1991 Pacific Northwest Loads and Resources Study, Pacific Northwest Economic and Electricity Use Forecast

Technical Appendix: Volume 1

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1991 PACIFIC NORTHWEST ECONOMIC AND ELECTRICITY USE FORECAST

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Bonneville Power Administration
Power Forecasting Branch

March 16, 1992

MASTER

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Energy Resources Development and Implementation Process

This document presents the compilation and analysis of information developed during several distinct activities which are part of BPA's Energy Resources Program.

The flow chart below illustrates how the Energy Resources Program works. Broadly speaking, the program has two primary functions--resource planning, and resource management. The first three blocks in the chart cover most of the planning tasks.

What Are the Needs of Our Customers?

To define the overall situation, BPA first assesses what the energy needs of customer utilities are likely to be over a 20-year planning horizon. Projections are developed and published jointly with the Northwest Power Planning Council. Also part of this initial step are forecasts of how much energy is available from existing Federal resources. BPA then compares demand and supply estimates in a Loads and Resources Study (this document), also known as the Whitebook.

What Choices Do We Have to Meet Those Needs?

The second step is to identify all the available alternatives for meeting customer needs. BPA develops resource supply forecasts for both generation and conservation resources. These studies also consider such factors as environmental and regulatory constraints, new technologies, and public opinion. Other efforts include examining opportunities for coordinating hydro system operations with Canada and arranging power purchases and transfers with Canadian and Southwest utilities.

How Can We Best Meet Those Needs?

Step three involves weighing the available alternatives and their consequences to arrive at the most appropriate and cost-effective resource mix for the short-term. Developing the Resource Program is a public review process in which BPA's customer utilities and other interested parties have an opportunity to influence resource decisions. The process focuses on a specific multi-year planning period, i.e., the 1990 Resource Program focuses on Fiscal Years (FY) 1992 and 1993, and the 1992 Resource Program, currently in draft form, focuses on FY 1994 through 2003. Preliminary results of this process are included as planned acquisitions in this document.

What Are We Doing to Meet Customer Needs?

From planning and strategy, BPA then moves to step four--meeting customer power needs. Based upon the policies and directives in the Resource Program, managers draw up an overall plan to capture the conservation available in the region's homes, factories, and offices. This results in many programs and projects, ranging from about 25 to 40 in any year. In the past, BPA teams have designed and managed most conservation programs. Now, utilities and other power producers are sponsoring their own programs with BPA support.

Bonneville is responsible for planning and acquiring generating resources--both conventional and renewable. Another part of step four is BPA's oversight function--seeing that BPA gets value from contracts for generated power.

How Well Did We Meet Those Needs?

Finally, in step five, BPA looks at how well it is doing its job. It is agency policy to evaluate all programs. Evaluation provides a means of comparing initial objectives with actual results. It is essential for verifying the energy savings from conservation programs and understanding the quality of our actions to acquire the energy.

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I. INTRODUCTION

This publication provides detailed documentation of the load forecast scenarios and assumptions used in preparing BPA's 1991 Pacific Northwest Loads and Resources Study (the Study). This is one of two technical appendices to the Study; the other appendix details the utility-specific loads and resources used in the Study. The load forecasts and assumptions were developed jointly by Bonneville Power Administration (BPA) and Northwest Power Planning Council (Council) staff. This forecast is also used in the Council's 1991 Northwest Conservation and Electric Power Plan (1991 Plan).

Range of Forecasts

The forecast of electricity use described in this document consists of five distinct scenarios -- high, medium-high, medium, medium-low, and low -- representing different levels of regional economic activity and energy use. Preparing for a range of possible futures has become the cornerstone of both BPA and Council planning efforts. The two groups have, however, maintained a slightly different emphasis. The Council, which is responsible for preparing and periodically updating a Regional Power Plan, focuses on the entire range of loads falling between the medium-high and medium-low cases (designed to represent 50 percent of expected variation), and assigns equal probability to loads falling anywhere in that range, with no single "most likely" case.

Because BPA actually must acquire and schedule the operation of specific resources to meet future demand, it focuses part of its planning process on a "most likely" projection of medium-case loads which is roughly in the center of the medium-high to medium-low range between the medium low and medium high scenarios. BPA assumes that the probability of loads being between the medium-low and low or between the medium-high and high are 20 percent each. The probabilities of loads being either below the low or above the high case are each 5 percent. BPA assumes that the probability of loads being between the medium and medium-high or medium and medium low are each 25 percent. (See Figure 1).

Figure 1
Future Load Probabilities

BPA updates the medium case annually for use in the Study, which must be published prior to the beginning of each calendar year. BPA uses the medium-case forecasts for operations, financial planning, rate setting, and contract administration purposes, in addition to resource planning. The forecast range (low thru high) is also used in the Study, but is updated only as needed, not necessarily annually.

This document focuses on the medium case, which constitutes the baseline for BPA's resource planning related to specific customer needs. For the 1991 forecast, the medium case uses BPA's projection of electricity prices and incorporates BPA's midterm forecast in the near term (through 1994). The midterm forecast, developed primarily for ratemaking purposes, differs in approach from the long-term forecast in several ways. The long-term forecast is organized by consuming sector and is developed using models which, for the most part, are not sensitive to business cycles or other short-term fluctuations in the economy. These long-term load projections capture structural changes in energy use and provide detailed information on energy end-use used to estimate conservation supply for resource planning. The midterm forecast is organized by rate pool (or class of customer) and is developed using econometric models that explicitly represent the effects of both cyclical economic activity and weather fluctuations. This level of detail and sensitivity is needed for ratemaking purposes and near-term operational planning. These two forecasts, long-term and midterm, are merged in the medium case to produce a 20-year projection of loads that takes into account the near-term effects of the cyclical economic activity used in developing BPA's near-term wholesale rates, while providing the energy use detail and expected longer term structural changes needed for resource planning.

This document describes the 1991 long-term forecast developed jointly by BPA and the Council. Section II contains an overview of the methods and rationale underlying the forecast range, and explains how the inevitable uncertainties of resource planning are accommodated.

Section III presents the forecast of regional economic activity, which drives load growth in each of the consuming sectors. This section focuses in particular upon the near-term outlook through 1995. Section IV presents a summary of the 1991 load forecast and describes how the midterm forecast is produced, how the midterm and long-term forecasts are merged, and how the merged annual forecast is converted to monthly loads. Section V presents the electricity prices underlying the load forecast and describes the Supply Pricing Model used to estimate rates. Section VI presents detailed, sector-by-sector descriptions of forecast results, forecasting methods and recent trends.

Finally, Appendix A reproduces the documentation of the 1991 load forecast from the Council's 1991 Plan. This documentation is particularly well suited to those wanting a general overview of the forecast range and the broader role of forecasts in resource planning.

II. FORECASTING CONCEPTS AND METHODS

Forecasting Uncertainty

Before describing the specifics of BPA's long-term forecasts, it is helpful to consider the resource planning uncertainties that BPA must confront as a regional power provider. Prior to producing its first independent forecast in 1982, BPA's role in preparing for future electricity sales growth was confined largely to its participation in the Pacific Northwest Utilities Conference Committee's (PNUCC) Sum-of-Utilities (SOU) forecast. This forecast was, and still is, prepared by adding together the long-term sales forecasts developed by individual utilities in the region. A single aggregate forecast, rather than a range of forecasts, formed the basis for resource planning. This approach, unfortunately, provided little room for flexible response on the part of resource developers if and when conditions changed.

Changes that took place in the operating environment of the utility industry during the late 1970s and early 1980s underscored the need to prepare for potentially significant changes in conditions affecting future loads. The effects of rapid increases in fossil fuel prices, substantial overruns in the costs of new thermal generation facilities, and an unexpectedly severe recession combined to slow the growth rate of regional electricity demand to unprecedented low levels. The region, preparing for power deficits, found itself instead with substantial surplus--a situation that required a rethinking of how forecasts were prepared and resources acquired.

Beginning with BPA's 1982 forecast, and with the Council's 1983 forecast and plan, a different forecasting approach designed to better reflect load uncertainty was adopted. A series of distinct scenarios were developed to represent different levels of economic activity and different conservation policy choices. End-use and econometric models were used to forecast demand for each of the major consuming sectors (residential, commercial, industrial, and irrigation) in conjunction with an electricity pricing model designed to determine retail rates. For each of the scenarios, different assumptions were made about levels of economic activity, energy uses, and costs and availability of new resources, including conservation. This approach made it possible to evaluate resource acquisition plans under a wide variety of possible future conditions. Probabilities were assigned to each scenario to indicate the forecasters' estimates of the likelihood that actual loads would exceed those projected. By using this series of forecasts and associated probabilities, along with projected costs and schedules for new resources, it was possible to determine a least-cost mix of resources. This general approach continues to be used by BPA and the Council.

The concept of uncertainty is easily misunderstood: it does not refer merely to the lack of precision or accuracy inherent in the models used to develop projections of load growth. It addresses the lack of determinism in real-world events and trends. Decisions that have yet to be made, or unexpected events that have yet to take place, inevitably will shape future energy demand. The range approach rests upon a recognition of this inevitability, and rather than attempt to predict the exact conditions that will occur, seeks to develop a series of forecast scenarios that encompass the effects of plausible variations in the factors that determine loads.

The medium case represents a continuation of "business-as-usual" conditions, the other cases, particularly the low and high, represent pessimistic and optimistic variations of the "most likely" case. The subjective probabilities attached to each of the forecasts establish a distribution of possible future outcomes. Each of the forecasts represents a different, unique possible set of conditions. While the models and data used to develop the forecasts certainly could be improved upon, improvements would not necessarily narrow the "bandwidth" of possible loads defined by the range.

Forecasted loads generally are described in terms of 20-year (and sometimes 5- and 10-year) average annual rates of growth (AARGs). Care is needed when comparing growth rates of different studies.

These rates of growth are calculated using the most recent actual weather-normalized sales values. Year-to-year changes in sales, however, fluctuate around "normal" rates of growth as a result primarily of business cycles. Because of this, if most recent actual sales reflect lower than normal sales (e.g., a brief downturn in the business cycle), 20-year forecasted growth rates may appear significantly higher than the growth rates in a subsequent year's forecast when the base year sales are higher, even though the outyear sales values are virtually the same. Figure 2 shows the growth rates for 4 historical 5-year increments and the projected growth rates for each of the five ranges.

Figure 2
Historical and Projected Growth Rates

Growth rates also may mislead if short-lived trends of the recent past are compared to projected long-term load growth rates. During the early 1980s, a deep recession in the region resulted in severely reduced rates of growth in electricity sales. By contrast, the late 1980s were characterized by strong recovery and accelerating load growth. Both of these trends were relatively short lived; either of them provides a poor basis for evaluating the long-term trend described in the medium case. Compared to the first, projected sales would appear wildly optimistic. Compared to the latter, they would appear unduly pessimistic. Long-term projected rates of growth should be evaluated primarily against long-term historical trends. Near-term differences should result in forecast revision only when analysis suggests that the factors driving the trends will be long-lived and significant over the life of the forecast.

One of the major uncertainties power planners must face is what the economy will do. Economic activity drives the use of energy and, as noted above, the different cases in the range describe different possible economic conditions. The following section describes the economic forecast underlying the 1991 Pacific Northwest Loads and Resources Study.

III. REGIONAL ECONOMIC AND DEMOGRAPHIC FORECASTS

Regional Economic Model (REM)

The baseline employment and population projections used in BPA's medium case forecast were produced using BPA's Regional Economic Model (REM), with review and adjustment of model results by BPA industry analysts. The REM is linked to a macro forecast of the national economy supplied by the WEFA Group, Inc., based in Bala Cynwyd, Pennsylvania.

The REM forecasts major economic and demographic variables (employment, population, households, and income) for each state in BPA's service region (Washington, Oregon, Idaho, and Western Montana). Model equations define historical relationships between key regional manufacturing and nonmanufacturing industries and national economic trends. Since the REM extrapolates historical trends into the future, model projections may not be properly characterized in the forecast when recent events cause deviations from the past. Therefore, model projections are reviewed and adjusted by industry analysts as necessary to incorporate PNW region-specific information for key industries which has not been adequately reflected in the model-generated forecast.

As presently configured, REM actually consists of four models operated independently of one another to produce an economic forecast for each state. Each state model consists of four basic components: income, wages, population, and employment. The forecasts of employment, households, housing and income are used by the various energy load models to define projected electricity requirements for the region.

1991 Economic Forecast. The current medium case forecast is a blend of near-term and long-term projections. BPA prepares a midterm economic forecast at least twice each year, first for Pacific Northwest Coordination Agreement (PNCA) planning purposes, then for incorporation in the annual loads and resources study. If the midterm forecast indicates a fundamental shift in the near-term outlook, it is merged with the long-term forecast in order to adjust for the expected change in employment. For the 1991 Pacific Northwest Loads and Resources Study, the medium case forecast presented here was prepared as a cycle forecast through 1994 and as a trend forecast beyond 1995.

The medium case economic forecast presented here differs from the employment projections used to drive the energy load models for the long term electricity forecast for the period after 1995. The forecast below was used to develop the electricity forecasts for 1991 to 1994 and then merged with the forecast prepared jointly by the Northwest Power Planning Council and BPA for the 1991 Plan Update. Appendix A details the 1991 joint forecast.

The forecast presented below incorporates recent macroeconomic and regional trends and is an alternative to the joint Council/BPA forecast. Table 1 presents the differences between the joint forecast and the alternative forecast developed independently by BPA. The alternative BPA forecast did not significantly alter the electricity forecasts for the planning period beyond 1995 so the joint forecast was used for the 1991 Whitebook Forecast. For the period 1991 to 1995, the forecast presented below was used for the purpose of incorporating near term revisions. For completeness, both the near term revisions to the joint Council/BPA forecast and the BPA long term alternative are presented.

Table 1
Total Nonagricultural Employment
1991 Forecast Differences
(Joint Final Plan vs. BPA Alternatives
(in Thousands)

	Washington	Oregon	Idaho	Montana	PNW
1990	-17.20	-4.25	-2.02	0.00	-23.47
1995	-85.87	-42.72	-14.59	0.00	-143.19
2000	-72.34	-29.38	-9.38	0.00	-111.11
2005	-62.13	-19.93	-5.69	0.00	-87.76
2010	-30.10	-16.55	0.00	0.00	-46.65

The forecasts for Western Montana and for the agricultural sectors remain unchanged from forecasts presented in Chapter 5 of the Council Plan, since only Washington, Oregon and Idaho employment projections are included in BPA's midterm economic forecast.

Historical Regional Economic Activity (1980-1990)

Although employment growth in the Pacific Northwest slowed during 1991, the region's economy has remained strong since 1987. Table 2 indicates that in terms of employment growth, the Northwest economy has outperformed the U.S. economy since 1986.

Table 2
Regional and National Nonagricultural Employment
(Annual Year-to-Year Growth Rate, Percent)

Year	Pacific Northwest	United States
1986	2.6	2.1
1987	4.1	2.7
1988	4.9	3.3
1989	5.0	2.7
1990	4.5	1.8
1991	1.8	-0.7

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest,
 August 1991.

The annual rate of growth in regional employment from 1987 through 1991 averaged 4.1 percent, compared to a 1.8 percent average annual rate of growth for the U.S. economy as a whole.

Table 3 presents historical nonagricultural employment levels by state and for the region as a whole from 1980 through 1990. Employment in the region increased from 3,079,400 in 1980 to 3,889,200 in 1990, representing an average annual rate of growth of 2.4 percent for the decade.

Table 3
Total Nonagricultural Employment by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1980	1609.6	1044.5	330.2	95.1	3079.4
1981	1612.8	1019.6	327.9	94.1	3054.3
1982	1568.6	961.7	312.3	93.1	2935.7
1983	1586.9	967.1	317.9	92.1	2963.9
1984	1659.3	1006.9	330.5	91.2	3087.9
1985	1710.2	1030.0	336.0	90.3	3166.5
1986	1769.6	1058.3	328.3	91.4	3247.5
1987	1852.0	1100.2	333.5	92.4	3378.1
1988	1943.1	1155.7	348.5	93.7	3541.0
1989	2052.1	1209.2	365.8	97.4	3724.5
1990	2155.2	1248.7	386.8	100.0	3889.2

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Regional economic activity rebounded strongly from the deep recession of the early 1980s. This is particularly true in manufacturing industries, where regional employment (including Montana) increased by 71,700 since 1980, reaching 663,700 in 1990. Although manufacturing employment recovered from recessionary levels, most new jobs occurred in the nonmanufacturing sectors. Nonmanufacturing accounted for nearly 85 percent of all new jobs since 1986, with construction, services, and trade employment leading the way. Growth in nonmanufacturing employment from 1986 through 1990 averaged 4.7 percent annually.

Tables 4 and 5 detail manufacturing and nonmanufacturing employment levels for the Pacific Northwest since 1980.

Table 4
Total Manufacturing Employment by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1980	309.7	215.2	53.3	13.8	592.0
1981	306.0	202.9	52.7	13.3	574.9
1982	289.0	185.9	47.8	12.9	535.6
1983	278.4	188.9	51.5	12.5	531.2
1984	288.0	201.2	54.8	12.0	556.0
1985	295.5	199.3	54.7	11.6	561.2
1986	305.0	198.6	52.1	11.9	567.4
1987	318.4	206.2	54.3	12.2	591.2
1988	341.9	214.1	57.8	12.5	626.3
1989	362.6	218.4	60.5	12.9	654.5
1990	369.0	218.8	62.8	13.1	663.7

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Table 5
Total NonManufacturing Employment by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1980	1299.9	829.3	276.9	81.3	2487.4
1981	1306.8	816.7	275.2	80.8	2479.5
1982	1279.6	775.8	264.5	80.2	2400.1
1983	1308.5	778.2	266.4	79.7	2432.8
1984	1371.3	805.7	275.7	79.2	2531.8
1985	1414.7	830.7	281.3	78.7	2605.3
1986	1464.6	859.7	276.2	79.5	2680.1
1987	1533.6	894.0	279.2	80.3	2787.1
1988	1601.2	941.6	290.7	81.2	2914.7
1989	1689.5	990.8	305.3	84.5	3070.0
1990	1786.2	1029.9	322.5	87.0	3225.6

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Regional Economic and Demographic Forecast (1990-2010)

The rapid pace of economic growth in the region slowed during 1991 as the robust economic performance since 1987 was constrained by recessionary conditions in the national economy. The severity of the national recession was aggravated by the impact of higher oil prices, the conflict in the Persian Gulf, and a severe deterioration in consumer confidence. Forecasts of national economic activity from The WEFA Group, Inc. call for recession through mid-1991 and economic recovery beginning in 1992. Stronger growth is projected during 1992 and 1993.

Table 6
Regional and National Nonagricultural Employment Forecasts
(AARG, Percent)

Year	Pacific Northwest	United States
1990	4.5	1.8
1991	1.8	-0.7
1992	2.2	2.1
1993	2.0	1.9
1994	1.8	1.7
1995	1.8	1.8
1995 - 2000	1.5	1.6
2000 - 2005	1.4	1.2
2005 - 2010	1.2	1.0

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Table 6 shows a sharp drop in regional employment growth, from 4.5 percent in 1990 to 1.8 percent in 1991. Region nonagricultural employment growth is projected to be slightly higher than the national

average employment growth rate throughout the forecast period. Pacific Northwest nonagricultural employment is projected to increase at a 1.5 percent average annual rate while national employment growth is projected to increase 1.3 percent annually through 2010. The region's relatively faster employment growth (see Table 7) reflects four factors: 1) positive but slow employment growth throughout the recession year 1991, 2) a mix of faster-growing manufacturing industries, 3) more robust nonmanufacturing activity, and 4) greater in-migration and population growth.

Table 7
Total Nonagricultural Employment Forecast by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1990	2155.2	1248.7	385.3	100.0	3889.3
1991	2197.5	1267.2	395.1	100.7	3960.5
1992	2245.9	1295.9	405.7	102.1	4049.6
1993	2292.2	1322.5	412.7	103.9	4131.3
1994	2332.9	1348.4	419.3	105.7	4206.2
1995	2379.2	1370.7	426.0	107.5	4283.3
2000	2566.4	1474.8	460.0	118.0	4619.3
2010	2918.2	1700.5	523.4	135.6	5277.7

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Chapter 5 of the Council's Plan Update similarly projects long-term total regional nonfarm employment growth at 1.5 percent annually for the period 1990-2010.

