	2.25
Agricultural Waste	billion pounds2/	--	0.6	39.5
Animal Waste	billion pounds3/	--	0.9	2.6
Windmills	No. of windmills4/	--	1	1,383

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE West Virginia No. 48 AREA (sq. mi.) 24,181

	Units	1976	1985	2000
Population	thousands	1,821	1,879	1,924
Energy Consumption	trillion BTU's			
Oil	"	256	261	163
Natural Gas	"	192	170	151
Coal	"	931	1,037	1,929
Other - Nuclear, Hydro, Geo, Solar, etc.	"	6	43	97
Total	"	1,384	1,511	2,340
Electric Power Input (10,400 BTU/KWH)	"	527	642	962
Energy Produced				
Oil, Includes NGL	thousand B/D	27.7	20	10
Natural Gas	billion cubic ft/yr	153	100	70
Coal	thousand short tons	111,216	139,725	291,927
Electric Power Energy Source	Megawatts	12,107	13,185	17,547
Oil	"	0	-	-
Natural Gas	"	0	-	-
Coal	"	12,025	12,315	15,867
Nuclear	"	0	-	-
Hydro/Geo	"	0	771	1,349
Peak Shaving/Unknown	"	77	76	76
Other	"	5	23	255
Water	Million Gals/Day	65.77	70.65	97.61
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	-	-	-
Natural Gas	"	-	-	-
Coal	"	11	11	14
Nuclear	"	-	-	-
Hydro/Geo	"	-	1	1
Other	"	1s	1s	1s
Petroleum Refining	Barrels Per Day	17,311	17,311	-
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE West Virginia NO. 48

Item	Units	1976	1985	2000
Automobiles	thousands	650	771	789
Dwellings	thousands	631	675	756
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	#3 originates
Solar Installations	No. in State	18	14,000	84,000
Municipal Sewage and Trash	billion pounds1/	--	0.15	0.98
Agricultural Waste	billion pounds2/	--	0.1	6.2
Animal Waste	billion pounds3/	--	0.3	1.0
Windmills	No. of windmills4/	--	0	296

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

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3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Wisconsin No. 49 AREA (sq. mi.) 517,247

	Units	1976	1985	2000
Population	thousands	4,609	5,001	5,600
Energy Consumption	trillion BTU's			
Oil	"	595	639	434
Natural Gas	"	362	338	328
Coal	"	314	410	865
Other - Nuclear, Hydro, Geo, Solar, etc.	"	137	174	621
Total	"	1,405	1,561	2,248
Electric Power Input (10,400 BTU/KWH)	"	409	557	1,359
Energy Produced		-		
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons		-	-
Electric Power Energy Source	Megawatts	9,392	11,436	24,791
Oil	"	621	798	-
Natural Gas	"	202	160	234
Coal	"	5,659	6,613	17,160
Nuclear	"	1,562	2,466	5,301
Hydro/Geo	"	477	486	704
Peak Shaving/Unknown	"	871	855	855
Other	"	0	58	537
Water	Million Gals/Day	45.81	59.18	138.17
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	1	1	-
Natural Gas	"	1s	1s	1s
Coal	"	5	6	16
Nuclear	"	1	2	5
Hydro/Geo	"	1	1s	1
Other	"	-	1s	1
Petroleum Refining	Barrels Per Day	40,406	40,406	
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Wisconsin NO. 49

Item	Units	1976	1985	2000
Automobiles	thousands	1,982	2,472	2,766
Dwellings	thousands	1,559	1,755	2,149
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	119	36,000	218,000
Municipal Sewage and Trash	billion pounds 1/	--	0.40	2.86
Agricultural Waste	billion pounds 2/	--	1.1	75.2
Animal Waste	billion pounds 3/	--	2.8	8.4
Windmills	No. of windmills 4/	--	5	5,023

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw. capacity.

DATE _____

STATE Wyoming No. 50 AREA (sq. mi.) 97,914

	Units	1976	1985	2000
Population	thousands	390	454	487
Energy Consumption	trillion BTU's			
Oil	"	121	139	91
Natural Gas	"	107	107	100
Coal	"	138	249	390
Other - Nuclear, Hydro, Geo, Solar, etc.	"	22	44	85
Total	"	387	539	666
Electric Power Input (10,400 BTU/KWH)	"	154	265	413
Energy Produced				
Oil, Includes NGL	thousand B/D	393	350	250
Natural Gas	billion cubic ft/yr	331	300	200
Coal	thousand short tons	24,638	93,140	194,597
Electric Power Energy Source	Megawatts	3,545	5,450	7,534
Oil	"	0	-	-
Natural Gas	"	0	-	-
Coal	"	3,263	5,159	6,980
Nuclear	"	0	-	-
Hydro/Geo	"	219	223	429
Peak Shaving/Unknown	"	63	62	62
Other	"	0	6	63
Water	Million Gals/Day	94.82	102.60	135.71
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	-	-	-
Natural Gas	"	-	-	-
Coal	"	3	5	6
Nuclear	"	-	-	-
Hydro/Geo	"	1s	1s	1s
Other	"	-	1s	1s
Petroleum Refining	Barrels Per Day	166,733	166,733	
Coal Gasification -- High BTU	billion cubic ft/yr	0	0	1 (89)

STATE Wyoming NO. 50

Item	Units	1976	1985	2000
Automobiles	thousands	174	232	250
Dwellings	thousands	127	153	180
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	4,400	8,000	22,000
Coal Slurry Pipeline	Originates or terminates	--	--	#7 and #8 originate
Solar Installations	No. in State	24	3,000	29,000
Municipal Sewage and Trash	billion pounds1/	--	0.04	0.25
Agricultural Waste	billion pounds2/	--	0.2	14.1
Animal Waste	billion pounds3/	--	1.0	3.1
Windmills	No. of windmills4/	--	0	421

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

DATE _____

STATE Puerto Rico No. 51 AREA (sq. mi.) 3,435

	Units	1976	1985	2000
Population	thousands	3,211	3,671	4,390
Energy Consumption	trillion BTU's			
Oil	"	191	216	157
Natural Gas	"	0	0	0
Coal	"	0	0	0
Other - Nuclear, Hydro, Geo, Solar, etc.	"	17	41	431
Total	"	208	257	588
Electric Power Input (10,400 BTU/KWH)	"	162	230	407
Energy Produced				
Oil, Includes NGL	thousand B/D	-	-	-
Natural Gas	billion cubic ft/yr	-	-	-
Coal	thousand short tons	-	-	-
Electric Power Energy Source	Megawatts	3,724	4,733	7,425
Oil	"	2,098	2,536	900
Natural Gas	"	0	-	-
Coal	"	0	-	-
Nuclear	"	0	-	2,300
Hydro/Geo	"	91	593	900
Peak Shaving/Unknown	"	1,500	1,472	1,972
Other	"	35	132	1,353
Water	Million Gals/Day	19.93	18.67	34.32
Facilities				
LNG (includes number and amount of GAS/YR (Bcf)		-	-	-
Power Plants (Number--assuming each is a nominal plant capable of generating 1100 megawatts)				
Oil	"	2	2	1
Natural Gas	"	-	-	-
Coal	"	-	-	-
Nuclear	"	-	-	2
Hydro/Geo	"	1s	1	1
Other	"	1s	1s	1
Petroleum Refining	Barrels Per Day	207,700	207,700	200,000
Coal Gasification -- High BTU	billion cubic ft/yr	-	-	-

STATE Puerto Rico NO. 51

Item	Units	1976	1985	2000
Automobiles	thousands	1,284	1,836	2,634
Dwellings	thousands	803	918	1,098
Oil Shale Production	MMBD	--	--	--
Uranium Extraction	tons	--	--	--
Coal Slurry Pipeline	Originates or terminates	--	--	--
Solar Installations	No. in State	24	18,000	165,000
Municipal Sewage and Trash	billion pounds 1/	--	0.30	2.25
Agricultural Waste	billion pounds 2/	--	0.0	0.6
Animal Waste	billion pounds 3/	--	0.0	0.2
Windmills	No. of windmills 4/	--	1	857

1/ One billion pounds of municipal sewage and trash will produce 6 trillion BTUs of energy.

2/ One billion pounds of agricultural waste will produce 0.53 trillion BTUs of energy.

3/ One billion pounds of animal waste will produce 2 trillion BTUs of energy.

4/ Nominal windmill, 100 Kw capacity.

SECTION IV. GENERAL COMMENTS

It is as true at the State level as it is at the national level that effective energy planning and policy formulation must be linked to realistic forecasts of future supply and demand.