Table 8
Total Manufacturing Employment Forecast by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1990	369.0	218.8	62.8	13.1	663.7
1991	368.0	214.8	63.3	12.5	658.6
1992	372.1	217.9	65.5	12.5	667.9
1993	375.1	220.6	66.9	12.6	675.2
1994	378.0	221.4	67.1	12.7	679.2
1995	379.2	222.3	67.4	12.9	681.7
2000	377.4	222.1	67.3	13.1	679.9
2010	369.0	233.8	67.4	13.5	683.6

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

The growth in manufacturing employment in the Pacific Northwest (see Table 8) has slowed significantly from the brisk pace of recent years (4.0 percent average annual rate of growth since 1986). Manufacturing employment growth for 1990 was a sluggish 1.4 percent and declined by an estimated 0.8 percent in 1991.

The current forecasts reflects: 1) slowing aerospace employment growth in Washington State, 2) reduced levels of employment in lumber and wood products due to productivity gains and supply restrictions, 3) softening in the housing markets, and 4) higher energy costs. On the positive side, this forecast includes employment gains in the technology-based industries in the near term. Manufacturing employment in the region (including Montana) is expected to add only 55,400 new jobs between 1988 and 1995, representing an average annual rate of growth of just 1.2 percent. (See Tables 4 and 8.)

In contrast to the minimal gains expected in manufacturing employment, nonmanufacturing employment in the region (including Montana) is projected to increase by 686,900 jobs between 1988 and 1995, a 3.1 percent average annual rate of growth. (See Tables 5 and 9.) The higher nonmanufacturing employment forecast reflects: 1) higher than expected near-term growth, particularly in the construction, trade and services sectors, 2) an upward revision in recent employment history, and 3) strong in-migration.

Nonmanufacturing employment posted a 4.6 percent increase in 1988, and a 5.3 percent increase in 1989, before slowing slightly to 5.1 percent in 1990. The near-term forecast in nonmanufacturing employment predicts an annual slowing to 2.4 percent in 1991 and 1992, slowing to 2.2 percent in 1993 and 2.1 percent in 1994 and 1995.

Although the region will not experience an actual decrease in nonmanufacturing employment, this forecast predicts a business cycle downturn in 1995.

Table 9
Total NonManufacturing Employment Forecast by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1990	1786.2	1029.9	322.5	87.0	3225.6
1991	1829.5	1052.4	331.8	88.2	3301.8
1992	1873.8	1078.0	340.3	89.6	3381.7
1993	1917.1	1101.9	345.8	91.2	3455.9
1994	1954.9	1127.0	352.1	92.9	3526.9
1995	2000.0	1148.4	358.6	94.6	3601.6
2000	2189.0	1252.7	392.7	104.9	3939.3
2010	2549.2	1466.7	456.0	122.1	4594.0

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Table 10
Total Population Forecast by State and Region
(Thousands)

Year	Washington	Oregon	Idaho	Western Montana	Region
1990	4800.9	2899.5	1031.6	303.3	9035.3
1991	4935.8	2958.6	1051.6	304.9	9250.9
1992	5059.2	3020.2	1073.7	308.1	9461.2
1993	5163.7	3073.3	1094.4	312.0	9643.4
1994	5259.4	3119.5	1114.4	316.1	9809.4
1995	5342.3	3161.5	1132.4	320.3	9956.5
2000	5640.2	3338.4	1201.1	343.3	10523.1
2010	6124.9	3668.3	1302.1	380.0	11475.3

SOURCE: Bonneville Power Administration,
1991 Economic Forecast for the Pacific Northwest, August 1991.

Chapter 5 of the Council's Plan Update projects long-term regional population growth at 1.3 percent for the period 1990-2010. Bonneville's projection for the same period is 1.2 percent (see Table 10). This compares with 0.7 percent annual growth in population for the nation.

Table 11 compares employment growth for the region and the U.S. for the years 1990 through 2010.

Table 11
Comparison of Regional and National Economic Forecasts 1988-2010
(Annual Year-to-Year Rate of Growth, Percent)

Year	PNW EMPLOYMENT			U.S. EMPLOYMENT			GNP	CPI
	Total	Manu.	NonMan	Total	Manu.	NonMan		
1988	4.9%	6.0%	4.7%	3.3%	2.2%	3.7%	4.4%	4.2%
1989	5.2%	4.5%	5.4%	2.8%	1.1%	3.3%	2.5%	4.8%
1990	4.5%	1.4%	5.1%	1.8%	-1.9%	2.4%	1.0%	5.4%
1991	1.9%	-0.7%	2.4%	-0.7%	-3.3%	-0.1%	0.0%	4.3%
1992	2.3%	1.4%	2.4%	2.1%	3.2%	1.8%	3.6%	3.9%
1993	2.0%	1.1%	2.2%	1.9%	1.8%	1.9%	3.1%	5.0%
1994	1.8%	0.6%	2.1%	1.7%	0.2%	2.0%	2.9%	5.3%
1995	1.8%	0.3%	2.1%	1.8%	0.0%	2.2%	3.0%	5.2%
2000	1.5%	-0.1%	1.8%	1.4%	-0.3%	1.7%	2.5%	4.8%
2010	1.3%	0.0%	1.5%	0.9%	-0.2%	1.1%	2.1%	4.8%

SOURCE: Bonneville Power Administration, 1991 Economic Forecast for the Pacific Northwest, August 1991.

SOURCE: WEFA July 1991 Long Term U.S. Economic Outlook

Table 11 indicates that employment growth in the region will exceed the national average in both manufacturing and nonmanufacturing throughout the forecast period. Real GNP growth is projected to expand at an average 2.5 percent rate over the 1988-1989 period. Subsequently, average real growth slows to 1.0 percent in 1990 and falls to zero in 1991. Real growth in GNP throughout the forecast

period averages 2.4 percent annually. Real domestic consumption will average 2.3 percent growth from 1990 through 2010.

The unemployment rate will decline steadily from 6.7 percent in 1991 to 4.8 percent in 2010 as a result of economic growth and the reduction in the rate of growth of the labor force.

Inflation, as measured by three key determinants -- the GNP implicit price deflator, the consumer price index, and the producer price index -- will exhibit average rates of increase of 3.3 percent, 4.3 percent, and 0.8 percent respectively for 1991, and 4.4 percent, 4.8 percent, and 4.5 percent for 2010.

Interest rates over the forecast period are primarily determined by the pattern of the inflation rate, the dynamics of the business cycle, and the expected path of the U.S. dollar. In 1990, the federal funds rate averaged 8.1 percent. The federal funds rate will fall to an average of 6.5 percent in 1992 and rise gradually thereafter to 7.0 percent in 2010.

These economic projections, along with electricity prices, are the prime determinants of sector energy sales. In the section that follows, the preparation of the long-term sales forecast used in the Study is described and the results of that forecast are summarized.

IV. FORECASTED LOADS USED IN THE PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

Between the preparation of economic projections and the development of the forecast presented in the Study are a number of critical steps. First, long-term forecasts of sales for all five cases are prepared, using a system of demand models (specific to each major consuming sector) and an electricity pricing model that projects retail rates. (The long-term forecast is detailed in Chapter 6 of the 1991 Plan, included in Appendix A to this document; details of the sector forecasts are presented in Section VI of this document.) This long-term forecast is then processed to separate nongenerating from generating public utility demand, shape sales by month, convert sales to loads, translate loads from calendar year to both operating and fiscal years, and, in the medium case, merge long-term and midterm forecasts. The resulting loads are those reported in the Study.

This section provides an overview of the 1991 long-term forecast. It then describes the midterm forecast and how it is combined with the long-term forecast. How annual sales are shaped to monthly projections and how sales are converted to loads are also discussed.

Long-Term Load Forecast

The forecast of firm regional sales presented in the 1991 Plan (Chapter 6) is summarized below. As shown in Table 12, firm sales range from 28,836 average megawatts in the high case, to 15,787 average megawatts in the low case, with medium-case sales reaching 22,075 average megawatts by 2010. Sales to public utilities grow at rates ranging from -0.86 to 1.98 percent, while sales to IOUs grow at rates ranging from 0.02 to 2.98 percent. Medium-case sales grow at 0.86 percent for publics and 1.51 percent for IOUs.

Table 12
Long-Term Forecast of Regional Sales
1991 Pacific Northwest Loads and Resources Study

	DEMAND IN AVERAGE MEGAWATTS			AARG
	1990	2000	2010	1990-
	(Actuals)			2010
<u>Region</u>				
High	18,231	23,305	28,836	2.32
Medium-High	18,231	20,935	24,583	1.51
Medium	18,231	19,587	22,075	0.96
Medium-Low	18,231	17,566	19,485	0.33
Low	18,231	15,520	15,787	-0.72
<u>Public</u>				
High	10,031	11,791	13,928	1.65
Medium-High	10,031	10,766	12,146	0.96
Medium	10,031	10,062	11,043	0.48
Medium-Low	10,031	8,997	9,785	-1.24
Low	10,031	7,755	7,702	-1.30
<u>Private</u>				
High	8,200	11,514	14,908	3.03
Medium-High	8,200	10,169	12,437	2.10
Medium	8,200	10,254	11,032	1.49
Medium-Low	8,200	8,569	9,700	0.84
Low	8,200	7,766	8,085	-0.07

Conservation in the Load Forecasts

Energy conservation savings are reflected in the load forecasts in several ways. First, the forecasts described here are "price-effects" forecasts that include any load reductions resulting from consumer response to changing electricity prices, (price-induced conservation). These forecasts also include the savings from historical conservation programs that utilities have offered to date. These historical savings are projected into the future until the measures installed wear out. Most conservation savings measures last at least 20 years, so the amount of conservation that wears out is small.

Price-effects forecasts also include the expected savings from currently planned conservation programs, even though the measures have not yet been installed. Table 13 summarizes the planned conservation savings included in the 1991 long-term forecast for the public utilities. Due to a lack of data on currently planned investor-owned utility conservation programs, conservation for this customer group is included as future conservation savings rather than a forecast reduction, described later and shown in Table 14.

In addition to price-induced and programmatic conservation, price-effects forecasts also include savings from revised building codes and appliance standards. The 1991 long term forecast includes savings from the adoption of Model Conservation Standards (MCS) by the State of Washington and from more stringent Federal Appliance Standards, both effective in 1991. Also, the 1991 long term forecast includes the impacts of Oregon's adoption of MCS which is effective in 1992. Savings from building codes and appliance standards are discussed in more detail in the residential sector forecast section of this document.

Distinguishing between savings from codes and standards, versus those from programs, can be confusing because both methods may be used to achieve the same kind of conservation. For example, savings from constructing new residences to Model Conservation Standards result both from state adoption of the MCS (as in Washington) and from BPA's Super Good Cents and Northwest Energy Codes programs. In the 1991 long term forecast, regional savings from Super Good Cents and Northwest Energy Codes occur historically prior to the adoption of MCS in Washington State, and after 1991 outside Washington.

Additional conservation savings beyond those included in the price-effects forecasts are available from more aggressive codes, standards, and programs. These additional potential savings are treated as a resource rather than a forecast load reduction in the resource planning process. These conservation resources are combined with generating resources to obtain an optimal, (essentially, a "least cost"), mix of future conservation and generation resources to meet load growth. The costs of these future resources become part of the projected electricity rates used in the load forecasts. Table 14 summarizes future conservation included as part of the mix of future resources used to meet load growth. This conservation is in addition to the conservation included in Table 13.

Table 13
Planned Public Utility Program Conservation
Included in the Price-Effects Load Forecast
(Cumulative Average Megawatts)

Cumulative Savings by Year						
Sector	1993	1994	1995	2000	2005	2010
Commercial	9	11	12	19	26	33
Residential (a)	10	14	17	36	51	68
Industrial	12	12	12	12	12	12
Agriculture	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>
Total	61	64	70	85	104	123

(a) MCS savings from 1992 Codes

Table 14
Future Conservation Included as a Resource

Cumulative Savings by Year				
Utility Type/Sector	1995	2000	2005	2010
<u>Public</u>				
Commercial	56	142	252	298
Residential	52	168	294	347
Industrial 1/	18	56	95	98
Agriculture 1/	1	4	9	25
Total	127	370	650	768
<u>Investor-Owned</u>				
Commercial	81	247	343	406
Residential	79	233	333	390
Industrial 1/	23	64	99	99
Agriculture 1/	<u>14</u>	<u>39</u>	<u>46</u>	<u>46</u>
Total	197	545	821	941

Projected long-term sales as adjusted for conservation are, in effect, the raw material for Pacific Northwest loads and resources studies. They must, however, be merged with the midterm forecast and shaped. The remainder of this section details this process.

Midterm Regional Load Forecast

The midterm load forecasting process projects monthly total regional firm load. In general, BPA's midterm load forecasts are designed to reflect near-term factors and events. Regional load for each of the following major customer groups is estimated separately: non- and small generating public utilities (NSGPU), generating public utilities (GPU), contract federal agencies, and the United States Bureau of Reclamation (USBR). BPA also produces a midterm forecast of direct service industry (DSI) firm and nonfirm loads, which is discussed in Section VI of this document. BPA does not produce a midterm forecast of investor-owned utility (IOU) loads.

BPA uses simple econometric models of electricity consumption to forecast midterm loads for the NSGPU and GPU. NSGPU and GPU loads are modeled separately as a function of average retail electricity price, heating degree-days, cooling degree-days, and nonagricultural employment.

Tables 15 contains the technical parameter estimates used during the January 1980 to December 1990 estimation period for both the generating and non-generating public utilities. Below are the definitions of the variables for the technical parameter estimates.

Variable	Definition
Intercept	-Constant
HDD60	-Heating degree-days, base 60
CDD55	-Cooling degree-days, base 55
Employment - 12mma (Generating)	-12-month moving average of the nonagricultural employment of Washington State and Lane County, Oregon.
Employment - 12mma (Non-Gen)	-12-month moving average of the regional nonagricultural employment.
Employment Change	-Difference in nonagricultural employment from the same month of the previous year.
Price - 12mma	-12 month moving average of retail electricity price.
Price - 12mma	-3 month moving average of retail electricity price.
Lag of Adjmw	-One-month lag of load (adjusted for conservation).

Table 15
Load Forecasting Model
Parameter Estimates
(For January 1981-December 1990)

Generating Public Utilities:

Variable	Estimate	t-statistic
Intercept	624.98	7.28
HDD60	64.30	53.64
CDD55	10.32	4.77
Employment - 12mma	0.00119	30.40
Employment Change	0.00064	3.80
Price - 3mma	-5.74	-2.76
Dummy Variables		
January	102.04	4.85
February	109.69	5.14
March	55.85	2.69
June	59.98	3.05
July	-53.33	-2.44
R-Square	0.9909	
MSE	2995.90	

Non-Generating Public Utilities:

Variable	Estimate	t-statistic
Segment 0		
Intercept	287.87	3.61
CDD55	19.00	4.54
Segment 1		
Intercept	260.99	3.16
HDD60	33.59	5.63
CDD55	21.36	4.95
Segment 2		
Intercept	128.09	1.60
HDD60	45.68	12.85
CDD55	71.62	1.84
Segment 3		
Intercept	101.55	0.96
HDD60	46.91	14.88
Employment-12mma	0.00054	23.33
Price - 12mma	-2.41	-3.15
Dummy Variables		
March	-157.26	-6.46
April	-79.74	-2.97
July	63.37	2.75
September	-107.46	-5.20
October	-76.18	-3.12
Lag of Adjmw	0.20	8.21
R-Square	0.9997	
MSE	3088.90	

The regional midterm load projections reflect BPA's assumptions regarding current and projected regional, national, and international economic conditions. Projections of regional economic activity provide the basis for projections of regional load.

The projections of nonagricultural employment used as inputs to the NSGPU and GPU midterm load forecasting models are derived using BPA's Regional Economic Model (REM). (See Chapter III.) REM contains state-level econometric models that project employment for the states of Washington, Oregon, and Idaho. Total nonagricultural employment for these three states is the basis of the NSGPU load forecast. The GPU load forecast is based on total nonagricultural employment for Washington State and Lane County, Oregon.

Based upon the 12-month moving average of temperature-adjusted loads, NSGPU and GPU load growth from 1988 through 1991 each averaged roughly 3 percent. These load growth rates are not expected to be sustained in the 1990s due principally to slower economic growth. The midterm NSGPU and GPU load forecasts project average annual rates of growth from 1991 through 1994 of 1.7 percent and 1.6 percent, respectively.

The contract federal agency load forecasts are developed by BPA Area Offices in cooperation with each federal agency. The USBR load forecast (produced by the USBR and reviewed by BPA) represents the "reserved energy" requirements for each USBR irrigation project in the Northwest.

Table 16
Midterm Load Forecast:
1991 Pacific Northwest Loads and Resources Study
(Average Megawatts)

Year	NSGPU	GPU
1990	3,196	3,735
1991*	3,228	3,826
1992	3,302	3,927
1993	3,341	3,971
1994	3,389	4,013

*Estimate of Actuals

Merge of the Midterm and Long-Term Load Forecasts and Development of Monthly Loads

A computer program--the Long-Term Output Program (LTOU)--transforms the long-term forecast of annual public and private energy sales into monthly projections of NSGPU, GPU, and IOU energy loads. The transformation process is as follows: (1) split the annual public sales into annual NSGPU and GPU sales; (2) shape the annual NSGPU, GPU, and IOU sales to monthly sales; and (3) convert the monthly NSGPU, GPU, and IOU sales values to monthly loads by adding transmission and distribution losses to sales. In addition, LTOU merges the midterm and long-term load forecasts, calculates peak loads and disaggregated (individual utility) loads for the NSGPU, GPU, and IOU, and calculates projections of federal system transmission losses.

Forecasted annual public utility sales are split into annual NSGPU and GPU sales using ratios calculated from the midterm load forecasts. For the medium case, the ratios are the average NSGPU and GPU shares of public sales for 1994, the year prior to the merge of the midterm and long-term forecasts. For all other forecasts in the range, the ratios are the average NSGPU and GPU shares of public sales from July 1990 through June 1991, the first year of the forecast.

Forecasted annual NSGPU and GPU sales are shaped to monthly sales values using average load shapes over the period 1991 through 1993 from the midterm load forecasts. Monthly energy sales peak in January with sales being lowest in May and September. Figure 3 shows the seasonal shape in monthly energy sales based upon the historical period 1989 through 1991. Forecasted annual IOU sales are shaped to monthly sales values using the shapes inherent in IOU load forecasts submitted to the Pacific Northwest Utilities Conference Committee (PNUCC) for publication in the Northwest Regional Forecast (NRF) of Power Loads and Resources, March 1991.

Figure 3
Historical Seasonal Monthly Sales
(Average Megawatts)

Forecasted NSGPU, GPU, and IOU monthly sales values are converted to monthly load values by adding distribution losses, which are calculated as a constant percentage of monthly sales. The distribution loss constants are based on historical sales and load data over the period 1983 through 1988. These constants are reviewed periodically and were not revised for the 1991 long-term forecast. The distribution loss constants for the NSGPU, GPU, and IOU are 4.2, 6.4, and 10.5 percent, respectively.

For the medium-case NSGPU and GPU regional load forecasts used in the Pacific Northwest loads and resources studies, the midterm regional load forecasts are merged with the long-term regional load forecasts to take advantage of the strengths inherent in each forecasting process. The midterm forecasting process reflects the cyclical nature of regional economic behavior and the resulting effects on energy demand, while the long-term, sector-specific models produce forecasts that better reflect long-term economic and structural changes in regional energy use. The midterm load forecasts for the NSGPU and GPU are used for the period July 1991 through December 1994. The long-term load forecasts for the NSGPU and GPU are used for January 1995 and beyond. The average difference in total public loads between the midterm and long-term forecasts from 1991 through 1994 is less than 1 percent. At the point of the merge (January 1995), there is approximately a 1.5 percent difference between the midterm and long-term projections of total public loads.

Monthly NSGPU, GPU, and IOU peak loads are calculated by applying a load factor to the monthly energy loads. The monthly load factors for the NSGPU are developed from the forecast information contained in BPA's Sum of Utilities (SOU) database, which contains point-of-delivery forecasts prepared by BPA Area economists for each regional NSGPU. The monthly load factors for the GPU and IOU are developed from the GPU and IOU load forecasts published in the PNUCC's 1991 NRF.

Disaggregated load forecasts (utility-specific) are also provided for the NSGPU, GPU, and IOU. The NSGPU disaggregation uses a combination of historical information and SOU forecast information. The GPU load forecasts are disaggregated using the utility-specific forecasts published in the 1991 NRF and BPA's analyses regarding current and expected load trends for each utility. The IOU load forecasts are disaggregated using the utility-specific forecasts published in the 1991 NRF.

Federal transmission losses are calculated as percentages of NSGPU, DSI, federal agency, and USBR peak and energy loads. Federal transmission loss factors were derived in 1986, based on January 1987 peak load conditions. These factors are reviewed annually and were not revised for the 1991 long-term forecast. The factors vary by month, and average about 2.6 percent for energy and 3.3 percent for peak load. Factors do not change year to year.

Additional federal transmission losses associated with deliveries of firm load to the GPU and IOU, along with CSPE and other contractual deliveries of firm load are included in the long-term forecast. These losses were estimated by BPA's Load/Resource Section based on the D3 Draft Long Term Load Forecast produced in May 1990, and vary by scenario.

V. RATE PROJECTIONS

BPA's Supply Pricing Model

The medium rate projection used in the study was produced using BPA's Supply Pricing Model (SPM). The SPM has been an integral part of the methods used to develop BPA's load forecast since 1982. The SPM calculates annual average electricity rate projections for BPA's wholesale power customers following the rate directives in the Northwest Power Act, and for retail customers of public and investor-owned utilities (IOUs) serving load within the Pacific Northwest. Calculations are performed for each federal fiscal year (October-September), using detailed data on resource output and cost, as well as transmission, distribution, conservation, and overhead costs, to estimate average rates, given a set of electricity loads. Projections of residential, commercial, and industrial loads of the public utilities and IOUs are input, along with BPA's DSI loads, federal agency loads, and other BPA contractual power obligations. Generating resources are added as needed to meet existing and future firm power loads.

The electricity price projections developed by the SPM, along with other inputs, are entered into the electricity demand models to produce the load forecasts. Several iterations between the SPM and the demand models may be necessary to reach equilibrium (i.e., the point at which loads resulting from the demand models after the electricity prices are input are not significantly different than those that were input to the pricing model). Table 17 presents the medium-case rate projection developed by the SPM for this forecast. Following are the primary assumptions for the medium-case rate projection.

Generating Resource Additions. For the public utilities, no new generating resources were added. The federal system acquired 112 average megawatts of hydro system efficiency improvements by 1995 and 77 average megawatts of generation through the competitive acquisition process by 1996. The IOUs needed to add generating resources throughout the term of the projection. The list of least-cost resources was supplied by the ISAAC model used by BPA and Council staff for integrated resource planning.

Conservation. Annual conservation savings were treated as load reductions. It was assumed that the cost of cost-effective conservation programs to meet IOU needs would be borne by the IOUs. Conservation costs for the IOUs were allocated through IOU retail rates. Public utilities were assumed to have signed BPA conservation contracts, and the cost of these programs were allocated to BPA rates.

Nonfirm Energy Sales. Nonfirm energy generated by the federal hydroelectric system was assumed to be available each year for sale to the following markets: high-cost thermal resource displacement, DSI first quartile, Pacific Southwest, low-cost thermal resource displacement, and displacement of firm purchases. The high-cost thermal market consists of combustion turbines and combined-cycle plants operating in the region. The DSI first quartile is approximately one-quarter of the total annual DSI load. The Pacific Southwest market represents BPA's nonfirm energy sales to the Pacific Southwest over the Pacific Northwest-Pacific Southwest Intertie. The low-cost thermal market consists of displaceable baseload coal plants and cogeneration that are operated to serve regional loads. The firm purchases market consists of the purchases that were necessary to meet a firm load deficit. Nonfirm energy sales to the high-cost and low-cost thermal markets effectively reduce the capacity factors of the displaceable resources accounted for in those two markets.

Assumed nonfirm rates are consistent with BPA's 1985 rate proceeding and the initial ruling of the Federal Energy Regulatory Commission administrative law judge in the proceedings for the 1981 and 1982 nonfirm energy rates.

Surplus Firm Power. BPA has five contracts in 1994 for the sale of surplus firm power. These contracts allow for service with firm power while surplus firm power is available, and for conversion to capacity

for energy exchange when it is not. All signed contracts except one large Pacific Southwest contract were assumed to be in the power sale mode for the duration of the projection. The remaining contract was assumed to be converted to a capacity for energy exchange, and the exchange energy that BPA received (ranging from 41 average megawatts in 1994 down to 28 average megawatts in year 2009, the last year of the contract) was treated as a new resource. Surplus power is calculated annually within the model, and contracts are served up to that amount. Any remaining surplus power was assumed to be sold as nonfirm energy. No surplus power was assumed to be sold at full cost for this projection. When surplus firm power was sold as nonfirm energy, the difference between fully allocated cost and revenues from sales at the nonfirm energy rate was spread uniformly over rates paid by all BPA firm power customers on a per-kilowatt-hour basis. For the surplus power contracts, if the contractual rate was higher than the full cost rate, then a credit was spread over rates paid by all BPA firm power customers; if the contract rate was lower than the full cost rate, then the deficiency was spread over rates paid by all BPA firm power customers as in the case of surplus firm being sold as nonfirm. Any IOU firm surplus was assumed to be sold at fully allocated cost by the IOU.

Oil and Natural Gas Prices. To incorporate the effect of oil and natural gas prices on nonfirm revenues, based on nonfirm sales projected by BPA's Rate Analysis Model (RAM), it was assumed that nonfirm sales to the Pacific Southwest would be made at 69 percent of the price of oil and natural gas. By 1997, the cost of oil and natural gas had risen so that BPA's average cost of nonfirm became the cap for the price of nonfirm sales to the Pacific Southwest.

Residential Exchange. Beginning in 1994, all IOU utilities that were in suspension status for the residential exchange were assumed to be participants. The level of public utility participation was projected exogenously to the SPM based on the most recent available average system cost projections for public participants.

Net Requirements Sales. All IOU and generating public utilities, with the exception of Utah Power and Light, were assumed to have signed net requirements contracts with BPA. These contracts obligate BPA to meet any loads that a signing utility cannot meet with its own resources. No new large single loads on public agencies were assumed. The private utilities were assumed to build or acquire resources to meet all future load growth except Puget Sound Power and Light. Puget purchases new resource firm energy through 1993 (93 average megawatts in 1992 and 84 average megawatts in 1993).

Retail Distribution Costs. Distribution costs were developed based on 1988 and 1989 historical data.

Pacific Northwest-Pacific Southwest Intertie. The third AC Intertie assumptions were an additional 500 average megawatts in service in 1993 and another 1100 average megawatts in service in 1994.

Inflation and Escalation. Winter 1989-1990 Data Resources, Inc. inflation and asset-specific escalation projections were used for projecting various costs over the forecast period.

Revenue Requirement. A revenue requirement consistent with the 1991 Initial Rate Proposal was used in the medium-case projection.

Federal Base System (FBS) Resource Replacement. No replacement of terminated or retired FBS resources was assumed.

DSI Contract Renewal. The current DSI contracts were assumed to be renewed in their existing form upon expiration.

DSI Rates. The DSI Variable rate was assumed to be in effect through June of 1996. In addition, the IP-PF link was assumed to be in place over the term of the forecast.

Table 17
Summary of Rates
(In 1980 Mills Per Kilowatt-hour)

PUBLIC UTILITIES						PRIVATE UTILITIES				
Year	Com- mercial	Resid- ential	Indus- trial	Irri- gation	Total	Com- mercial	Resid- ential	Indus- trial	Irri- gation	Total
1990	22.4	25.7	16.4	18.4	21.6	33.7	33.6	22.5	25.7	30.2
1995	21.0	24.5	14.9	17.0	20.3	32.0	32.1	20.4	23.7	28.4
2000	21.4	25.1	14.9	17.2	20.6	34.1	33.5	21.7	24.5	29.9
2005	21.8	25.8	14.9	17.3	21.0	36.0	34.8	22.7	25.2	31.4
2010	22.6	26.9	15.2	17.8	21.8	39.0	37.4	24.8	27.1	33.9

DIRECT SERVICE INDUSTRIES						REGION TOTALS				
Year	Com- mercial	Resi- dential	Indus- trial	Irri- gation	Total	Com- mercial	Resi- dential	Indus- trial	Irri- gation	Total
1990			15.2		15.2	29.0	30.1	18.0	22.1	24.7
1995			13.6		13.6	27.3	28.7	16.5	20.4	23.4
2000			12.8		12.8	28.7	29.8	16.9	20.9	24.3
2005			12.1		12.1	30.0	30.8	17.1	21.3	25.3
2010			12.3		12.3	32.2	32.8	18.2	22.4	27.0

VI. SECTOR DETAIL

As noted earlier, the long-term forecast is developed using a series of models to project energy use in major consuming sectors. These models generally disaggregate total sector energy use into a number of smaller component categories (e.g., end-use, building or housing type, industry, etc.) as shown in Figure 4 and are operated interactively with an electricity pricing model that estimates retail rates. In Section IV, an overview of the 1991 long-term forecast was provided. In this section, detailed results are presented for five major consuming sectors: non-DSI (or utility) industrial, Direct Service Industries, residential, commercial, and irrigation. The discussions focus upon the significant issues in each sector and, as such, differ considerably (e.g., high case assumptions for DSI, housing codes for residential, vacancy rates for commercial, etc.). To the extent possible, efforts have been made to avoid duplicating the contents of the Council's document. Where appropriate, the text in this section references the contents of the Council's report. Each sector description includes a summary of industrial activity, a summary of major results, a discussion of the models and methods used, and the detailed results most significant in that sector.

Figure 5 shows the distribution of 1990's public firm sales by sector. Together the residential, DSI and industrial sectors accounted for about 77 percent of 1990 firm sales.

Figure 5
1990 Public Firm Sales

Figure 4
Flowchart of Disaggregated Sector Energy Use

Industrial Sector Load Forecast

Sales to the non-DSI industrial sector in 1990 were 2,024 average megawatts of firm electricity, accounting for 22 percent of the region's total firm public non-DSI sales. With the exception of slight declines during the mid-1970s and early 1980s due to regional and national economic downturns, sales to the non-DSI industrial sector have grown steadily.

Table 18 shows industrial sector forecasts of firm electricity use for selected years under all five cases. In the high case, consumption of electricity grows to 3,741 average megawatts by 2010, an average annual growth rate of 3.1 percent. In the low case, industrial electricity grows to 2,074 average megawatts. The more likely range of growth in industrial electricity use is from 0.9 percent per year to 2.3 percent per year, with medium case growth at 1.6 percent per year.

Table 18
Non-DSI Industrial Firm Sales
(Average Megawatts)

Scenario	Actual 1990	1995	2000	2010	AAGR(%) 1990-2010
High	2,024	2,614	2,963	3,741	3.1
Medium-High	2,024	2,445	2,685	3,159	2.3
Medium	2,024	2,303	2,460	2,765	1.6
Medium-Low	2,024	2,126	2,223	2,423	0.9
Low	2,024	1,939	1,988	2,074	0.1

Industrial electricity use is highly concentrated in a few subsectors. Figure 6 illustrates the estimated composition of industrial firm electricity use in 1990. Five industries (food, lumber, pulp and paper, chemicals, and metals) account for 85 percent of the electricity sold to the non-DSI industrial sector.

Figure 6
Shares of Non-DSI Industrial Firm Sales, 1989
Based on 1989 Long-Term Forecast

The non-DSI industrial load forecast is based upon a variety of joint Council/BPA forecasting models. Generally, the forecast for a particular industry is based on projections of production or employment for that industry, energy intensity, and electric and fuel prices. The forecast methods vary considerably among the different industries, ranging from very detailed models for the key industries, to simple assumed relationships between output and electricity use for the smaller industries. These models are described in greater detail in the 1991 Northwest Power Plan, Volume II, Part I, Chapter 6.

In the medium case, electricity sales to the non-DSI industrial sector are expected to grow more slowly than historically. This is largely due to the slow growth projected for the key industries. Also assumed is a gradual decline in electricity use per unit of output for key electricity-intensive industries. Table 19 compares the medium-case forecasted rates of load growth for the key industries, the minor industries, and the total industry sector. Key industry load is projected to grow at only 1.0 percent per year, compared to 2.5 percent per year for the minor industries. Projected activities for the key industries are described below.

Table 19
Industry Growth Rates, 1990-2010, Medium Forecast

	Production AARG (%)	Firm Sales AARG (%)
Key Industries	1.3	1.0
Minor Industries	3.2	2.5
Total	2.5	1.3

Current events affecting the wood products industry have both short-term and long-term consequences for energy consumed by this industry. The immediate situation is that U.S. housing starts during 1991 were the lowest since 1946, and recovery is expected to be slow. In addition, the decision in 1990 by the U. S. Fish and Wildlife Service to list the northern spotted owl as an endangered species have reduced the supply of timber in the near-term.

In the longer term, demographic factors indicate a period of reduced household formation leading to fewer new housing starts and lower demand for wood products, relative to the late 1970's. Although the size of newly constructed single family houses has increased since 1980, demand for wood products will decline due to the projected lower housing starts and continuing substitution of structural panel for regionally produced plywood, which no longer has a market advantage east of the Rocky Mountains. Further exacerbating the lower demand-side projections, the available supply of timber in the Pacific Northwest will be significantly reduced due to the implementation of spotted owl conservation plans and past harvest rates that exceeded sustained yield rates. Timber supply will be restricted until the middle of the next decade when second-growth stands are mature enough to ease the supply situation somewhat.

The medium load forecast for the lumber and wood products industry is based on a projected 25 percent decline in timber harvest in western Oregon and western Washington. This decline is moderately offset by mild increases in production in eastern Oregon and eastern Washington and Idaho, areas that are relatively unaffected by harvest restrictions due to spotted owl conservation plans. The industry is projected to grow at -0.9% per year through 2010. (See Table 20).

For the pulp and paper industry, output was projected for the medium case based on a forecast in a report prepared for BPA by EKONO, a regional industrial consulting firm. Total paper and paperboard production is expected to grow at about 0.7 percent according to EKONO. This is due to anticipated future raw material supply constraints, difficulties in obtaining permits for new or "greenfield" mills, and North American pulp and paper mill capacity growing faster than demand. The pulp and paper industry is projected to grow at 1.4 percent per year (see Table 20).

Electricity consumption by the chemical industry is largely comprised of chlorine and caustic soda production and is therefore closely linked to growth in the pulp and paper industry. Due to environmental concerns about dioxin effluents from the pulp bleaching process, production of chlorine and caustic soda is not expected to grow with pulp and paper production. However, increased production of chlorine-free bleaching chemicals (such as hydrogen peroxide and sodium chlorate) is expected to offset some of the projected decrease in electricity consumption by chlorine and caustic soda. Table 20 includes both the projected sales for the chemical and pulp and paper industries and the projected growth rate per year.

The food processing industry has experienced relatively flat employment growth during the past 12 to 14 years. Output per person and load per unit output increased during the early 1980s, resulting in a more competitive industry by the end of the decade. Shifts from canned to frozen products increased load during the 1980s. Conversely, some shift from frozen to fresh may decrease load per unit output for the next two decades. Output projections were based on relatively flat employment growth in recent history, reports to BPA by Northwest Economic Associates (1984, 1986 and 1989), and telephone interviews with key individuals at each land grant University in the region.

Table 20
Non-DSI Industrial Firm Sales By Type of Industry
(Average Megawatts)

Industry Type	1990	1995	2000	2010	AARC % 1990-2010
Food	135	154	177	202	2.0
Lumber	207	183	163	172	-0.9
Pulp & Paper	975	1,047	1,120	1,275	1.4
Chemicals	227	244	259	292	1.3
Primary Metals	292	308	317	311	0.3
Other	311	367	424	513	2.5

Direct Service Industry Load Forecast

The direct service industries (DSIs) are a group of 15 industrial firms operating 19 plants in the Pacific Northwest that purchase electric power directly from BPA. These plants primarily involve electricity-intensive industrial processes such as production of aluminum and other primary metals, pulp and paper, ferroalloys, and chlor-alkalis. (See Table 21.) For forecasting purposes, the DSIs are divided into aluminum and non-aluminum industries.

Table 21
Direct Service Industries

Industry	Companies
Primary Aluminum	Alcoa, Columbia Aluminum, Columbia Falls Aluminum, Northwest Aluminum, Intalco, Kaiser, Reynolds, Vanalco
Aluminum Fabrication	ACPC, Kaiser, Reynolds, Vanexo (1) (3)
Magnesium/Ferrosilicon	Northwest Alloys (1)
Abrasives	Carborundum (2)
Titanium	Oremet
Nickel	Nickel Joint Venture
Pulp/Paper	Port Townsend Paper Co.
Chlor-Alkali	Georgia Pacific, Atochem
Calcium Carbide	Pacific Carbide (2)
Steel Plate	Gilmore Steel (3)

(1) Subsidiary of Alcoa

(2) Plants currently closed and dismantled

(3) No load placed on BPA at present time

Aluminum DSIs

Aluminum DSI loads are forecasted by comparing an aluminum price forecast with the estimated production costs for each smelter, to estimate short- and long-term economic viability of operations. Initial estimates of operating rates by smelter are then evaluated in light of historical smelter operations and other known individual smelter characteristics, and modified to reflect this additional information.

Aluminum Price Forecast. BPA forecasts U.S. transaction prices for aluminum ingot, the price used to determine the Variable Industrial (VI) rate charged to BPA's aluminum DSI customers. The price projections through 1995 for the various scenarios are shown in Table 22.

Table 22
Aluminum Price Forecasts
(Nominal \$)
October 1991 Forecast

	HIGH	MEDIUM-HIGH	MEDIUM	MEDIUM-LOW	LOW
91Q4	61.4	58.1	54.7	53.6	52.4
92Q1	76.0	67.5	59.0	57.0	55.0
92Q2	82.0	72.7	63.5	59.7	56.0
92Q3	92.0	77.7	63.5	60.7	58.0
92Q4	103.0	83.2	63.5	62.0	60.5
93Q1	114.0	91.0	68.0	65.2	62.3
93Q2	126.0	99.5	73.0	67.9	62.7
92Q3	132.7	105.6	78.6	69.5	63.2
93Q4	133.7	107.5	81.4	70.0	63.7
94Q1	134.9	109.5	84.2	70.6	64.2
94Q2	136.0	111.5	87.0	71.2	64.7
94Q3	137.2	113.5	89.9	71.8	65.3
94Q4	138.4	115.1	91.8	72.5	65.9
95Q1	139.7	119.8	93.2	73.2	66.5

The aluminum price forecast consists of five scenarios: high, medium-high, medium, medium-low, and low. Except for the near-term to mid-term period from November 1991 to 1995, each forecast is a "target" or "trend" forecast. "Trend" or "target" means that the forecasted real price is constant over time (in nominal terms, the price goes up with the rate of the GNP Deflator, DRI, Winter 1990-91, Review of the U.S. Economy). Before 1995, the aluminum price forecast reflects slower than average economic growth in the world and higher than desired primary aluminum inventory levels. After January 1995, the aluminum price trend forecasts are based on the historically observed aluminum price ranges during calendar years (CY) 1980 through 1988.

The medium forecast is based, until January 1995, on the expectation that aluminum prices will be below the target price. Improvement in the world economy and an accompanying higher demand for aluminum will take place. However, relatively high inventories and high smelting capacity increases in 1991 and again in 1993 will keep prices from rising to the target level during this period. The medium forecast target price is 70 cents per pound (1986\$) starting in January 1995. Historically, from CY 1980 through 1988, aluminum prices have averaged approximately 70 cents per pound in 1986\$ (see Table 23).

Like the medium forecast, the high, medium-high, medium-low, and low forecasts, are based on short- to medium-term economic expectations; until 1995 for the medium-high forecast and until 1993 for the other forecasts. After that, each of the forecasts becomes a trend or target forecast. These targets are based on observed aluminum price ranges during the period CY 1980 through 1988.