Energy forecasting at the national level, for example, has served to remind us that U.S. energy supplies in the not-too-distant future (e.g., 1990 and 2000) will depend in significant part on sources that are not now major contributors to the U.S. energy mix. U.S. consumption of nuclear, hydro, geothermal, solar and that category usually designated as "other" in energy resource charts is expected to go from 5,500 to 33,200 trillion BTUs (a more than 600 percent increase) by the end of this century. On the other hand, oil consumption (on which the United States so largely depends today) is expected actually to decline from about 35,000 to about 26,100 trillion BTUs (or 26.5 percent) during the same period and the consumption of gas is expected to decline from 20,200 to about 18,400 trillion BTUs (or some 9 percent).

Changes on a State basis can be expected to follow these trends on the average. But we know that there is and will continue to be much variability between individual States in energy consumption and production. It is only through a mechanism such as disaggregated national forecasting that it becomes possible to see the differences and changes in energy consumption and production that can be expected to occur in any particular geographic area or State.

Such disaggregation has been possible in the case of the Department of Commerce national-level energy forecast on which the State projections in this paper have been based. The authors hasten to add that the same should be true for other national-level forecasts prepared by other U.S. Government agencies or by firms and research organizations in the private sectors. In any case, the advantages to State resource planners of having the results of such disaggregations available for reference purposes in their own planning and forecasting efforts are obvious.

It is also recognized that there will be rigidities in projections applying at the State level that are derived solely from the disaggregation of national level forecasts. These can be dealt with or modified only by specific analysis of the factors affecting future energy supply and demand in each State that may not have been taken into account at the higher levels of aggregation in the national forecast. The

judgment factors that necessarily must be introduced in such forecasts should have a local basis. Thus, it is strongly recommended that the projections contained in this paper be reviewed and assessed by appropriate agencies within the various States. Until such review occurs, and its results are incorporated in revised projections, they must be viewed as tentative and preliminary.

The above is not intended to imply that energy/resource planning and forecasting have been absent at the State level. Many States have in fact undertaken extensive assessments of the energy situation within their areas and have developed specific plans to cope with energy supply needs that are expected to evolve in the years ahead. What is not clear, however, is whether such State plans and accompanying forecasts have been developed in the context of a national energy supply/demand balance (or even a regional balance) under the constraint that State totals must add to a single national total on both the production and consumption sides. It is assumed that this has generally not been the case.

Moreover, even though preliminary in nature, the State projections presented in this paper point up the potential value of greater interaction between national, regional and State level energy planning. The need for such interaction is highlighted by what was perhaps the major difficulty faced in developing these projections: the assignment of specific energy production or energy conversion facilities (i.e., oil refineries, LNG terminals, coal gasification plants, and electrical power generating plants) to particular states. As noted earlier, such assignment -- even though past trends and careful judgment were used -- often had to be arbitrarily done.

It is recognized that when site selections are actually made in the future, they are likely to be highly charged politically. The cry may be heard, "Why should our State assume the environmental and other burdens necessary to keep your State warm or your factories running?" There will, of course, be countervailing forces at work in such cases, e.g., the need to sustain economic growth, employment, reduce the tax base, etc. On whatever basis these potential problems of interregional and interstate divisiveness in the energy area are solved, however, the ultimate distribution of the mix of energy production and supply systems may be quite different from that which makes apparent sense at this time. This points up even more the value of an integrated national-regional-state energy planning approach which can take such problems into account at an early date.

Finally, it will be noted, particularly in the electricity area, that individual State totals in some instances may seem unexpectedly high at first blush and the mix of fuel sources to provide electricity seem out of keeping with current trends. The 32 nuclear power plants projected for California in the year 2000 is a case in point.

In commenting on this, we need to start, first of all, with the reminder that the Commerce national-level energy forecast on which the State projections are based is on the low side (for energy growth rates and energy consumption levels) among existing standard forecasts. The Commerce forecast projects a slower energy consumption growth rate (2 percent/year over the period) compared to other national forecasts (3 percent or more for most). In the electricity area, the Commerce forecast projects only a 3.4 percent per year rate of growth for the period, much lower than other available forecasts.

Even with these low growth rates and low electrical capacity levels, however, the Commerce forecast projects the need for some 264 nuclear electrical power plants (normalized at 1100 Megawatts for computational purposes) by the year 2000. Apportioned among the States, this means 3 such plants in Rhode Island, 11 in North Carolina, 22 in New York and 32 in California. These numbers may seem extreme to some. The total number required (264) was considered low in 1976 and even today (as the laborious permit process continues to lengthen and construction schedules slow nearly to a halt) the number is considered low or in the mid-range.