Table 23
Historical Aluminum Market Prices

	Historical Cycle (1986\$)	Running Average 1 Year	Running Average 2 Years	
80 - Q1	115.6			
80 - Q2	100.7			
80 - Q3	95.4			
80 - Q4	93.5	101.3		
81 - Q1	82.1	92.9		
81 - Q2	76.2	86.8		
81 - Q3	69.2	80.3		
81 - Q4	62.3	72.5	86.9	
82 - Q1	58.0	66.4	79.7	
82 - Q2	52.0	60.4	73.6	
82 - Q3	50.9	55.8	68.0	
82 - Q4	52.2	53.3	62.9	
83 - Q1	62.1	54.3	60.4	
83 - Q2	73.5	59.7	60.0	
83 - Q3	82.0	67.5	61.6	
83 - Q4	81.7	74.8	64.1	
84 - Q1	77.8	78.8	66.5	
84 - Q2	69.1	77.6	68.7	
84 - Q3	56.0	71.1	69.3	
84 - Q4	55.2	64.5	69.7	
85 - Q1	52.5	58.2	68.5	
85 - Q2	52.2	54.0	65.8	
85 - Q3	48.2	52.0	61.6	Lowest 1 Year:
85 - Q4	48.4	50.3	57.4	85-Q1 through 85-Q4
86 - Q1	58.1	51.7	53.9	
86 - Q2	59.2	53.4	53.7	
86 - Q3	55.5	55.3	53.6	Lowest 2 Years:
86 - Q4	53.3	56.5	53.4	85-Q1 through 86-Q4
87 - Q1	58.0	56.5	54.1	
87 - Q2	67.5	58.6	56.0	
87 - Q3	77.6	64.1	59.7	
87 - Q4	81.0	71.0	63.8	
88 - Q1	93.2	79.8	68.2	
88 - Q2	111.9	90.9	74.7	
88 - Q3	114.1	100.0	82.1	Highest 1 and 2 Years:
88 - Q4	102.1	105.3	88.2	87-Q1 through 88-Q4
		105.3	88.2	MAXIMUM
		50.3	53.4	MINIMUM
AVERAGE = 72.2				

NOTE: All Figures in 1986 Dollars

Smelter Production Costs. There are four categories of production costs: power, alumina, labor, and other costs. The basis for the cost estimates is the report entitled, "Technical Study to Compare and

Evaluate Aluminum Production Cost Data (July 1990)," by Resource Strategies, Inc. (RSI), one of BPA's aluminum industry consultants. Table 24 shows estimated smelter production costs in 1989.

Table 24
Regional Aluminum Smelter Production Costs
(1989, Net Operating Costs, Nominal \$)

	Total ¢/lb
Columbia Falls	71.0
The Dalles	69.3
Ferndale	64.2
Goldendale	67.1
Longview	70.6
Mead	69.8
Tacoma	75.4
Troutdale	76.2
Vancouver	72.3
Wenatchee	71.2
Region Average	70.2

SOURCE: "Technical Study to Compare and Evaluate
Aluminum Production Cost Data," Resource
Strategies, Inc., July 1990.

Aluminum DSI Load Forecast. BPA's long-term price/cost analysis showed that if aluminum prices forecasted in the high, medium-high, and medium aluminum scenarios are realized, all regional smelters could recover their costs, implying operation of all smelters at full capacity for each of those scenarios. However, only rarely have all regional potlines operated at full capacity simultaneously since the last potline (number 45) was installed in the early 1980's. Even when monthly aluminum prices peaked at \$1.29 per pound in 1988, all regional smelters did not operate at full capacity. Analysis of aluminum DSI load data from the historical period CY 1976 through 1989 indicated that the regional smelters have operated at about 250 average megawatts below full capacity during times when aluminum prices were high enough for all smelters to recover their costs. The reasons for such past potline closures included labor disputes, alumina supply problems, electricity supply disruptions, excess inventories, equipment maintenance, equipment failures, corporate strategies, and management anticipation of these or other problems. Therefore, in recognition of the fact that aluminum price is not the sole determinant of smelter operation, aluminum DSI loads in the medium case were adjusted downward by about 280 average megawatts from full capacity levels implied by the price/cost analysis. By 1996, loads in the medium-high case were adjusted downward by about 100 average megawatts from full capacity levels. Loads in the high case were at full capacity. In all five scenarios, the loads were adjusted for the closure of the Reynolds-Troutdale smelter, until January 1993. Table 25 shows firm and non-firm loads placed upon aluminum DSI plants in 1990.

Table 25
Aluminum DSI
1990 Loads by Plant
(Average Megawatts)

	Total	Firm	Non-Firm
Vanalco	228	175	53
Alcoa (Wenatchee)	176	154	22
Columbia Aluminum	279	217	62
Columbia Falls	338	266	72
Martin Marietta	162	128	34
Intalco	450	347	103
Kaiser (Mead)	397	322	75
Kaiser (Tacoma)	149	121	28
Reynolds (Longview)	417	320	97
Reynolds (Troutdale)	246	189	57

Under the medium-low and low scenarios, the aluminum price/cost analysis showed that several smelters may not recover their production costs, given the forecasted prices. Also, other factors were considered, such as the growing cost of environmental compliance and historical smelter operating rates during periods of low prices. Given these factors, the aluminum smelter loads for the medium-low and low cases were about 950 aMW and 1500 aMW below capacity, respectively.

In the low case it is assumed that, as a result of less favorable power sales contract terms after 2001, that all but two smelters will cease service from BPA, resulting in an operating rate of 25 percent after 2001.

Comparison of Aluminum DSI Long-Term Load Forecast to Prior Forecasts

The 1991 long-term load forecast, like the 1990 long-term load forecast, assumes that regional smelters will perform at a 90 percent operating rate. There are two major assumptions underlying this optimistic forecast: improvements in the overall health of the aluminum industry, and relative economic advantages of the regional smelters compared to many other smelters in the world.

Several BPA aluminum consultants continue to be optimistic about the long-term aluminum outlook, as supply and demand for aluminum are expected to be in balance from 1993 on. Increased demand for aluminum is due to an improved world economic outlook, expanded use of the aluminum beverage can and, most importantly, accelerated use of aluminum in automobiles. In addition, there were significant smelter closures during the 1980s. The current oversupply of aluminum is temporary. More high cost, older, smelters are expected to close in 1992. Demand for aluminum will increase and is expected to be in balance with supply in 1993 and beyond.

All regional smelters have made economic efficiency improvements, which include enhanced electrical efficiencies due in part to BPA's Con/Mod program.

Reduced labor requirements, positive experiences by locally owned and operated smelters that reduced the uncertainty of their economic viability, and BPA's variable rate structure have reduced costs and risks. In addition, regional smelters are located advantageously to minimize transportation costs to Pacific Rim markets.

The long-term smelter operating rate assumptions for the five forecast scenarios are shown in Table 26. These are unchanged from the 1990 forecast.

Table 26
Smelter Operating Rate Assumptions
(Percent)

Scenario	1991 Forecast
High	100
Medium-High	97
Medium	90
Medium-Low	67
Low	50

Peak Loads. The forecasted loads are in total average megawatts (aMW), and therefore require the application of load factors in order to determine peak loads. To determine total peak loads, aluminum DSI average energy loads are divided by the load factor, assumed in this case to be 0.985 for the aluminum smelters. This load factor is based on normal operations for each plant.

Aluminum DSI Load Forecast Summary. Table 27 summarizes the load forecasts for the FY 1992-2012 rate period for each of the scenarios.

Table 27
Aluminum DSI Load Forecast
(Average Per Fiscal Year)

Fiscal Year	High	Medium-High	Medium	Medium-Low	Low
1992	2880	2844	2650	2519	2332
1993	2880	2831	2733	2347	2055
1994	2880	2829	2759	2162	1767
1995	2880	2787	2648	1939	1400
1996	2880	2783	2604	1919	1369
1997	2880	2783	2601	1919	1369
1998	2880	2783	2601	1919	1369
1999	2880	2783	2601	1919	1369
2000	2880	2783	2601	1919	1266
2001	2880	2783	2601	1919	926
Annual Load, 2002 - 2013	2880	2783	2601	1919	732

Non-Aluminum DSIs

Non-aluminum DSI Load Forecast. The load forecast for the non-aluminum DSIs was prepared on a plant-by-plant basis using historical and technical plant information, current and planned operating schedules, and forecasted general economic and market conditions.

In the Medium case, revisions were made to the near-term (through December 1994) portion of the long-term forecast. From January 1995 onward, the forecast is the same as the 1991 Northwest Power Plan. The near-term changes include the permanent shut down of Vanexco in July 1991, which reduced total projected load by 4 aMW. Georgia Pacific's load also was reduced by 6 aMW (from 31 aMW to 25 aMW) to reflect slower market conditions for chlorine. Finally, Nickel Joint Venture is projected to extend operation from June 1992 through December 1994 at 75 aMW. The Special Industrial Power (SI)

rate contract for Nickel Joint Venture began in September 1990 and expired in June 1991. Under this SI rate contract, Nickel Joint Venture's load was 50 percent firm. The Industrial Firm Power (IP) rate contract is now back in effect, and load will be 75 percent firm. In the Low case, Nickel Joint Venture is projected to shut down in December 1990. In the High case, Nickel Joint Venture is projected to reopen its ore mine and remain at 100 average megawatts until 2001 when it depletes the mine's ore and shuts down.

In the Medium case, Northwest Alloys was projected to restart its ferrosilicon furnace in February 1992, raising its total load from 25 to 52 average megawatts. This was based on the expectation that ferrosilicon will be less expensive to manufacture than to purchase at that time. Beginning December 1992, Northwest Alloys is projected to reduce its total load by 27 average megawatts for plant maintenance every December and January. In the Low case, the plant's load is projected to remain at 25 average megawatts throughout the forecast period. In the High case, the plant's magnesium and ferrosilicon furnaces are projected to be in full operation, with no maintenance slowdowns, resulting in a projected annual load of 67 average megawatts throughout the forecast period.

In the Medium case, Atochem's total load is projected to grow slightly, from 79 to 81 average megawatts, assuming that growth in demand for the plant's sodium chlorate will outweigh a drop in demand for chlorine and caustic soda. Load is projected to drop by 10 average megawatts every July and December for plant maintenance. In the Low case, projected load is 41 average megawatts, reflecting slower market conditions. In the High case, it is assumed that Atochem will obtain an increase in its contract for BPA service, raising projected load to 110 average megawatts.

Loads for the Carborundum plants in Vancouver, the Pacific Carbide plant in Portland, and the Gilmore Steel plant in Portland are projected to be zero for all forecast scenarios. Carborundum and Pacific Carbide are closed and dismantled. Gilmore Steel's load is being served by PGE at a rate equivalent to BPA's IP rate and is not projected to use BPA power. As with the other DSI customers, their contracts do not expire until the year 2001.

Oremet is projected to grow gradually from its current load of 10 average megawatts to 15 average megawatts by late 1992 in the Medium forecast. This assumes that there is a steady growth in demand for titanium and that Oremet's plans for expansion are realized. The High forecast projects no further expansion and hence is equivalent to the medium forecast. The Low forecast assumes slower market conditions.

All other plant loads are projected to remain stable at current load levels, consistent with economic and market forecasts. Table 28 shows the firm and non-firm loads that were placed upon the non-aluminum DSIs in 1990.

Table 28
Non-Aluminum DSIs
1990 Loads by Plant
(Average Megawatts)

	Total	Firm	Non-Firm
Alcoa (Addy)	31	28	3
Alcoa (Vanexco)	3	3	<1
Kaiser (Trentwood)	52	42	10
ACPC	42	41	1
Port Townsend	11	9	2
Georgia Pacific	21	19	2
Hanna Nickel	67	53	14
Oremet	10	8	2
Atochem	68	60	8
Gilmore	<1	<1	<1
Reynolds (Cable)	2	2	<1
Carborundum	<1	<1	<1
Pacific Carbide	<1	<1	<1

Peak Loads. The non-aluminum peak load forecast was developed by dividing each plant's energy load forecast by the plant's historical load factor. These load factors range from .58 (ACPC) to .95 (Georgia Pacific) and are based on normal operations for each plant.

Forecast Ranges. Table 29 displays the low, medium, and high forecasts of non-aluminum DSI loads. The medium-high scenario is the average of the medium and high scenarios, and the medium-low scenario is the average of the medium and low scenarios. For each non-aluminum DSI plant, a high, medium, and low forecast scenario is developed using historical and technical plant information, current and planned operating schedules, and forecasted general economic and market conditions as described previously. Nickel Joint Venture accounts for most of the differences between the low, medium, and high forecasts.

Table 29
Non-Aluminum DSI Load Forecasts
(Average Per Calendar Year)

Calendar Year	High	Medium	Low
1992	420	303	133
1993	421	305	133
1994	421	305	133
1995	421	239	133
1996	421	241	133
1997	421	242	133
1998	421	243	133
1999	421	244	133
2000	421	245	133
2001	371	245	133
Annual Load,			
2001 - 2012	321	246*	133

* Increases slightly from 245 to 247 during this period

Residential Sector Forecast

In 1990, the residential sector accounted for nearly 40 percent of Pacific Northwest public utility firm sales of electricity. The long-term forecast of residential electricity sales is generated by simulating the energy consumption for eight distinct end-use/housing type or equipment classifications. Figure 7 presents both the 1990 and 2010 forecast of residential electricity sales for each of the eight end-uses from the 1991 Long-Term Forecast.

Figure 7
Residential End-Use Electricity Use
(Average Megawatts)

Total sector electricity sales are primarily a function of the energy use intensities of these eight energy-consuming end-use classifications, multiplied by the number of households of each housing type using the specific end-use or equipment-type. Therefore, the two chief determinants of residential electricity sales are end-use energy consumption intensities and the predicted growth of the housing stock.

Energy use intensities are determined primarily by fuel costs, per capita income, and the efficiency of energy-consuming equipment available to residential consumers. In addition to the retail price of electricity, the price of alternative fuels is an important determinant of the overall demand for electricity.

Of primary concern is the retail price of natural gas relative to electricity. Where it is available, natural gas is the primary fuel substitute for electricity in the space and water heating and cooking end-uses. Both relative price and the sensitivity to changes in relative fuel prices are important in determining the share of price-induced fuel-switching that occurs in the existing housing stock. These are also key factors in the initial fuel and equipment choices being made in new construction. To capture this reaction to changing fuel and equipment costs, life-cycle-cost calculations are used to determine residential fuel choice for the space and water heating and cooking end-uses. These calculations are then adjusted using econometric methods to reflect the observed or 'real world' fuel choice, as well as to

account for any physical barriers to the selection of a specific fuel (i.e., selection of natural gas in areas where natural gas is not available).

The other principle component in determining residential electricity demand is the predicted changes in housing stock. Growth of the housing stock is a function of both population growth and the changing size of the average household. Predicted shifts in population are driven by the regional economic forecast's underlying estimate of employment. In addition to its effect on population, the economic forecast also determines personal income, which affects the residential sector by influencing both the choice and utilization of electricity-using equipment.

Residential Sector Forecast Results

Table 30
Residential Sector Summary Indicators
Pacific Northwest Utilities
by Utility Type

	Utility Type	Est. 1990	High	2010 Forecast			
				Medium-High	Medium	Medium-Low	Low
Households (millions)	Public	1.464	2.598	2.205	2.072	1.952	1.648
	IOU	2.112	3.676	3.139	2.959	2.803	2.374
Electricity Price (1990 c/kWh)	Public	4.0	4.8	4.3	4.1	3.6	3.3
	IOU	5.2	6.0	5.5	5.7	4.8	4.6
Natural Gas Price (1990 \$/MMBTU)	Both	5.57	10.34	8.75	7.47	6.36	5.07
Saturations							
Electric Space Heat (%)	Public	59	65	62	60	56	56
	IOU	41	48	46	44	43	42
Electric Water Heat (%)	Public	86	81	83	83	83	82
	IOU	79	75	75	75	75	74
Electricity Use (all homes, kWh per household)	Public	15,779	14,309	14,487	14,138	14,249	14,199
	IOU	13,362	12,921	12,840	12,502	12,494	12,211
Space Heat Use (stock average, all electrically heated homes, kWh per household)	Public	9,552	8,273	8,762	8,534	8,832	8,985
	IOU	7,447	6,910	7,124	7,073	6,704	6,929
Space Heat Sales (aMW)	Public	939	1,585	1,354	1,203	1,105	942
	IOU	738	1,391	1,184	1,044	966	783
Total Residential Sales (aMW)	Public	2,638	4,244	3,648	3,344	3,176	2,671
	IOU	3,222	5,422	4,600	4,423	3,996	3,309

Table 30 provides a summary of estimated 1990 values and projected 2010 values of several components that determine total electricity use in both public and IOU utility areas. Although total residential electricity use varies widely across the five forecast ranges, use per household shows much less variation. The fairly narrow range of per household use projections for 2010 indicates that the variation in total residential electricity use is primarily due to differences in the projected number of households.

Electricity use per household is the net result of changes in efficiency, housing type, housing size, and fuel choice. While changes in some of these individual components are substantial, there is a tendency for them to be offset by one another in their effects on use per household. For example, equipment efficiencies generally improve over time, tending to reduce use per household, while the average sizes of multifamily and manufactured housing units are projected to increase, resulting in increasing use-per-household energy requirements for space conditioning.

As shown in Figure 7, the space and water heating end-uses combine to account for nearly half of the total residential sector sales of electricity. Figure 7 also shows that, although the space heating end-use is predicted to grow most rapidly over the 20-year forecast horizon in terms of absolute average megawatts, (570 average megawatts on a regional basis) or 1.5% average annual rate of growth (AARG), the "Other" end-use, (defined as a miscellaneous category to account for all remaining electricity use not captured in the other seven end-uses), is projected to grow most rapidly in terms of the average annual rate of growth, 2.1%. This is primarily due to the increasing presence of "plug load" equipment and small household appliances found in residential dwellings.

Table 31 presents the saturation and penetration rates (electric market shares represented in existing and new construction housing stock respectively) for 1990 and 2010. In addition, Table 31 presents annual electricity use per unit, in kilowatt(hours per year (kWh/yr), for residential space and water heating in new construction, by housing and utility type.

Table 31
Residential Electric Space and Water Heating
Saturation, Penetration, and Use Per Unit

		<u>Saturation</u>		<u>Penetration</u>		<u>Use per Unit</u> <u>in NEW</u>	
		1990 %	2010 %	1990 %	2010 %	1990	2010
		(kWh/yr)					
PUBLIC UTILITIES							
<u>Space Heat</u>							
	Single Family	.53	.51	.53	.55	7,760	6,750
	Multifamily	.81	.82	.97	.89	2,350	1,900
	Manufactured	.76	.80	.80	.83	8,740	9,680
<u>Water Heat</u>							
	Single Family	.86	.82	.80	.81	3,710	3,540
	Multifamily	.83	.79	.97	.98	2,620	2,490
	Manufactured	.96	.98	.97	.99	3,100	3,030
IOUs							
<u>Space Heat</u>							
	Single Family	.28	.29	.35	.37	6,680	5,940
	Multifamily	.84	.84	.92	.87	2,060	1,740
	Manufactured	.62	.69	.72	.74	7,800	8,800
<u>Water Heat</u>							
	Single Family	.76	.70	.66	.65	3,340	3,080
	Multifamily	.92	.90	.96	.96	2,450	2,230
	Manufactured	.81	.79	.83	.83	2,860	2,620

Table 31 indicates that electric space heat penetration rates for both utility types in 2010 are expected to increase slightly above 1990 levels, in both single family and manufactured housing types. Electric water heat saturations by 2010 are projected to drop slightly relative to 1990 levels in both pools and across all housing types with the exception of Public manufactured housing.

Space heating electricity use per household is estimated to drop across housing types except manufactured housing and rate pools. This is largely a function of improved thermal performance of new construction and efficiencies in space heating equipment.

Water heating electricity use per household is predicted to decline over the 20-year forecast period, reflecting the presence of more efficient electric water heaters in the appliance stock, which drives down the average use per unit.

Table 32 shows the annual average rate of growth (AARG) of total residential sector electricity sales for both temperature-normalized historical sales and the long-term forecast values for 2000 and 2010. Weather-adjusted sales data were used in the comparison since these figures more closely equate to the forecast estimates which are computed for a normal heating year.

The growth in electricity sales rebounded during the 1984-1989 period, following zero or negative growth experienced during the late 1970s and early 1980s, a period that witnessed substantial increases in the retail price of electricity, coupled with the recessionary pressures experienced by the region's

economy. The recovery in electricity sales is most pronounced for the public utilities, which grew on a temperature-normalized basis at 2.0 percent annually over the 1984-1990 period.

Temperature-normalized historical electricity sales in those areas served by investor-owned utilities (IOUs) have been somewhat flat, growing at near 1 percent annually through 1990. In addition to being moderated by the same recessionary pressures of the late 1970s and early 1980s experienced by the public utilities, sharp increases in IOU retail electricity prices relative to natural gas, coupled with the increasing availability of natural gas in the IOUs' service territories, have contributed significantly to the loss of new electric market share for the IOUs during the 1980s. As a result, and as shown in Table 31, a large portion of the IOUs' residential space heating market has shifted away from electricity, generally in favor of natural gas.

By the end of the decade of the 1990's the average growth for the IOUs is expected to exceed that of the publics 1.5% vs. 1.3%, primarily due to the growth in end-uses other than space heat or water heat. By the end of the forecast period, the growth in both pools will slow but the public pool growth will still barely lag behind that of the IOUs, 1.2% AARG for the publics and 1.3% AARG for the IOUs. Although the public sector will experience slightly higher numbers of new housing units, the higher growth in electricity demand for other end-uses in the IOUs will off set the higher number of new housing units in the public pool.

Table 32
Residential Sector Electricity Demand Growth
(AARG in Percent)

	Actual 1984*-1990*	Predicted 1990*-2000	Predicted 1990*-2010
Public Utilities	2.0	1.3	1.2
IOUs	1.1	1.5	1.3

*Temperature-normalized actuals

Figure 8
IOU Residential Electricity Sales

Figure 9
Public Utility Residential Electricity Sales

Determinants of Residential Electricity Sales

As discussed previously, the demand for electricity in the residential sector is principally a function of fuel choice, changes within the housing stock, and the efficiency and utilization of electricity-using equipment and appliances.

The space heating end-use is the largest single consuming end-use in the residential sector. In addition to the efficiency of the space heating equipment, space heating requirements are also determined by the thermal integrity of the dwelling. Table 33 presents the per-unit electric space heating requirement of a new, regionally representative, single family dwelling. These estimates are derived from engineering technology curves used to represent improved shell performance of a "regionally representative" house.

Table 33
Space Heating Electricity Use in a New Single Family House
(Kilowatthours Per Year)

	Public	IOU
1979 Base Year Value	13,500	10,500
1980-86 Building Practice	9,700	8,400
OR/WA Building Codes (1986)	7,800	6,500
1992 Codes	5,300	4,100

Table 33 presents the effect that improving structural integrities through more stringent building standards and codes has had on residential space heating electricity requirements over the past decade. Oregon and Washington Building Codes (OR/WA Codes), adopted in 1986, have, on average, reduced the annual electric space heating requirement of a new, regionally representative single family unit by approximately 1,900 kilowatthours, compared to building practices that existed during the 1980-1986 period. With the adoption of new MCS- level codes by Washington, effective in 1991, and by Oregon, effective in 1992, average savings of 2,500 kwh per unit are achieved beyond the 1986 code level. As shown in Table 34, cumulative 1992-2010 medium case regional savings of 196 average megawatts, over and above the savings due to the earlier 1986 codes, can be attributable to 1992 Codes. 95 average megawatts of this increased savings is predicted to occur in areas served by the public utilities.

Table 34
Savings Attributable to 1992 Building Codes By Forecast Range
(Average Megawatts)

	Low	Medium-Low	Medium	Medium-High	High
Public Utilities	40	75	95	126	203
Regional	84	156	196	252	400

In addition to measures increasing the thermal integrity of residential dwellings, federal appliance standards that specify the efficiencies of various residential end-use equipment will also affect future demand for electricity. Savings attributable to the 1993 Federal Appliance Standards for refrigerators, freezers, and water heaters have been incorporated into the 1991 long-term forecast. Table 35 compares estimated electricity use per unit under varying Federal Appliance Standards with equipment use in the forecast's base year of 1979.

The imposition of the 1993 Federal Appliance Standards is estimated to have an effect of saving nearly 300 kilowatt hours per year in refrigerators, when compared with the earlier 1990 standards, and 200 kilowatthours per year in freezers. Table 36 indicates that approximately 157 average megawatts of cumulative 1992-2010 regional savings are attributable to the 1993 Federal Appliance Standards, approximately 63 average megawatts of this among the public utilities. These savings are over and above the savings under the earlier 1990 Federal Standards.

Table 35
Selected End-Use Effect of 1993 Appliance Standards
(Kilowatthours Per Year)

	1979 Base Year	1990 Standard	1993 Standards
Refrigerator	1,600	980	700
Freezer	1,200	690	500

1/ Regional average

As with natural gas, the use of wood as a source of residential space heat can affect residential electricity sales. In addition to being considered a primary source of space heat, wood is also considered a supplemental fuel available to residential consumers to augment or temporarily replace the use of conventional-fuel space heating equipment.

To estimate the magnitude of wood heating's effect on residential electricity sales, BPA has studied the use of wood as a heat source. First, a recent study conducted by BPA and the Washington State Energy Office indicates that nearly one-fifth of all Washington State households with electric space heat use woodstoves or fireplaces. Of these households, approximately 70 percent use wood for space heat, while the remaining portion burn wood for "aesthetics".

Table 36
Savings Attributable to 1993 Federal Appliance Standards
By Forecast Range
(Average Megawatts)

	Low	Medium-Low	Medium	Medium-High	High
Public Utilities	49	59	63	68	81
Regional	122	147	157	167	198

An on-going analysis of residential ELCAP-metered data performed by BPA and Pacific Northwest Laboratories staff is also under way. This analysis has led to the development of a residential space heat model that explicitly accounts for the use of wood heat in residential dwellings equipped with permanently installed electric space heating systems. The results from this analysis indicate that, in 1982, approximately 1,300 kilowatthours per year of electricity per electrically heated house were displaced by the use of wood as a supplemental heat source. It is estimated that on a regional basis, given the number of electrically heated single family units with wood burning capability, the use of wood heat for residential space heating currently displaces approximately 130 average megawatts of electricity annually.

Commercial Sector Load Forecast

Forecasting Methods

The five projections embodied in the forecast range were primarily the result of simply running different sets of economic inputs (i.e., employment) and fuel and electricity prices through the commercial demand model used by BPA and the Council. Adjustments were carried out prior to the execution of the forecast to calibrate the model to actual commercial sales for the 1979-89 period. Without these adjustments, the model tended to underforecast actual commercial sales. These adjustments included (1) substitution of actual survey-derived estimates of commercial square footage for years between 1979 and 1986 for those developed internally by the model based upon employment over that same time period, (2) a gradual alteration of post-1990 office employment values to simulate the return to normal levels (i.e., 10 percent) of vacancies after a mid-1980s high of 20 percent, and (3) the introduction of an amenity factor to reflect recent changes in operating hours, comfort levels, and energy management systems in offices, retail establishments, schools, colleges, and the miscellaneous building category represented in the model.

The version of the model currently used to produce the long-term commercial forecast displays a strong response to price in the fuel choice component. As a consequence, space heating choices throughout the forecast look very different between the two rate pools (i.e., public and private utility). Among public utility customers, where electricity prices are relatively lower, there is a much higher predicted saturation of electric space heating than is the case for customers of investor-owned utilities. Lacking comprehensive regional survey data on commercial fuel choice, it is difficult to evaluate the accuracy of this model component. Utility-level surveys taken in the Seattle and Portland areas suggest that the differences between the two rate pools might not be as significant as the model predicts. In sharp contrast, information obtained from out-of-region utilities that have commercial rates comparable to those predicted for the Northwest in the outyears of the forecast display electric space heating saturations comparable to those produced by the model. In an attempt to explicitly address this dimension of uncertainty, the high-case parameters for the fuel choice microsimulation were changed in a way that would make the selections of public and private utility customers similar, despite rate

differentials. This has the effect of raising the high case slightly, thereby widening the bandwidth of the range to accommodate more potential uncertainty regarding commercial customer behavior and its impact on sales.

Recent Historical Loads

During the 1980s, when demand growth slowed dramatically for most sectors, the commercial sector continued to show significant annual increases, raising its share of total regional sales from 16 to roughly 22 percent between 1970 and 1990. Although rates of growth did not match those of the 1970s (5.3 percent per year), commercial sales climbed steadily throughout the 1980s (3.5 percent per year), even during the harshest recessionary periods. While it is difficult to identify all the factors which contributed to this growth, several stand out as having significant effects.

Perhaps most notable was the heavy construction of strip malls and downtown office buildings, which boomed at a time when the economy was conspicuously sluggish. Office vacancies soared to unprecedented levels (near 20 percent), while, at the same time, even more new office space was constructed. Tax laws at the time made it advantageous for developers to build, even if a large portion of the newly constructed space went unused. More particularly, in the Seattle area, building ordinances were proposed which were designed to limit downtown construction. In anticipation of the passage of these ordinances, an abnormally high number of new projects were "grandfathered" in, hastening an already exceptional increase in office space. In recent years, these conditions have changed and vacancies have shown the beginnings of a downward trend, though not yet to normal levels.

Other, less directly measurable, changes in the commercial sector seem to have had effects on electricity sales. A number of unanticipated uses for electricity (or, in some cases, underanticipated levels of use) appeared to have influenced the increased growth in sales. Most notable of these was the proliferation of computers, office machines, and miscellaneous equipment in both new and existing buildings. While the commercial model was designed to account for a "miscellaneous" load that encompassed electromechanical end uses, much more modest growth was expected than actually occurred. Also underestimated by the designers of the commercial model was the impact of exterior and security lighting. The commercial model treats 100 percent of floor space as lighted, then simply deals with changes in lighting load as a function of changing efficiencies of lamps. Since electricity prices tended to rise (and lighting standards were introduced) during the 1980s, the per-square-foot electricity consumption for lighting predicted by the forecasting model has tended to decrease. What the model has virtually omitted is the impact of exterior lights, which, in effect, raise lighting saturations to greater than 100 percent. Finally, there is anecdotal information from a number of sources suggesting that many newer buildings are being run differently than anticipated, with increased operating hours, comfort levels, or both. Without some sort of adjustment for such "amenities," the commercial model appears to miss some of the electricity-consuming activity in the sector. These diverse trends not only seem to have increased actual electricity consumption in the recent past, but also promise to continue doing so in the future.

It was mentioned above that uncertainty exists concerning space heating fuel choice in the Northwest region. Until a number of sources of data (including the recently completed Pacific Northwest Nonresidential Energy Survey (PNNonRES) can be subjected to thorough and comparative analyses, it will be impossible to ascertain with any certainty how much of the standing commercial space (or water) in the region is heated using electricity. If, as some sources suggest, the penetrations and saturations for electricity are higher than the commercial model predicts, this could be a source for the undercounting of electricity sales over the entire forecast period. While current information on fuel choice and the dynamics underlying it is conspicuously incomplete, a recent study conducted by the Gilmore Research Group for BPA provided some valuable first insights into both current selections for space heating equipment and the decision factors underlying them.

This research proceeded through three stages. During the first two stages, interviews and focus group sessions were conducted with members of the commercial building design and development communities to discover what types of heating systems they were installing in new buildings and what factors were considered in making these equipment selections. In the final stage, a brief telephone survey of over 300 buildings constructed in Oregon and Washington between January 1986 and December 1988 was conducted. The buildings in the survey were sampled from a list of new commercial construction projects obtained from F.W. Dodge. Dodge follows projects from the initial request for a permit up to the groundbreaking stage for the new building. Because care was taken to sample only those projects for which ground had been broken, a high response rate (over 97 percent) was obtained during the survey. This study is described in detail in Fuel and Equipment Choice in New Commercial Construction: Final Report available from the Power Forecasting Branch at BPA. In brief, the major conclusions of the study can be summarized as follows:

- the final responsibility for fuel choice decisions lies with owners and developers;
- fuel choice decisions may be the result of pre-existing building designs or simply developer preferences;
- the factors of greatest importance in HVAC decisions are fuels availability, intended use of the structure, payback period, and maintenance requirements;
- for a large portion of developers, initial cost rather than life-cycle cost forms the basis for equipment selection decisions; and
- heating fuel choices display a pattern of preference by building type in all offices, roughly 70 percent of the space heated area uses electricity as a fuel source (and almost 100 percent of large offices), while about 33 percent of new retail construction, 76 percent of grocery floor area, 39 percent of restaurants, and 29 percent of warehouses use electricity.

These results do not provide a sufficient basis for a full evaluation of the fuel choice component of the forecasting model. They do, however, provide insights that may be used to evaluate the plausibility of several key model results and guide further investigative efforts.

First of all, the findings of high levels of electric heating in offices suggests that the model is not overstating its use during the 1980s and 1990s. The model shows electric space heating saturations in offices at levels above 1979 base year levels despite relatively unfavorable electricity prices. It would seem that engineering construction decisions predisposing developers toward electricity are at least as strongly felt as the model predicts.

Secondly, the findings more generally call to question the responsiveness of the commercial model's treatment of fuel choice in selected building types (e.g., gas in restaurants) where one fuel seems to dominate based on design considerations. The study, unfortunately, provided insufficient detail to conduct a thorough evaluation of this behavior, let alone permit a respecification of the choice parameters underlying the microsimulation of decisionmaker activity.

Finally, the Gilmore findings suggest that for some building types (such as offices) the differences between rates found in public and private pools should have less effect on fuel and equipment choice than the model projects (i.e., the fuel choice component is overresponsive). Once again, a larger and richer set of data is required to conduct the analysis necessary to test this claim or support model revisions.

Commercial Sector Forecast Results

Table 37 displays regional commercial electricity sales for the five cases comprising the forecast range. The range accommodates 3,313 average megawatts of uncertainty by the year 2010. This value represents the difference between the low case (which actually displays a 324 average megawatt increase from 1990) and the high case (in which electricity sales increase by 3,788 average megawatts over the 21-year period described in the forecast).

Table 37
Commercial Sector Electricity Demand
(Average Megawatts)

	Actual 1990	1995	Forecasts		Growth Rate (% per year) 1989-2010
			2000	2010	
High	3,870	4,948	5,721	7,549	3.4
Medium-high	3,870	4,494	4,993	6,295	2.5
Medium	3,870	4,346	4,676	5,610	1.9
Medium-low	3,870	4,081	4,210	4,969	1.3
Low	3,870	3,912	3,906	4,236	0.5

Closer inspection of the medium case reveals some of the trends projected to occur in the commercial sector during the 20-year study period. Table 38 presents a number of summary indicators for the sector at 5-year increments. It disaggregates the region by public and private utility, allowing for comparisons of rate pool behavior.

Over the forecast period, several trends emerge regionally. For both rate pools, the growth of commercial floorstock slows abruptly in the 1990s, following the economic recovery and boom in office space construction of the late 1980s. Average Annual Rates of Growth (AARGs) drop from over 3 percent to between 1 and 2 percent per year. At the same time, increasing electricity prices induce gains in equipment efficiency. In terms of actual use-per-square-foot kilowatthour consumption, however, the gains in efficiency are at least partially offset by amenity enhancements. For both public and investor-owned utilities, space heating use per square foot is much less for offices than for commercial buildings. This is not surprising, since a large percentage of office floorstock is in large buildings, where shell characteristics and internal heat gains from lights and equipment make space heating a relatively minor portion of the load. Across the sector, both the price of electricity and the price of natural gas have an effect on the saturation of electricity as a heating fuel. During the late 1980s, the price of natural gas actually dropped, and in the medium case is predicted to increase very gradually through the end of the forecast period. By contrast, the price of electricity grew during the 1980s (although both rate pools leveled off near the end of the decade) and is forecasted to grow again beyond the mid-1990s. Gas becomes relatively more, then relatively less, attractive as the decade progresses. Both rate pools show an increase in electric space heating in the forecast outyears resulting in generally higher electric space heating penetrations. The composite effects on sales growth are reflected in the energy forecasts for the two rate pools. Sales in both rate pools slow in the 1990s (relative to the late 1980s regional economic recovery) and accelerate modestly after 2000.

Table 38
Commercial Sector
Medium Case Summary Indicators

		1990	1995	2000	2005	2010
Floor Space (million sq ft)	Public	737.5	783.0	834.5	890.4	942.4
	IOU	1,395.7	1,516.9	1,166.1	1,829.3	1,991.6
Electricity Prices	Public	3.4	3.2	3.3	3.3	3.5
(1990 ¢/kWh)	IOU	5.2	4.9	5.2	5.5	6.0
Natural Gas Price	Both	3.65	3.48	4.36	4.82	5.11
(1990 \$/million btu's)						
Sales (kWh per square foot of floor space)						
Offices						
Space Heat (offices	Public	6.4	6.7	6.8	6.7	6.5
heated by electricity)	IOU	6.2	5.9	5.7	6.1	6.2
Lighting	Public	8.3	8.4	8.4	8.3	8.2
	IOU	8.3	8.5	8.4	8.3	8.1
Total	Public	25.3	27.1	27.6	27.4	27.0
	IOU	24.2	24.7	24.6	24.9	24.9
All Commercial Buildings						
Space Heat (buildings	Public	10.5	11.0	11.0	10.7	10.2
heated by electricity)	IOU	8.0	8.1	8.0	7.8	7.3
Lighting	Public	6.0	6.1	6.1	6.0	5.9
	IOU	5.1	5.2	5.1	5.1	5.0
Total	Public	19.8	20.8	21.0	21.1	21.5
	IOU	14.5	14.4	14.1	14.3	14.5
Saturation of Electric Space Heat (%)						
Offices	Public	74	78	79	82	88
	IOU	66	64	61	66	74
All Commercial Buildings	Public	60	64	64	68	76
	IOU	42	38	34	38	47
Total Sales (aMW)						
Public						
Space Heat		539	631	673	736	834
Lighting		505	543	578	610	639
Total		1,664	1,860	1,998	2,148	2,313
IOU						
Space Heat		535	528	518	621	774
Lighting		814	895	977	1,057	1,133
Total		2,312	2,486	2,678	2,980	3,297
Region Total						
Space Heat		1,074	1,158	1,191	1,356	1,608
Lighting		1,319	1,438	1,554	1,667	1,771
Total		3,976	4,346	4,676	5,128	5,610

Commercial electricity sales in public utility service areas grow at a rate of 1.8 percent per year between 1990 and 2000, and at 1.6 percent between 1990 and 2010. These particular patterns of growth are the result of the combined influences of employment increases (through its impact on floorspace) and changes in comparative fuel prices. Commercial square footage growth slows most noticeably in the early 1990s, as vacancies in offices (the high-growth segment of the 1980s) move toward normal levels.

Although commercial construction continues, the boom in downtown Seattle, which contributed strongly to the unprecedented high regional growth in the 1980s, is over by the early years of the forecast. Overall square footage growth in public utility areas proceeds at a rate of 1.2 percent over the 20-year forecast period. At the same time that floorspace growth is the slowest, natural gas prices reach their lowest point in the 1979-2010 period, while electricity rates which grew rapidly through the 1980s, level off briefly during the 1990s. These price trends induce efficiency gains and fuel switching, lowering the use per square foot consumption and slowing the increase in electric space heating saturations. As natural gas prices increase relative to electricity later in the forecast period, electricity use increases. In 1990, commercial buildings, on average, use 10.5 kilowatthours per square foot for heating, and 6.0 kilowatthours for lighting. Space heating saturation is 60 percent. By 2010, the average kilowatthour use per square foot for heating is 10.2 and saturations top out at 76 percent. For offices, where electricity is the fuel of preference (at least in larger structures), electric space heating saturations are visibly higher (topping out at 88 percent). For lighting, buildings average 5.9 kilowatthours per square foot in that same year. An examination of the use-per-square-foot values for offices reveals several contrasts that underscore the characteristics of this important building type. Space heating is lower for offices than for commercial buildings on average (6.5 vs. 10.2 kilowatthours per square foot in 2010). Large offices tend to display significant internal heat gains due to shell characteristics, high occupancy, and the heavy use of business machines. As such, they require less space heating. For lighting, however, the 2010 value for offices exceeds the commercial average (8.0 vs. 5.8), since higher illumination levels are needed because of all the deskwork being conducted on the premises.