On the other hand, if this number of projected nuclear plants is not built during this period, what are the options? Hydroelectric potential is limited (the projections in fact call for a major expansion in hydro-generation capacity) and the conversion of coal to gas to heat boilers to create steam-generated electricity is both expensive and inefficient. Coal-fired electrical generating plants are the obvious alternative.

Most forecasts place major dependence on western U.S. sources for reaching 1985 and the year 2000 coal production goals. The State projections contained in this paper see Wyoming going from 25 million tons in 1976 to 195 million tons in the year 2000; Montana goes from 23 to 85 million tons in the same period; and Illinois goes from 61 to 168 million tons. Colorado increases coal production by 350 percent during this period and

Ohio by more than 100 percent. The question is -- can we expect increases of a much greater magnitude?

Looking at Eastern coal, more than one-half of which is deep-mined, the State projections in this paper indicate that West Virginia will have to go from 111 to 292 million tons of coal production and Kentucky from 147 to 342 million tons to meet the overall national totals. These represent major expansions in coal production. Is greater expansion possible? If not, and if expansion of Western coal beyond that forecast in the State projections is limited, and the projections of nuclear plants are deemed unrealistic, then the only option remaining is vastly reduced electrical consumption and all that implies.

Thus the value of disaggregating national energy forecast values into State-level projections becomes apparent. Many of the fundamental issue still to be resolved in dealing with the national energy problem stand out in a clearer light: Can the United States build the number of nuclear and coal-burning electrical utility plants projected as needed, given the environmental, safety and resource problems to be faced? Can reliance be placed on the so-called inexhaustible or renewable energy resources to see us through the difficult period of transition from fossil-fuel-based energy? If the energy shortfall is to be made up in imports from abroad, will the energy (oil) be available and, if available, will the United States be able to afford the cost? If major reductions in energy consumption (beyond those already built into the Commerce energy forecast on which these State projections are based) are necessary, can needed levels of employment, GNP and standards of living be maintained -- if so with how much less energy?

These are questions and issues that must be faced and dealt with at the State and regional, as well as at the national level.

BIBLIOGRAPHY

BIBLIOGRAPHY

"Gas Supply Review," American Gas Association, July-August, 1977, Volume 5, Nos. 10-11.

"Inventory of Power Plants in the United States," Federal Energy Administration, June, 1977.

"Mineral Industry Surveys," U.S. Department of the Interior, Bureau of Mines, Coal--Bituminous and Lignite, 1975.

"Coal Fields of the United States," U.S. Geological Survey, U.S. Department of the Interior.

National Coal Association, May 12, 1977, letter to the President from Carl E. Bagge.

"A Study of New Mine Additions and Major Expansion Plans of the Coal Industry," National Coal Association, August, 1976.

Fuels and Energy Data, 1973 and 1974, Bureau of Mines, U.S. Department of the Interior.

Project Independence, Project Independence Report, Federal Energy Administration, November, 1974, Map entitled "Geothermal Resources--Areas of Promise," p. 149.

"LNG Fact Book," American Gas Association, December, 1977, exhibit K1, K2 and K5.

"Interim Revisions of State Projections" (OBERS Program), Bureau of Economic Analysis, U.S. Department of Commerce.

"Forecast of Likely U.S. Energy Supply/Demand Balances for 1985 and 2000," U.S. Department of Commerce.(NTIS PB 266 240)

November 16, 1977 letter to Secretary Kreps from Gary J. Wicks, Deputy Assistant Secretary for Land and Water Resources, U.S. Department of the Interior.

"Twentieth Century Petroleum Statistics 1977," DeGolyer and MacNaughton.

"The Oil and Gas Industry in Your State, 1977," published by the Independent Petroleum Association of America IPAA.

"An Analysis of the Per Capita Energy Consumption by States Based on 1972-74 Data," Gustaferro and Stanley, April, 1977.

February 1, 1978, letter to Mr. Gary J. Wicks from James W. Curlin, Deputy Assistant Secretary for Policy, U.S. Department of Commerce (containing Energy/Water Requirements for Each Region).

November 15, 1977, letter to Mr. Roswell Wing from Randolph R. Newton, Division of Technology Overview, Department of Energy (containing the Water Planning Figures for Energy).

Nationwide Analysis Summary (Preliminary Draft -- For Review Only), U.S. Water Resources Council, April 1977.