Although the overall 20-year rate of growth differs only slightly for investor-owned utilities (1.7 vs. 1.6 percent), the forecasts differ significantly in a number of ways. Most of these differences are the result of the noticeably higher electricity rates for IOUs and their impacts on consumption. Square footage grows at a rate of 1.8 percent over the forecast period, but during the 1990s the effects of relative fuel prices slow sales growth. In 1990, only 42 percent of commercial square footage is electrically heated in IOU service territories (66 percent of offices), and this percentage falls to 34 percent by 2000. As fossil fuel prices increase relative to electric rates in the forecast outyears, space heating rebounds slightly, with saturations rising to 47 percent on average and 74 percent for offices by 2010. Higher electric rates also result in lower kilowatthour-per-square-foot efficiencies. Space heating values decrease from 8.0 to 7.3 kilowatthours per square foot over the 20-year forecast period, while lighting values decline more modestly (5.1 to 5.0). In offices, lighting values for IOUs are identical to those for public utilities (8.3) in 1990 and are only slightly lower in the out years (e.g., 8.2 vs. 8.1 in 2010). Overall, IOU sales grow more slowly in the 1990s than do public utility sales, but rebound more strongly near the end of the forecast.

Irrigation Sector Load Forecast

Forecasting Methods

The low, medium-low and medium irrigation sector load forecasts are based upon observed trends in numbers of acres irrigated, coupled with technological efficiencies gained from 1979 to 1989. The range between the medium-high and medium-low encompasses the variability observed in loads from 1979 to 1990. The medium-high forecast includes 90,000 additional irrigated acres in Washington, and conversion of 500,000 acres in the Snake River Basin from flood to low-pressure sprinkler irrigation. The high forecast includes the additional 90,000 acres in Washington, and conversion of 1.3 million acres in the Snake River Basin to sprinkler irrigation (shifting from 38 percent of irrigated acres being sprinkled in 1984, to 70 percent being sprinkle-irrigated by the end of the 20-year study period). Under the medium-high case, 650,000 flood-irrigated acres are converted to sprinkler irrigation. The high and medium-high cases are designed to maintain existing levels of irrigation while conserving surface flows of water for fish migration and other uses. Depleted surface flows and endangered species recovery measures could induce stringent water conservation measures in the Snake River Basin. Table 39 lists the assumptions employed to forecast changes in loads caused by converting from flood to sprinkler irrigation in the Snake River Basin.

Sector Growth Trends

There were about 4 million acres irrigated during 1984, of which 1.5 million acres were sprinkled. In both the high and medium-high cases, 1.3 million acres would be converted from flood to sprinkler irrigation. By 2010, the medium-high case would result in conversion of 50 percent of the acres to sprinkler irrigation under the high case. Conversion is projected to follow a logistic, s-shaped pattern under both the high and medium-high cases. The high case would be fully implemented by 2010.

As Figure 10 illustrates, the irrigation load has been volatile, fluctuating by as much as 90 average megawatts year-to-year since 1975. This is attributable primarily to widely varied weather conditions. Load growth ceased during the 1980s, due to unavailability of sufficient water and suitable land, combined with some improvements in efficiency.

Figure 10
Pacific Northwest Irrigation Sales History and Forecast

Irrigation Sector Forecast Results

Because of the limited availability of water and suitable lands, total acres irrigated are not forecasted to increase beyond the 90,000 acres projected for Washington under the medium-high and high cases. (See Figure 10.)

Table 39 lists the technical coefficients used to estimate the increase in load and river flow that could result by converting from flood to sprinkler irrigation. A key assumption of the high and medium-high forecasts is that farmers would be motivated to convert from flood to sprinkler irrigation.

The key factors that would shift with transition from flood to sprinkler irrigation are water and electricity consumption. Shifting from 40 percent to 65 percent irrigation efficiency would conserve about 0.7 acre-feet of water per acre now flood-irrigated. Flood irrigation consumes no electricity for pumping at the field (headgate). Pressurizing for sprinkling would require about 240 kilowatthours per acre-foot of water pumped, an increase of 530 kilowatthours per sprinkled acre.

With full implementation, load would increase by 93 average megawatts. Load to public utility customers would increase by 9 average megawatts, assuming conversion would be distributed between private and public utilities proportional to their current irrigation load.

Both the electricity consumption and water conservation factors are preliminary; the results are considered to be within only 20 to 30 percent of what a more thorough investigation would establish.

The important result is that significant water conservation would be possible if water law, policy and administration could assure that conserved water would be maintained for instream flow enhancement. This shift would have the effect of increasing load while also increasing power resources by increasing net flows through Snake and Lower Columbia turbines.

Table 39
Irrigation Sector Load Forecast
Technical Coefficients Used to Compute Forecasted Change

Technical Coefficients		Flood	Side-Roll Sprinkler
Crop requirement	Acre Feet	1.7	1.7
H2O Efficiency	%	0.4	0.65
H2O/Acre	Acre Feet	4.25	2.62
Return Flow/Acre	Acre Feet	1.28	0.45
Net Withdrawal	Acre Feet	2.97	2.17
kWh per acre/foot		0	240

Acreage Irrigated			
Irrigated Land (1984)	Flood	Sprinkler	Total
(BASELINE: 38% sprinkled based on ratio for Areas 24 & 32.)			
Oregon Area 24	428,500	187,200	615,700
Idaho Area 32	<u>2,075,600</u>	<u>1,326,000</u>	<u>3,401,600</u>
Total (baseline)	2,504,100	1,513,200	4,017,300
(PROJECTED: 70% sprinkled based on ratio for Areas 12 & 13: 1984)			
Acres to Convert	<u>-1,298,910</u>	<u>+1,298,910</u>	<u>-0-</u>
Total (projected)	1,205,190	2,812,110	4,017,300

Energy and Flow Effects						
Year	Power Requirements		Projected Energy and Flow Effects			
	High	Med-High	Flow Enhancement		PUBLIC's Load	
	(Average MW)		High	Med-High	High	Med-High
			(Thousand Acre Feet)		(Average MW)	
1995	6	3	71	35	1	0
2000	33	10	389	115	3	1
2002	53	15	596	168	5	1
2005	76	25	851	276	8	2
2010	90	47	1,014	523	9	5
Fully Implemented	93	93	1,045	1,045	9.3	

Assumptions, Table 39:

- Technical coefficients used in calculations are correct.
- Percent sprinkled acres will be the same as in Columbia Basin Areas 12 & 13 (1984).
- Conversion to sprinklers will follow a logistic (s-shaped) curve: slow adoption, rapid and then slow conversion from 38 percent to 70 percent of irrigated acres. High forecast assumes a 20-year conversion schedule.
- Medium-high forecast is based on a 40-year conversion schedule.
- Water institutions will be revised to retain conserved water in-stream.

SOURCES: Northwest Economic Associates and BPA Power Forecasting Branch

APPENDIX A

**NORTHWEST POWER PLANNING COUNCIL
DRAFT 1991 REGIONAL POWER PLAN
CHAPTERS 5 AND 6**

CHAPTER 5

ECONOMIC FORECASTS FOR THE PACIFIC NORTHWEST

Introduction

Under the Pacific Northwest Electric Power Planning and Conservation Act of 1980, Congress charged the Northwest Power Planning Council with forecasting electrical power requirements as the basis for a plan to meet regional electricity needs. The Bonneville Power Administration has prepared regional electricity demand forecasts since 1981 to use as a basis for its planning. These forecasts were developed with Bonneville and will be used as a common basis for resource planning and analysis. This chapter describes economic and demographic assumptions used in developing forecasts of electricity use for the Council's 1991 Power Plan.

Economic and demographic assumptions are the dominant factors influencing the forecasts of demand for electricity. A good rule of thumb is that demand for electricity will parallel economic activity in the absence of other changes. This relationship is modified by shifts in relative energy prices, including the price of electricity and other fuels, by changes in the composition of economic activity; and by the gradual depreciation and replacement of buildings and energy-using equipment in the region.

Recognizing that the future is highly uncertain, the Council and Bonneville have adopted planning strategies that incorporate flexibility and risk management. Economic and demographic assumptions are both extremely important determinants of future electricity needs and are, at the same time, highly uncertain. The objective of the range of planning assumptions discussed in this chapter is to help define the extent of uncertainty. Planning must address a range of future electricity needs that reflects, among other factors, this underlying economic uncertainty.

In order to recognize uncertainty explicitly, the Council and Bonneville have prepared forecasts that bracket the highest and lowest plausible economic scenarios for the next 20 years. The purpose of this approach is to develop a flexible resource strategy that provides an adequate supply of electricity at the lowest cost. The risks are

twofold: the risk of not having an adequate supply of electricity, and the risk of being saddled with expensive investments in unnecessary resources.

The Council and Bonneville have developed a range of forecasts for each state in the Northwest. The forecasts are built from analysis of individual sectors of the economy. The forecasts are influenced by results produced by Bonneville's Regional Economic Model, as well as studies and expertise provided by groups and individuals throughout the Northwest. Detailed review was also provided by the Council's Economic Forecasting Advisory Committee and other interested parties.

Because future economic conditions are highly uncertain, the forecasts encompass a wide range of possibilities for future economic growth. The high forecast assures that the Council's plan will accommodate record regional economic growth, should it occur. In the high forecast, total regional employment grows at almost twice the rate of a high national growth in employment. The high forecast represents a case in which the region grows faster relative to the nation than in any historical 20-year period. The low case also implies a relative performance below any historical 20-year period in the region. Table 5-1 shows a comparison of the forecast range to a range of national forecasts prepared by the WEFA Group.¹ Detailed tables showing employment, population and household forecasts by state are in Appendix 5-D.

A more likely range of outcomes is bound by the medium-high and medium-low forecasts. This smaller, more probable range shows growth higher than the nation for most of the range. This is consistent with historical patterns, because the Pacific Northwest has grown faster than the nation over the long term. The medium range of forecasts assumes this will continue to some extent.

1. The WEFA Group, *U.S. Long-Term Economic Outlook*, Volumes 1 and 2, First Quarter 1990 and Third Quarter 1990.

*Table 5-1
Comparison of Forecasts—Average Annual Rate of Growth (%) 1989-2010*

Region	High	Medium-High	Medium	Medium-Low	Low
Total Employment	2.8	2.0	1.5	1.1	0.7
▪ Manufacturing	1.5	0.8	0.2	-0.7	-1.4
▪ Non-manufacturing	3.0	2.2	1.7	1.4	1.0
Total Population	2.1	1.6	1.3	1.0	0.7
Households	2.8	2.0	1.7	1.5	0.7
Wharton National Outlook			High	Medium	Low
Total Employment			1.5	1.3	1.1
▪ Manufacturing			0.2	-0.2	-0.6
▪ Non-manufacturing			1.8	1.6	1.5
Total Population			1.0	0.8	0.6
Households			1.4	1.2	1.1

The economic and demographic forecasts in this report are similar in many respects to the forecasts for the Council's 1989 Supplement to the 1986 Northwest Conservation and Electric Power Plan. The forecasts encompass a range of employment growth between the years 1987 and 2010 that is smaller than the range in the 1989 supplement, because the medium-low and low cases are somewhat higher than in the previous forecasts. Table 5-2 shows a comparison of the forecast ranges.

Forecasts of employment growth in a number of manufacturing industries are higher in these forecasts than in the 1989 supplement forecasts. These higher growth rates are only partially offset by lower forecasts of productivity growth in many manufacturing industries. As a result, forecasts of manufacturing output are higher in all scenarios except the high case.

Forecasts for Utility Service Areas

The economic and demographic assumptions are divided into public and investor-owned utility service areas to provide inputs into the demand forecasting system, which forecasts electricity consumption by utility type. Industrial production at the detailed industry level, employment in the commercial sector, and housing units are divided into public and investor-owned utility areas for each state. The splits between public and investor-owned utility areas are provided by Bonneville. According to these estimates, approximately 40 percent of regional manufacturing production, commercial employment and households are located in public utility service areas. In the case of major manufacturing industries, the shares of production allocated to public or investor-owned utilities

were developed by detailed industry analysis of plant location or county employment patterns. Housing stock shares were allocated on the basis of customer counts in the residential sector at the utility and state level. The commercial sector shares incorporated data provided by Seattle City Light, which showed a decrease in the public utility share of King County's employment in Washington state. This historical shift was assumed to continue for King County. For the rest of Washington state and for the other states and counties, the shares of commercial sector employment were based on residential customer counts by utility and state. They were assumed to remain constant over the forecast period.

Forecast Overview

Overview of the Regional Economy

The Pacific Northwest is blessed with rich natural resources of minerals, agricultural lands, fisheries and forests. The abundance of natural resources has provided the region's inhabitants with jobs and income, as well as a desirable environment for recreation and a high quality of life.

The development of the vast Columbia/Snake River system for navigation, electricity production, irrigation and recreation has contributed to economic growth in the region. Low electricity rates, relative to those found elsewhere in the nation, have attracted electricity-intensive industries, such as the aluminum industry, to the Pacific Northwest.

Table 5-2
Comparison of Forecasts—Average Annual Rate of Growth (%) 1987-2010^a

	High	Medium-High	Medium	Medium-Low	Low
1989 Supplement to the 1986 Northwest Conservation and Electric Power Plan					
Total Employment	2.8	2.1	1.6	1.1	0.4
▪ Manufacturing	1.3	0.5	0.0	-0.5	-1.3
▪ Non-manufacturing	3.1	2.4	1.8	1.3	0.6
Manufacturing Output	4.9	3.5	2.9	2.3	1.1
Population	2.0	1.5	1.2	0.9	0.4
Households	2.7	2.0	1.6	1.3	0.3
1991 Northwest Conservation and Electric Power Plan					
Total Employment	2.9	2.2	1.8	1.4	1.0
▪ Manufacturing	1.8	1.1	0.6	-0.2	-0.9
▪ Non-manufacturing	3.1	2.4	2.0	1.7	1.3
Manufacturing Output	4.9	4.0	3.4	2.5	1.7
Population	2.1	1.6	1.4	1.1	0.8
Households	2.8	2.1	1.8	1.6	0.9
^a Growth rates differ from those shown in previous tables because they cover different time periods.					

More recently, industries such as electronics have grown in the region, attracted primarily by the quality of the labor force and quality of life. The development of port facilities and growing trade with Alaska and the Pacific Rim countries have provided a source of new jobs for the region. Growth in the non-manufacturing sectors, in general, has been rapid. These developments have provided diversity to a region dependent on resource-based industries.

During the 1960s and 1970s, total employment grew faster in the region than in the nation. Table 5-3 compares growth patterns between the region and the nation for the last three decades. During the 1980s, the region grew at about the same rate as the nation on average. However, this average growth rate masks divergent patterns of growth. In the first half of the decade, the region suffered from a severe recession that hit the region much harder than the nation. The recovery from the recession was slower and more gradual than previous experiences. In the late 1980s, however, the region once again moved into the position of growing faster than the nation. In the last few years, Northwest states have shown up in the list of the 10 fastest growing states in the country.

The region's stronger performance in the late 1980s was fueled by high operating levels in key manufacturing industries, such as forest products, aerospace and aluminum. After enduring a severe depression in the early

1980s, the region's wood products industry set new production records in the late 1980s. During this period, however, productivity gains were so high that employment in 1989 was 20 percent lower than in 1979.

The lumber and wood products category includes logging activities, some of which are related to pulp and paper production. In addition, many companies manufacture both wood and paper products. Including pulp and paper products, the forest products industry accounted for 25 percent of the region's manufacturing employment in 1989.

The second largest regional manufacturing industry is transportation equipment, composed primarily of aerospace. It accounted for 22 percent of manufacturing employment in 1989. After employment declined more than 20 percent in the early 1980s, the industry has recovered, increasing employment more than 70 percent since 1983.

Primary metals is the largest industrial consumer of electricity in the region, accounting for nearly half of all industrial electricity consumption. Most of the electricity consumption is concentrated in the primary aluminum industry, which operates 10 plants in the Northwest. This industry has experienced dramatic swings in prices of aluminum, increasing electricity prices, and increasing competition from lower-cost producing areas. Recently, aluminum smelters have increased their operating rates in

response to higher worldwide aluminum prices and more attractive electricity rates.

Pulp and paper is the second largest industrial consumer of electricity, followed by chemicals, lumber and wood products and food processing. In 1989, the top five industrial consumers of electricity accounted for almost 90 percent of the electricity used by industrial customers in the region.

Growth in regional non-manufacturing industries has lagged behind national trends throughout the 1980s and is largely responsible for the somewhat slower growth in the region's economy. Mining and government were the only non-manufacturing categories to perform better than the nation in the 1980s.

*Table 5-3
U.S. and Pacific Northwest Employment Trends—Average Annual Rate of Growth (%)*

	1967-1979		1979-1989	
	Pacific N.W.	United States	Pacific N.W.	United States
Total Employment	3.0	2.2	1.7	1.8
Manufacturing Employment	2.2	1.2	0.6	-0.7
▪ SIC ^a 20—Food and Kindred Products	1.3	-0.2	-0.1	-0.4
▪ SIC 24—Lumber and Wood Products	1.0	0.8	-2.2	0.0
▪ SIC 26—Pulp and Paper Products	0.3	0.9	0.5	-0.1
▪ SIC 28—Chemicals and Allied Products ^b	-0.1	1.6	1.7	-0.2
▪ SIC 33—Primary Metals	2.9	0.3	-2.4	-4.6
▪ SIC 35—Non-electric Machinery	6.3	2.8	1.8	-1.4
▪ SIC 36, 38 Electrical Equipment and Instruments	9.0	2.2	3.0	0.0
▪ SIC 3—Transportation Equipment	2.3	1.1	2.8	-0.1
▪ Other Manufacturing	3.4	1.0	1.4	-0.1
Non-manufacturing Employment	3.2	2.5	1.9	2.5
▪ Mining	1.2	1.6	-1.5	-2.8
▪ Construction	4.2	2.2	-0.8	1.7
▪ Transportation, Communication and Utilities	1.8	1.5	1.0	1.1
▪ Wholesale and Retail Trade	4.2	3.1	2.2	2.5
▪ Finance, Insurance and Real Estate	5.4	3.4	1.4	3.2
▪ Services	5.7	4.5	4.3	4.6
▪ Government	3.7	3.5	1.3	1.2

^a Standard Industrial Classification (SIC) code is the classification of industries used in federal statistics. See Appendix 5-B, Table 5-B-1 for list.

^b Change in classification of a facility in the region to chemicals has artificially raised the rate of growth from 1979-1989. Excluding this facility in the 1989 data would yield a growth rate of 0.8 percent.

Major Trends

There are a number of basic trends common to the range of forecasts. While the extent of change resulting

from these trends varies somewhat in each forecast, it nevertheless forms a context for the future. Many of the trends relate to demographic patterns in the existing population.

One of the primary demographic changes that continues to occur is the aging of the population. From 1989 to 2010, the national population between 50 and 59 years of age is projected to increase more than 85 percent, while the population between the ages of 25 and 34 is projected to decline by more than 10 percent. The population over the age of 60 is projected to increase by 34 percent during this period. Figure 5-1 shows the percentage change in population by age group for the nation from 1989 to 2010. Although the age composition of the population in the region will vary among scenarios because of migration, the general patterns of demographic change will persist.

This aging of the population is expected to affect consumption patterns, the labor force, and labor productivity. Consumption patterns are expected to emphasize personal services, clothing, travel and health services, as the older population increases in size. Over the next 20 years, the number of young people entering the labor force will increase at a slower rate than historically. From 1989 to 2010, the population aged 15 to 24 is projected to increase at an average annual rate of only 0.5 percent, compared to the period from 1970 to 1980 when the population in this age group increased at an average annual rate of 1.8 percent. This is the primary reason that the labor force is projected to increase at a slower rate over the next 20 years. The tightening labor supply will put upward pressure on wages. Producers will seek to substitute capital for labor, which tends to increase productivity or output per employee. In addition, the rapid pace of technological

change and continuing pressure of international competition will stimulate capital investment as well.

A second major trend is the increase in the proportion of women in the labor force. From 1960 to 1989, the female labor force participation rate increased from 37 percent to 57 percent. This trend is expected to continue to varying extents over most of the forecast range. This is reflected in the increase in the proportion of the population that is employed. The employment to population ratios are shown in Table 5-4.

Growth in the importance of non-manufacturing industries is projected in each of the forecasts. Traditionally, studies of regional economic growth have focused on the manufacturing industries. Recently, the non-manufacturing industries have attracted more attention because of their size and rapid growth. In 1989, non-manufacturing industries accounted for 83.7 percent of total employment in the region. Non-manufacturing employment increased at a rate nearly 70 percent higher than manufacturing employment from 1960 to 1979.

The outlook is strong for industries such as communications and machinery that will play a key role in growing technological changes and productivity-enhancing investments. The foreign trade sector is expected to continue to increase in importance. The Pacific Northwest is well positioned to participate in trade to the Pacific Rim countries, and that possibility is assumed to be an important component of the higher-growth forecasts.

Population Change

Figure 5-1
Percent
Population
Change
by Age Group
U.S. 1989-2010

Slower growth of the region's large resource-based industries characterizes all of the forecast range. Lumber, paper and food products are not expected to be important sources of economic growth for the region, even in the

high forecasts. As shown in Table 5-4, these industries account for a smaller proportion of manufacturing employment in all scenarios than in 1989.

*Table 5-4
Comparison of 1989 and 2010*

	1989	2010				
		High	Medium-High	Medium	Medium-Low	Low
Persons per Household	2.53	2.20	2.31	2.31	2.31	2.55
Employment/Population Ratio	0.45	0.51	0.49	0.47	0.46	0.45
Percent of Total Employment	100.0	100.0	100.0	100.0	100.0	100.0
▪ Manufacturing	16.3	12.7	12.6	12.4	11.0	10.3
▪ Non-manufacturing	83.7	87.3	87.4	87.6	89.0	89.7
Percent of Manufacturing	100.0	100.0	100.0	100.0	100.0	100.0
▪ Lumber and Wood Products	20.0	13.0	13.9	14.1	15.7	16.6
▪ Transportation Equipment	21.8	20.2	19.3	18.4	16.6	15.5
▪ Food and Kindred Products	11.8	9.8	10.2	10.6	11.7	12.4
▪ Electronics (SIC 35, 36, 38)	15.9	22.0	21.2	20.8	21.1	21.4
▪ Pulp and Paper Products	4.6	3.4	3.7	4.0	4.9	5.3
▪ Other	25.9	31.7	31.8	32.0	29.8	28.8
Percent of Non-manufacturing	100.0	100.0	100.0	100.0	100.0	100.0
▪ Agriculture	8.5	4.8	5.3	5.5	5.6	5.8
▪ Mining	0.3	0.3	0.3	0.2	0.2	0.2
▪ Construction	5.1	4.5	4.7	4.4	4.3	4.4
▪ Transportation, Communication and Public Utilities	5.9	4.6	4.6	5.0	5.0	4.9
▪ Wholesale and Retail Trade	27.6	29.6	29.8	29.3	29.1	28.7
▪ Finance, Insurance and Real Estate	6.3	7.1	6.9	6.6	6.4	6.1
▪ Services	25.5	30.4	29.5	30.6	30.7	30.8
▪ Government	20.7	18.8	19.0	18.5	18.8	19.1

Description of the Scenarios

The economic assumptions rely on basic policy assumptions, many of which operate at the national level. Each of the five regional economic forecasts was made within the context of a corresponding view of the national economy. Forecasts developed by the WEFA Group were the primary source of national economic variables used in developing regional projections.

Certain results of the national forecasts are included directly in the regional forecasts. These include inflation rates, interest rates, industry-specific productivity growth, and basic demographic patterns. Other assumptions create a greater variation in the regional forecasts than in the national forecasts, however. These include wider fuel price ranges, regional shares of national employment growth by industry, and specific assumptions about the viability of the regional aluminum industry.

In developing the scenarios, it is important to recognize the wide range of possible outcomes for the regional economy. A short-term view of the future was rejected in favor of developing scenarios that would encompass a wide range of uncertainty about the region's economy in the long run. The high case presents quite a different future for the regional economy than the low case. For example, there are 50 percent more jobs in the region in the high case than in the low case by the year 2010.

In addition to an underlying high-growth scenario on the national level, the regional outlook for the high-growth case implies that the region's economy fares better, relative to the nation, than it has in the past. The large resource-based industries, such as forest products, aluminum, agriculture and basic chemicals, maintain a vital presence in the region's economy but are not expected to contribute to new jobs. In the high case, employment in lumber and wood products is projected to decline 10 percent from 1989 to 2010. Other resource-based industries show no increase in jobs. On the other hand, industries such as electronics, trade and services expand rapidly, nearly doubling their employment in 20 years. As shown in Table 5-1, total employment is projected to increase 2.8 percent per year, which is similar to the rate of growth sustained by the region from 1960 through 1980. Population is projected to grow 2.1 percent per year, while households grow 2.8 percent per year. The following conditions are assumed for the high case. The region will continue to be a favorable location for growth, because of: 1) the richness and diversity of its natural resources; 2) the quality of the environment and labor force; 3) the quality of the educational system; 4) relatively lower electricity prices; and 5) proximity to expanding markets in Japan and other Pacific Rim nations.

In the medium-high scenario, rapid growth in high-technology and commercial industries is coupled with moderate levels of activity in forest products, agriculture and basic chemicals. Employment in non-manufacturing industries increases nearly 60 percent. These changes result in employment growth of 2.0 percent per year, and population and household growth of 1.6 and 2.0 percent per year, respectively. Although the overall level of employment growth in the medium-high scenario is slower than the region experienced in the 1960s and 1970s, it still represents a case in which employment growth is one-third faster than national growth in the high case.

In the medium-low growth forecast, traditional industries experience low levels of economic activity, while other manufacturing and commercial industries experience moderate growth levels. Employment in lumber and wood products is projected to decrease by one third. The region continues to increase its share of employment in electronics and non-manufacturing industries, however. Total employment is projected to increase 1.1 percent per year, with population and households increasing 1.0 percent and 1.5 percent per year, as shown in Table 5-1. In the medium-low scenario, employment growth is as slow as national growth in the low case.

The regional outlook for the low case shows very slow growth in total employment over the 20-year forecast horizon. In this scenario, the region plunges into a deep recession in the early 1990s, which is followed by a slow recovery. Manufacturing continues to decline throughout the forecast period. Growth in non-manufacturing is partially offset by declines in many of the larger, traditional industries. Employment in aerospace is projected to decline by almost 50 percent. Total population and households are both projected to increase 0.7 percent per year. This slow level of growth implies net outmigration of population throughout the forecast period.

Employment and Production

Lumber and Wood Products

In 1989, the regional wood products industry accounted for 44 percent of U.S. softwood lumber production and 36 percent of U.S. softwood plywood production. The bulk of production in the region—more than half of lumber production and 70 percent of the softwood plywood production—occurred in Oregon. Furthermore, a large proportion of production in both Oregon and Washington is west of the Cascades. The lumber and wood products industry is the second largest manufacturing industry in the Pacific Northwest, accounting for 20 percent of manufacturing jobs in 1989.

In recent years, the industry has experienced wide swings in production and employment levels. A major factor contributing to volatility in this industry is new housing. New housing accounts for 40 percent of the market for lumber and wood products. Figure 5-2 is a graph showing U.S. housing starts, Pacific Northwest lumber production, and plywood production for 1960 to 1989. The graph shows that regional lumber and plywood production follows a cyclical pattern similar to U.S. housing starts.

Other factors affecting lumber and plywood demand include housing types, average housing unit size, growth in other end uses for lumber and plywood, and international demand. An average-sized single-family unit uses approximately three times as much lumber and wood products as a multifamily unit. From 1970 to 1974, the average share of single-family units to total units was 58 percent. This share increased to 73 percent for the years 1975 to 1979. The share of single-family units is affected by the cost of housing and demographic factors. An area of growing demand for lumber and plywood in the last few years has been in repair and remodeling use. Currently, repair and remodeling account for close to 40 percent of U.S. lumber consumption. The value of the dollar compared to other currencies has an impact on exports of lumber and wood products. Dramatic increases in exports through Northwest ports have occurred over the last few years. Industry and government groups have escalated their efforts to increase exports through marketing programs in recent years as well.

The region's lumber industry has experienced increasing competition from lumber-producing areas in the southeastern United States over the last several decades. Higher transportation, labor and stumpage costs have made it difficult for the Northwest to retain its historical market shares. Northwest lumber mills have responded by seeking lower wage rates and taking steps to improve labor productivity. Although production levels in the late 1980s broke previous records established in the 1970s, employment was nearly 20 percent lower in 1989 than in 1979. In spite of cost cutting, Northwest production costs remain higher than costs faced by Southeastern competitors.

In the Southeast region, timber resources are owned primarily by the forest products industry and other private parties. The timber harvest can respond to fluctuations in demand, relieving pressure on stumpage prices. In addition, the tree growth cycle is faster in the Southeast—approximately 35 years compared to 50 years in the Northwest. In the Northwest, the federal government owns more than half of the commercial timberlands. Timber resources under the management of the U.S. Forest Service are governed by laws limiting cuttings to a level that may be maintained over the long term.

In the Northwest region, controversy over the future of old-growth forests and survival of species such as the northern spotted owl contribute to the uncertainty about future timber availability from federal lands. Other factors that add to the uncertainty of future timber resources

include natural disasters, improvement of timber management techniques, and changes in wilderness or recreational designations, to name a few.

Southeast timber resources are also subject to several uncertain factors. Recent studies show that more privately held timberlands in the Southeast are being lost to other uses, such as agriculture or urban development, than previously thought. New studies indicate that southern timber inventories will soon begin to decline. In addition, the intensity of management applied by non-industry private timber owners is subject to uncertainty.

The Northwest wood products industry also faces competition from Canadian producers. Canadian producers increased their share of the U.S. market rapidly in the late 1970s and early 1980s. U.S. producers prevailed in a dispute involving Canadian government subsidies to private companies, which resulted in a 15-percent export tax on Canadian lumber destined for the United States.

Competition to the region's plywood industry is provided by the introduction of low-cost substitute products. The substitutes include products such as waferboard and oriented strandboard. These products are fabricated from faster-growing trees and waste chips. Their main cost advantage is the use of lower-cost materials. Although there are mills currently in the region or under consideration that produce these products, most of the plants producing waferboard and oriented strandboard are expected to be located in other regions of the country.

Lumber and Plywood Production

Figure 5-2
Comparison of
Pacific Northwest
Lumber and
Plywood
Production with
U.S. Housing
Starts 1960–1989

As the region enters the 1990s, a number of timber supply issues are unresolved. The region is faced with a declining private timber supply, a legacy of harvesting practices of 50 and 60 years ago. In addition, the supply of public timber is declining because of competing uses of public forests and concerns regarding old-growth timber.

The U.S. Fish and Wildlife Service determined in June of 1990 that the northern spotted owl was a threatened species. A federal interagency team of scientists developed a proposal, known as the Jack Ward Thomas report, to prevent the extinction of the spotted owl. Congressional and administrative committees are exploring other alternatives as well. These issues will not be resolved in the near future, as timber interests and environmental interests are sure to carry on the disputes for years.

The reductions in lumber processing from spotted owl set-asides may be partially offset by recently enacted federal legislation that allows states to restrict the export of logs from state-owned lands. This issue also remains unresolved.

The production forecasts presented in this paper are based on recent U.S. Forest Service forecasts. The Forest Service projects demand and supply from the timber-producing regions in the United States to the year 2030. The medium case is based on new Forest Service management plans, with adjustments to reflect old-growth set-asides to protect the spotted owl on federal lands similar to preliminary estimates of the impacts of implementing the Jack Ward Thomas report.

There is a great deal of uncertainty regarding the outcome of spotted owl protection efforts on timber harvests. The ranges around the medium case reflect this. In all the scenarios, production decreases from current levels until the turn of the century. A greater supply of private timber becomes available beginning then as the improved management techniques on private lands over the past few decades begin to bear fruit.

Changes in output per employee are used to convert production forecasts into employment. Production, employment and output-per-employee forecasts for the lumber and wood products industry are shown in Table 5-5.

Pulp and Paper

The pulp and paper industry is the second largest industrial consumer of electricity in the region. In 1989, firms producing pulp and paper products accounted for 20 percent of the electricity consumed by industry as a whole. The pulp and paper industry employed 29,800 people in 1989.

In the Northwest, most of the raw material used in the pulp-making process is wood chips, a byproduct from lumber and plywood plants. Availability and cost of wood chips in the future will operate as a deterrent on capacity expansion in this region. Restrictions on timber supply may lead to lower levels of lumber and plywood produc-

tion. In addition, lumber and plywood mills have improved the yield from each log. These trends lead to less available log residue for use in pulp and paper production. Another factor has been the growth of the export market for chips.

The long-term outlook for the Pacific Northwest industry is favorable with regard to proximity to markets in the West and in the Pacific Rim. Other factors, however, including fiber availability and comparative production costs (such as the cost of labor), compare less favorably to the Southeastern producing areas. The Northwest's advantage in electricity costs has decreased to some extent as a result of large increases in electricity rates since 1979. Not only are electricity costs a major portion of direct operating costs, but electricity prices also affect the costs of chemicals used in the bleaching process. Chlorine and caustic soda are produced through an electrolytic process, which is highly electricity intensive.

Nationally, the demand for paper products is expected to be strong, with paper holding its own against petroleum-based plastic products. In addition, the Northwest has the largest inventory of preferred long-fiber softwoods, and access to ports to serve world markets.

The production forecasts for the primary production categories of pulp (SIC 2611), paper (SIC 2621) and paperboard (SIC 2631) were based on staff analysis and on work performed by Ekono, Inc., for Bonneville. Ekono supplied Bonneville with a range of projections by industry for the region, based on its analysis of fiber availability and cost compared to other regions.² Bonneville and Council staff reviewed historical trends and modified the forecasts to reflect comments from the Economic Forecasting Advisory Committee. Forecasts for regional production, employment and productivity growth in the pulp and paper industry are shown in Table 5-6.

In addition to primary products, the pulp and paper industry includes the production of miscellaneous converted paper products (SIC 264), paperboard containers and boxes (SIC 265), and building paper and board mills (SIC 266). These categories include the manufacture of bags, boxes and containers, writing paper, tissue paper and building board at sites where primary products are not produced. Industries within these categories locate close to population centers. The employment forecasts are shown in Table 5-6.

2. Ekono, Inc. *A Study to Review and Update Production and Energy Consumption Data for the Pacific Northwest Pulp and Paper Industry*. Report No. 02340. Submitted to the Bonneville Power Administration. August 20, 1990.

*Table 5-5
Lumber and Wood Products Forecasts 1989-2010*

	Production			Average Annual Rate of Growth (%)		
	1989	2000	2010	1989- 2010		
Lumber (SIC 2421) (billion board feet)						
High		15.4	17.4	0.3		
Medium-High		14.1	15.9	-0.1		
Medium	16.4	12.8	14.5	-0.6		
Medium-Low		11.6	13.0	-1.1		
Low		10.3	11.6	-1.6		
Plywood (SIC 2436) (billion square feet)						
High		7.7	8.5	-0.6		
Medium-High		7.1	7.8	-1.0		
Medium	9.6	6.4	7.1	-1.4		
Medium-Low		5.8	6.4	-1.9		
Low		5.2	5.7	-2.5		
	Employment (thousands)					
		2010				
	1989	High	Medium-High	Medium	Medium-Low	Low
Lumber (SIC 2421)	47.9	42.7	40.7	37.0	33.3	29.6
Plywood (SIC 2436)	19.0	12.4	12.1	11.0	9.9	9.1
Other SIC 24	63.8	61.9	53.7	48.3	45.1	41.1
Total SIC 24	130.7	117.0	106.4	96.3	88.3	79.8
		Output per Employee—Average Annual Rate of Growth (%) 1989–2010				
		High	Medium-High	Medium	Medium-Low	Low
Lumber (SIC 2421)		0.8	0.6	0.6	0.6	0.6
Plywood (SIC 2436)		1.8	1.5	1.5	1.5	1.3
Other SIC 24		1.6	1.4	1.0	1.0	1.0

Chemicals

The manufacture of chemicals consumes approximately 11 percent of the electricity purchased by the industrial sector in the region. Elemental phosphorus production accounts for approximately half of the electricity consumed by the chemicals industry, followed by chlorine and caustic soda, which accounts for approximately 20 percent. In the Council's forecasting models, the consumption of electricity by these two industries is modeled on a plant-by-plant basis. Two of the chlorine and caustic soda plants are direct services industries (DSIs) of Bonneville.

The remainder of the chemicals industry in the region is dominated by nuclear fuels processing and agricultural chemicals (such as fertilizers). The nuclear fuels processing component has exhibited large swings in employment, as policies of the federal government have changed over the last 20 years. The agricultural chemicals component increased at a steady rate in the 1970s, but it has experienced little growth recently.

*Table 5-6
Pulp and Paper Products (SIC 26) Forecasts 1989-2010*

Industry		Production--Average Annual Rate of Growth (%) 1989-2010				
		High	Medium-High	Medium	Medium-Low	Low
Pulp (SIC 2611)		1.8	1.3	0.8	0.4	0.0
Paper (SIC 2621)		2.9	2.4	1.9	1.4	0.9
Paperboard (SIC 2631)		2.5	2.0	1.5	1.0	0.5
	Employment (thousands)					
		2010				
	1989	High	Medium-High	Medium	Medium-Low	Low
Pulp (SIC 2611)	2.4	2.1	1.9	1.8	1.7	1.6
Paper (SIC 2621)	12.9	13.4	12.6	12.4	11.2	10.6
Paperboard (SIC 2631)	5.4	5.0	4.7	4.7	4.2	4.0
Other Paper (SIC 26XX)	9.1	9.7	8.7	8.1	8.1	7.1
Total SIC 26	29.8	30.2	28.0	27.0	25.2	23.3
		Output per Employee--Average Annual Rate of Growth (%) 1989-2010				
		High	Medium-High	Medium	Medium-Low	Low
Pulp (SIC 2611)		2.7	2.6	2.4	2.4	2.2
Paper (SIC 2621)		3.0	2.8	2.4	2.4	2.2
Paperboard (SIC 2631)		3.0	2.8	2.4	2.4	2.2

Chlorine and caustic soda are produced at five plants in the region, four located in Washington and one in Oregon. Nationally, over half of the chlorine produced is used within the chemicals industry to manufacture a variety of organic and inorganic chemicals. An additional 13 percent is used by the pulp and paper industry as a bleaching agent in the production of paper. In the Pacific Northwest, a much larger portion of production goes to the pulp and paper industry varying from 32 percent to 80 percent, depending on the plant and temporary shifts in market conditions. Two of the five plants in the region are owned by pulp and paper companies.

The manufacture of chlorine and caustic soda involves the electrolytic separation of salt into two co-products: chlorine and sodium as sodium hydroxide (caustic soda). Approximately 1.12 pounds of caustic soda are produced per pound of chlorine.

The market outlook for the two products differs substantially. In the past, chlorine has held the stronger market and higher price. Expansion plans were based on growth in chlorine demand. As little as 10 years ago, caustic soda was considered an undesirable "byproduct," and for years producers sought to develop a commercial process to produce chlorine without producing caustic soda.

In the last few years, the price of caustic soda has risen and supplies have tightened, while chlorine demand has dropped and prices have remained stable.

Industry experts have predicted growth rates for national chlorine demand to range from an average of 1 percent to 3 percent per year, whereas demand for caustic soda could increase at rates ranging from 2.5 percent to 5 percent. This is slower than the rate of growth in production from 1960 to 1980, which averaged 4.1 percent per year. From 1970 to 1980, however, production increased at an annual rate of only 1.6 percent. The outlook for chlorine has been affected by environmental regulations on effluent standards. Pulp and paper producers may substitute other chemicals in pulp bleaching to reduce dioxins. The outlook for caustic soda is much more favorable because it has a broader base of end uses. One of the fastest growing end uses is in the neutralization of waste acids. Tougher environmental standards would enhance the outlook for caustic soda. Soda ash can be substituted for caustic soda, and although the initial investments required to handle soda ash are high, projections of relative price increases for caustic soda and soda ash favor some conversion to soda ash. Production of chlorine and caustic soda is

likely to be constrained by the price of chlorine because chlorine is more difficult to store.