APPENDIX A

Excerpts from

Department of Commerce Energy Forecast

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-266 240

Forecast of Likely U.S. Energy Supply/Demand Balances for 1985 and 2000 and Implications for U.S. Energy Policy

Domestic & International Business Administration, Washington, DC

20 Jan 77

Figure A-1

Historical and Most Probable U.S. Energy Forecasts for 1985 and Year 2000

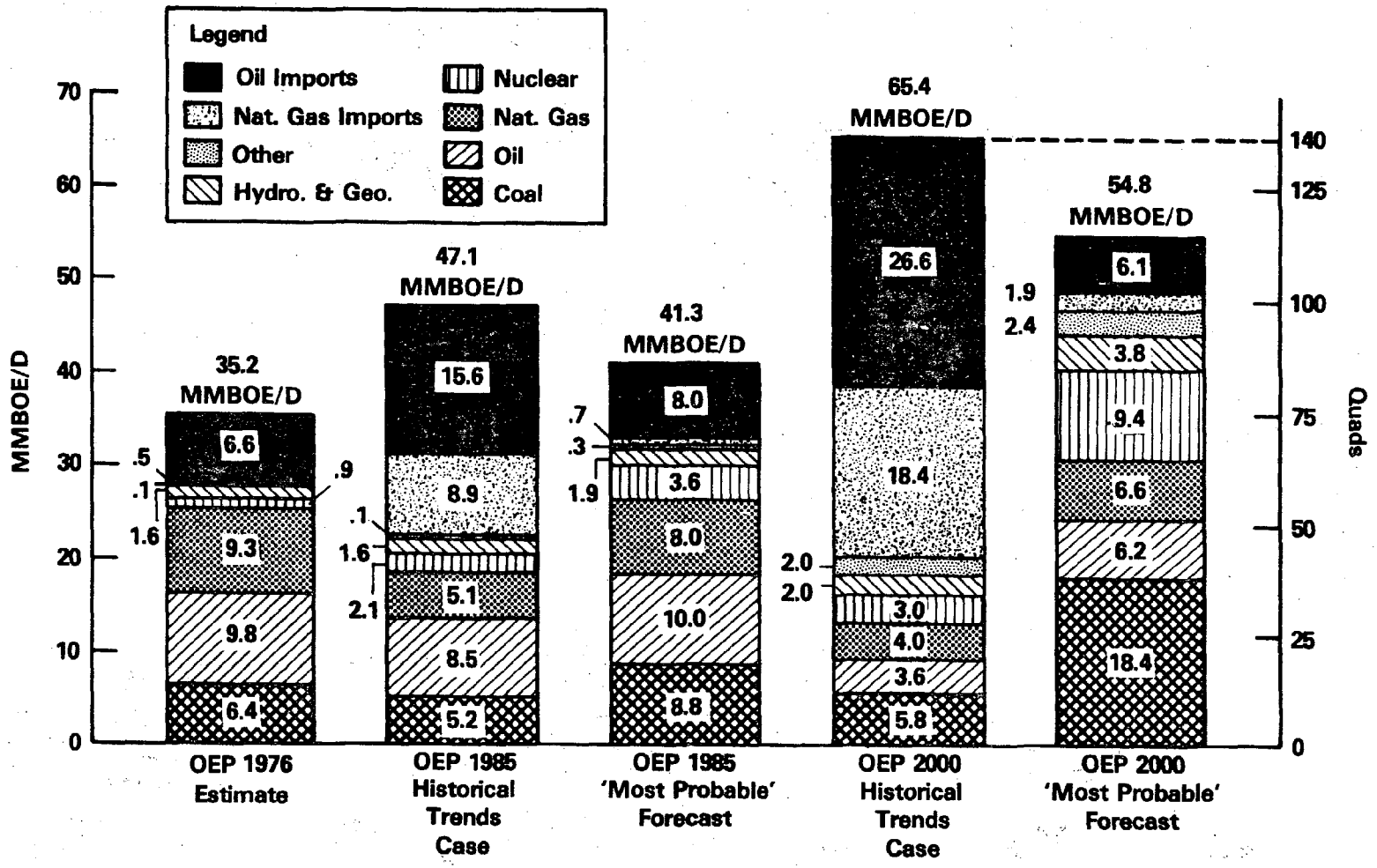

TABLE XVII (c)

REQUIREMENTS FOR ELECTRICAL CAPACITY *

Type	1976 T.Min.1/	1976 Actual	1976 Ratio2/	1985 T.Min.1/	1985 Ratio2/	1985 Est.Req.	2000 T.Min1/	2000 Ratio2/	2000 Est.Req.
Nuclear	21,118	45,600	.46	84,474	.60	141,000	217,351	.75	290,000
Hydro/Geoth.	35,958	65,600	.55	43,607	.55	79,200	86,986	.55	157,000
Other	456	1,000	.46	1,826	.55	3,300	21,689	.60	36,200
Coal	106,963	219,200	.49	141,210	.53	266,000	311,301	.55	566,000
Gas	31,191	66,000	.47	25,114	.47	53,500	6,278	.47	13,300
Oil	32,305	66,000	.49	38,356	.49	78,000	- 0 -	-	-
Peak Shaving	-	48,600				48,600			48,600
Total	228,000	511,000	.45	334,600	.50	669,600	643,605	.60	1,111,000

1/ A theoretical minimum capacity to produce electricity indicated in Table VII (100% availability, 0 Reserve, 100% Load factor)

2/ A calculation ratio which sums availability of machinery and load factor.

* In Megawatts

FORECAST ASSUMPTIONS

The critical assumption in the national forecast relates to the rates of energy consumption and production growth.

The forecast assumes an approximate 1.2 percent per capita rate of energy consumption growth over the forecast period. This is much less than during the decade of the 60's and early 70's and is lower than the rate used in most other energy forecasts. The reasons for selecting this difference are:

- Energy consumption patterns have clearly undergone some real change since the 1973-74 crisis and consumption growth levels have decreased.
- The U.S. appears to be approaching "energy saturation" on a per person basis under existing patterns of income distribution, e.g., large energy consuming items such as automobiles and air-conditioners are approaching total market penetration.
- Government conservation legislation and public awareness programs will have increasing impact on energy consumption.
- Increasing energy prices will also have a dampening effect on consumption.
- Technology in the form of energy-saving devices, lighter materials, etc., will contribute to reduce per capita energy use.

In short, the forecast asserts that energy growth projections must be viewed in the light of recent events. Thus the forecast projects that per capita primary energy consumption will grow at the rate of about 1.2 percent per year (as compared to a rate of 1.5 percent since 1947) and that overall U.S. energy consumption will grow at approximately 2 percent during this period.

The following additional assumptions, it is believed, also reflect the political, social and economic realities of the United States in the near future. Although these statements are subject to debate, we rate their probability of fulfillment to be high:

- GNP will continue to grow at the 50-year historical rate of 2.2 percent per year per capita, or about 3 percent overall per year in constant dollars.

- The population growth rate will continue to decrease and in 1985, U.S. population will be about 234,000,000 and in the year 2000, about 262,000,000. (Census Bureau-Series II).

- There will be no OAPEC embargo; the cartel will hold.

- That the United States will not be involved in any major wars or limited wars such as Viet-Nam.

- The strategic petroleum storage program (EPCA) will be implemented.

- Until 1985, OPEC will continue to export 28 to 38 million barrels of oil per day (MMBD) at a price equal to or only moderately exceeding the current dollar rate adjusted for future inflation. After 1985, the price increase will accelerate commensurate with the increasing world-wide demand and the ultimately decreasing world supply world-wide of petroleum.

- Interstate natural gas will approach the price of oil on a BTU basis.

- The U.S. public will become increasingly conservation-conscious as a result of higher energy prices as well as of the national awareness programs conducted by the public and private sectors.

- That the business and public view of energy has changed since 1973 and that henceforth all architects, engineers and product designers will apply energy efficiency standards.

- That there will not be any new invention or development comparable to the automobile or air conditioning in this short time frame which requires large quantities of energy, or if developed, it will have its own renewable energy source or will not penetrate the mass market to an appreciable degree.

- There will be some accommodations, on a case-by-case basis, between Clean Air Act requirements and the proposals to utilize coal in generating electricity. There will also be some lessening of environmental standards as they are applied to automobile NOX emissions.

- And finally, that the current U.S. energy resource base as estimated by the Department of Interior's Geological Survey Circular II 725 (June 1975) is correct.

It should be noted that the assumptions underlying the forecast exclude either "miracles" or "manacles." That is to say dramatic, unforeseen technological breakthroughs that might suddenly change the energy picture are not provided for. Neither is it expected that the American public will accept direct controls or direct energy rationing in the absence of a clear and present crisis (e.g., embargo) or as long as the deficit in the energy balance can be made up with foreign oil at a price competitive with the cost of alternate fuels.

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