Although not all of the chlorine produced in the region is sold to pulp and paper producers, growth in the production of paper (SIC 2621) was chosen as a reasonable indicator of chlorine and caustic soda production growth. The projections presented here are within the range of projections for national production cited in the preceding paragraphs. Comparison of the production growth rates for chlorine and caustic soda and paper (SIC 2621) shows that the range of forecasts are very similar. Table 5-7 shows projections of production for chlorine and caustic soda, SIC 2812.

Elemental phosphorus production is located in only four states (Idaho, Florida, Montana and Tennessee), near deposits of phosphate rock. Elemental phosphorus is extracted from phosphate rock in electric furnaces, and frequently converted nearby to phosphoric acid and other compounds.

Elemental phosphorus plants are classified under industrial inorganic chemicals, not elsewhere classified (SIC 2819). In the Northwest, firms producing elemental phosphorus, nuclear fuel, corn starch, chemical catalysts and a variety of other products are classified under SIC 2819. About half of the nation's total elemental phosphorus production capacity is located in the Northwest. Of this, 85 percent of capacity is located in Idaho, with the remainder in Montana.

The major end-use markets for elemental phosphorus are cleansers and detergents (45 percent), food and beverages (15 percent), metal treating (10 percent) and other chemicals and cleansers (30 percent). The outlook for elemental phosphorus production in the Northwest depends, in part, on the demand for these products.

The detergent market has been projected to remain stable or increase slightly over the forecast period, with growth rates ranging from 0 percent to 1 percent per year. Non-detergent uses, such as food and beverage products and other uses, have been forecast to increase at rates of 1.4 percent to 2.4 percent per year.

The problems facing elemental phosphorus producers in the region include the cost and availability of electricity and the maturity of their markets. The costs of additional electricity beyond current contracted amounts may lead to no expansion in capacity over the forecast period. This was assumed to be the case for the low scenario. The high-case projection is a weighted average of the higher ranges of forecasts for detergent and non-detergent uses of elemental phosphorus. Projections of production are shown in Table 5-7.

The residual category for chemicals (SIC 28XX) includes a wide variety of products manufactured in the region. The larger groups in employment and energy use are the nuclear engineering, fuels and waste processing segments, and agricultural chemicals (primarily fertilizers and pesticides). There also are many other types of chemical products manufactured in the region. The forecasts for the other chemicals category are shown in Table 5-7.

Table 5-7
Chemicals Industry Production Forecasts—Average Annual Rate of Growth (%) 1989-2010

Industry	Production				
	High	Medium-High	Medium	Medium-Low	Low
Chlorine and Caustic Soda (SIC 2812)	3.1	2.3	1.6	1.6	0.9
Elemental Phosphorus (SIC 2819)	1.4	0.8	0.3	-0.2	-0.2
Other Chemicals (SIC 28XX)	3.0	1.9	0.9	0.4	-0.7
Industry	Output per Employee				
	High	Medium-High	Medium	Medium-Low	Low
Chlorine and Caustic Soda (SIC 2812)	3.0	2.2	1.5	1.5	1.5
Elemental Phosphorus (SIC 2819)	1.5	1.0	1.0	1.0	1.0
Other Chemicals (SIC 28XX)	2.5	2.0	1.3	1.0	0.3

The forecast range for the region can be compared to national forecasts for the chemicals industry. The WEF/A Group's forecasts for chemicals range from 1.9 percent to 3 percent growth in output from 1989 to 2010. The forecasts for the region are lower because of the slower growth forecast for the agricultural chemicals and the nuclear fuels processing segments of the regional industry.

Agriculture and Food Processing

Over the past decade, agriculture has adjusted to changes in the national economy, federal programs and international markets. Northwest agriculture and food markets are increasingly national and international. Increasing sales of farm products from the Midwest and Northeast to large East Coast markets has put more pressure on Northwest producers to sell overseas, primarily in the Orient. A comprehensive study of Northwest agriculture concluded that if Northwest agriculture is to experience reasonable growth, it must continue to develop foreign markets. Regional agriculture has been fairly successful in doing so.

Agricultural production supports a large food processing industry. In 1989, 76,900 persons were employed in food and kindred products (SIC 20), which represented nearly 12 percent of regional manufacturing jobs. Activity in this industry is concentrated in frozen and canned fruits and vegetables (SIC 203), which accounted for nearly half of the employment in food and kindred products and over half of food processing electricity consumption. Processed potatoes are the major products in this category, accounting for over half of the value added in the regional food processing industry. Another portion of the industry important to coastal areas is the seafood canning and freezing industry. Poor commercial fishing conditions have closed a number of these plants.

The outlook for employment in frozen and canned fruit and vegetable products relies on future demand for processed foods in the United States and Pacific Rim countries. Changes in consumer lifestyle and preferences have prompted the industry to seek specialized market niches. Most food manufacturers have implemented practices to increase the efficient use of labor, management and energy. These changes have become permanently incorporated into the industry structure and are important in the forecasts.³ The projections of employment and output in food processing for the region are shown in Table 5-8. Only the high and medium-high cases show an increase in regional food processing employment.

The High-Technology Industries

A great deal of attention has been focused recently on the high-technology industries. State and local governments in the United States and national governments around the world have initiated studies and programs designed to understand and attract economic development by encouraging growth in high-technology industries. In past years, the growth of electronics and software firms has been heralded by some as a panacea for stagnation in some of the region's resource-based industries.

The first step in a discussion of high-technology industries is to define the group of industries to be discussed. Several methods of defining high technology have been proposed, but there is no general agreement on which definition is the most appropriate. To a certain extent, the nature of technology-intensive activity makes definition difficult, because the industries are changing so rapidly. New industries are created and others become obsolete, thus causing any definition of high-technology industries to be tied to a particular point in time.

3. Wilkins, John; Stenberg, Cynthia; Farah, Mark; and Burge, Marilyn; Bonneville Power Administration. *Food Processing, SIC 20*. August 1989.

Table 5-8
Food Processing Forecasts 1989-2010

	Employment (thousands)		Average Annual Rate of Growth (%) 1989-2010	
	1989	2010	Employment	Output
High		87.9	0.6	4.4
Medium-High		78.6	0.1	3.7
Medium	76.9	72.5	-0.3	3.3
Medium-Low		65.9	-0.7	2.8
Low		59.6	-1.2	2.2

Most definitions have looked at one or a combination of three factors: research and development expenditures as a proportion of value added, the percentage of scientific and technical personnel in industry employment, and product sophistication. The definition described in this chapter was adopted from a Battelle study⁴ for the state of Washington and reflects a combination of all three factors. The Battelle study included a number of chemical industries in its definition of high-technology industries. These industries were excluded from the definition of high-technology industries used in this chapter. The chemical industry forecasts have been discussed in a previous section. The modified list of industries included in the high-technology groups and their SIC codes are shown in Table 5-9.

Even at the level of industry detail shown in Table 5-9, it is difficult to categorize industries as high-technology industries. At more detailed levels of categorization, however, data are not available to analyze the industries because of disclosure laws that protect companies' rights to proprietary information. In the United States, the industries listed in Table 5-9 comprised approximately 5.0 percent of total wage and salary employment in 1987, compared to 5.7 percent for the region. The high-technology share of total employment was 7.6 percent in Washington, 4 percent in Oregon, 4.5 percent in Idaho and 0.5 percent in Montana.

4. Battelle Seattle Research Center, *High Technology Employment, Education and Training in Washington State*, June 1984.

Table 5-9
High-Technology Industries

SIC Code	Industry Name
	Machinery
351	Engine and Turbines
357	Office, Computing and Accounting Machines
	Electrical Equipment
361	Electric Transmission and Distribution Equipment
362	Electrical Industrial Apparatus
365	Radio and Television Receiving Equipment
366	Communication Equipment
367	Electronic Components and Accessories
369	Miscellaneous Electrical Machinery
	Transportation Equipment
372	Aircraft and Parts
376	Guided Missiles and Space Vehicles and Parts
	Professional Instruments
381	Scientific Instruments
382	Measuring and Controlling Instruments
383	Optical Instruments
384	Medical and Dental Instruments
386	Photographic Equipment and Supplies
	Business Services
737	Computer and Data Processing Services
7391	Research and Development Laboratories

In 1987, high-technology industries employed 158,700 persons in the region, with approximately 43 percent of the employment concentrated in the transportation equipment category. The second largest category was electrical equipment, with 20.5 percent, followed with 15.8 percent of high-technology employment. Table 5-10 shows employment in 1987 by state for the major high-technology groupings.

The aerospace industry in the region is dominated by The Boeing Company, which has production facilities in Washington and Oregon. Aerospace employment in Washington has been extremely cyclical, dropping from 104,000 in 1968 to 40,000 by 1971. In 1981, it reached a level of 80,900, only to drop to 65,000 by 1983. From 1983 to 1989, aerospace employment increased more than 70 percent to 113,700.

From 1970 to 1987, the high-technology industries increased employment at an average annual rate of 3.4 percent. This compares to a national growth rate of 2.1 percent over the same period. Removing aerospace from the calculation shows that non-aerospace, high-technology employment increased at an average annual rate of 11.5 percent in the region, compared to a national rate of 2.4 percent.

The factors often cited as favorable for the region's growth in high-technology include the quality of the region's labor force, available land, good educational facilities and an environment suitable for maintaining a high quality of life. A survey of high-technology companies regarding location factors was completed by the Congressional Joint Economic Committee in 1982. The results are shown in Table 5-11. The existing concentration of firms in the region also testifies to the importance of spin-off activity from Pacific Northwest firms and California firms.

Table 5-10
Employment in High-Technology Industries 1987

	United States	Pacific Northwest	Washington	Oregon	Idaho	Montana
Machinery (SIC 351, 357)	462,500	12,400	4,800	4,600	3,000	0
▪ Percent of High-Tech	10.8%	7.8%	4.3%	12.9%	26.3%	0.0%
Electrical Equipment (SIC 361, 362, 365, 366, 367, 369)	1,679,300	32,500	17,500	11,300	3,400	300
▪ Percent of High-Tech	39.2%	20.5%	15.8%	31.7%	29.8%	27.3%
Transportation Equipment (SIC 372, 376)	815,100	67,900	65,700	2,200	0	0
▪ Percent of High-Tech	19.0%	42.8%	59.4%	6.2%	0.0%	0.0%
Professional Instruments (SIC 381, 382, 383, 384, 386)	562,800	20,750	7,800	12,200	500	250
▪ Percent of High-Tech	13.1%	13.1%	7.1%	34.3%	4.4%	22.7%
Business Services (SIC 737, 7391)	766,600	25,150	14,800	5,300	4,500	550
▪ Percent of High-Tech	17.9%	15.8%	13.4%	14.9%	39.5%	50.0%
Total High-Tech	4,286,300	158,700	110,600	35,600	11,400	1,100
Percent of Total Employment	5.0%	5.7%	7.6%	4.0%	4.5%	0.5%
Total Employment	85,483,800	2,805,500	1,464,600	883,400	253,300	204,200

SOURCE: U.S. Census Bureau. *County Business Patterns*, 1987. The employment figures shown in this table are based on a survey of employment during the pay period including March 12. As such, they are not comparable to annual average data used in other segments of this report. They are used for illustration purposes here because they are available at the level of industry detail needed for all states.

Table 5-11
Factors that Influence Regional Location of High-Technology Companies

Factor	Percentage of Firms Citing Factors as Significant or Very Significant
Labor Skills and Availability	89.3
Labor Costs	72.2
Tax Climate	67.2
Academic Institutions	58.7
Cost of Living	58.5
Transportation	58.4
Access to Markets	58.1
Regulatory Practices	49.0
Energy Costs and Availability	41.4
Cultural Amenities	36.8
Climate	35.8
Access to Raw Materials	27.6

NOTE: Firms were asked to rate each factor as very significant, significant, somewhat significant, or not significant.

SOURCE: United States Congress, Joint Economic Committee. *Location of High Technology Firms and Regional Economic Development*. June 1982, p. 23. Battelle Seattle Research Center. *High Technology Employment, Education and Training in Washington State*. June 1984.

The factors often cited as unfavorable for the region's growth in high-technology industries include high labor costs, unfavorable tax policies, and complex regulatory practices that make it difficult to expand or locate facilities. There is also some question as to the region's commitment to improving or maintaining the quality of its educational systems in light of tax revolts and state and local budget crises. Many states and cities in the United States are competing aggressively to attract high-technology industries. Some areas of the country, such as New England and North Carolina's Research Triangle Park, enjoy advantages in their traditions of high-quality academic institutions.

Forecasts of employment for high-technology industries are shown in Table 5-12. The table shows forecasts for industries at the two-digit SIC level, which includes some businesses that are not classified as high-technology industries. Electrical equipment and professional instruments are the only categories in which nearly all of the employment is in the high-technology category. In machinery and business services, only 32 percent and 19 percent, respectively, of the employment are in the high-technology industries.

The computer machinery category has been a rapidly growing sector of the machinery industry in the region.

Much of the remainder of the machinery industry is farm, construction, logging and other heavy machinery. These categories are not forecast to grow rapidly.

Aerospace employment, which is dominated by the Boeing Company, accounts for 80 percent of employment in the transportation equipment industry in the region. Commercial aircraft production represents the largest portion of production in the region. During the early 1980s, annual average employment in aerospace declined almost 20 percent. Commercial aircraft orders had dropped substantially because of low profits in the airline industry and declines in passenger miles. Since then, Boeing has increased employment over 70 percent as orders increased, in response to improvements in economic conditions and in the financial condition of airlines. Boeing's primary competition is Airbus Industrie, a European aircraft consortium.⁵ The market for commercial aircraft is projected to be strong, although it will probably continue to be highly cyclical. Because employment in this category is dominated so much by one company, the forecasts encompass a wide range of uncertainty.

5. Yee, Dennis; Farah, Mark; Wood, Stephen; West, Peter; and Burge, Marilyn; Bonneville Power Administration. *Transportation Equipment, SIC 37*. August 1989.

Table 5-12
High-Technology Industry Forecasts—Annual Rate of Growth (%) 1989-2010

	Employment				
	High	Medium-High	Medium	Medium-Low	Low
Machinery (SIC 35)	3.1	2.0	1.3	0.5	-0.2
Electrical Equipment (SIC 36)	3.8	2.7	2.1	1.0	-0.2
Transportation Equipment (SIC 37)	1.2	0.2	-0.6	-2.0	-3.0
Professional Instruments (SIC 38)	2.2	1.5	0.9	0.3	-0.2
Business Services (SIC 73) ^a	5.0	3.9	3.5	3.3	3.0
	Output				
	High	Medium-High	Medium	Medium-Low	Low
Machinery (SIC 35)	7.7	6.4	5.6	4.7	3.8
Electrical Equipment (SIC 36)	8.0	6.9	6.2	5.0	4.0
Transportation (SIC 37)	3.9	2.7	1.8	0.4	-0.9
Professional Instruments (SIC 38)	6.5	5.5	4.8	4.2	3.5

^a Forecasts of output are not developed for the non-manufacturing industries.

Other Manufacturing Industries

There are a number of smaller manufacturing industries that play a relatively minor role in employment and electricity use in the region. The largest of these industries include printing and publishing, fabricated metals, and stone, clay and glass products. Recently, printing and publishing employment has increased rapidly. This is largely because of growth in the demand for computer software manuals and industry changes spurred by advances in desktop publishing systems. The fabricated metals and stone, clay and glass industries are projected to grow slowly, in line with national trends. The forecasts for these industries are shown in Table 5-13.

Growth in Non-manufacturing Industries

The non-manufacturing industries account for most of the region's employment, 83.7 percent in 1989. Employment in non-manufacturing industries has grown faster in the last two decades than employment in manufacturing. Table 5-14 shows the shares of total employment by industry for the region and the United States. The largest category of non-manufacturing employment in the region is wholesale and retail trade, followed by services (which includes such industries as health care, business services and personal services). The third largest non-manufacturing industry is government.

Strong growth in the non-manufacturing sectors has occurred at the national level, as well as at the regional level. A larger proportion of manufactured goods is produced in other countries, which has had a negative impact on the proportion of employment in manufacturing. Productivity gains in the past have been higher in manufacturing industries, and this has lowered employment relative to output. However, computerization of some activities could lead to higher productivity gains in non-manufacturing.

A closer look at specific industries may add some insight into the growth in the non-manufacturing sectors.⁶ The services industry was the fastest growing industry in the region from 1970 through 1987, increasing employment at 5.5 percent per year. In 1987, health services accounted for 33 percent of the region's employment in services. Employment in health services increased at an annual rate of 5.3 percent from 1970 through 1987. Growth in this sector resulted from the expansion of health-care benefits for workers and elderly people and growing public interest in personal health.

6. This discussion of non-manufacturing industries relies on data from *County Business Patterns*. The most recent year available for all four states was 1987. Please refer to Table 5-15 for further information.

*Table 5-13
Other Manufacturing Industry Forecasts—Average Annual Rate of Growth (%) 1989-2010*

	Employment				
	High	Medium-High	Medium	Medium-Low	Low
Printing and Publishing	3.4	2.7	2.4	1.2	0.5
Fabricated Metals	2.1	1.2	0.8	-0.5	-0.9
Stone, Clay and Glass	2.1	1.0	0.2	-1.1	-1.9
Petroleum	1.8	1.1	0.3	-2.5	-3.7
Textiles	1.6	0.4	-0.3	-1.0	-2.0
Apparel	2.5	1.2	0.7	-0.3	-1.4
Furniture	2.7	1.6	1.0	-0.4	-1.0
Rubber and Plastics	4.7	4.3	3.6	1.2	-0.1
Leather Products	1.9	0.9	0.3	-0.5	-2.3
Miscellaneous Manufacturing	2.8	1.7	1.1	-0.5	-2.5
	Output				
	High	Medium-High	Medium	Medium-Low	Low
Printing and Publishing	4.3	3.3	3.0	1.9	0.9
Fabricated Metals	4.2	3.1	2.7	1.4	0.8
Stone, Clay and Glass	5.1	3.7	2.9	1.5	0.4
Petroleum	5.2	4.2	3.5	0.5	-0.7
Textiles	5.9	4.4	3.6	3.0	1.7
Apparel	5.2	3.7	3.1	2.1	0.8
Furniture	5.5	4.3	3.5	2.1	1.3
Rubber and Plastics	7.7	7.0	6.2	3.9	2.4
Leather Products	2.5	1.3	0.7	-0.1	-2.1
Miscellaneous Manufacturing	5.6	4.4	3.8	2.3	0.1

The second largest service category—business services—accounted for 16 percent of the region's employment in services. This category was among the fastest growing sectors in services, increasing employment at an annual rate of 7.7 percent. This category includes a diverse group of industries, such as computer and data processing services, advertising agencies, building services companies and personnel agencies.

Although it only accounted for 3 percent of services employment in 1987, the legal services industry was the fastest growing of the services industries. Employment increased at an annual rate of 8.7 percent from 1970 through 1987.

Employment in construction increased 2.7 percent per year from 1970 through 1987. Even so, construction em-

ployment may exceed 1979 levels for the first time in 1990, as a result of slower population growth during most of the 1980s.

The finance, insurance and real estate sector increased employment at an average annual rate of 3.7 percent from 1970 through 1987. The most rapidly growing sectors in this industry were holding and investment offices and credit agencies (other than banks). Deregulation of the financial industry has led to the creation of a wide range of services and financial instruments offered by a diverse group of businesses. The competition has put a great deal of strain on financial institutions. This may result in an industry shakeout in the next few years, accompanied by slower employment growth.

Table 5-14
Total Employment Shares—United States and the Pacific Northwest—Percent of Total (%)

	Pacific Northwest		United States	
	1970	1989	1970	1989
Total Employment	100.0	100.0	100.0	100.0
Manufacturing	20.5	16.3	25.1	17.5
Non-manufacturing	79.5	83.7	74.9	82.5
▪ Mining	0.5	0.3	0.8	0.6
▪ Agriculture	9.0	7.1	4.3	2.9
▪ Construction	4.3	4.3	5.1	4.7
▪ Transportation and Public Utilities	6.2	4.9	5.8	5.1
▪ Wholesale and Retail Trade	20.6	23.2	20.7	23.1
▪ Finance, Insurance and Real Estate	4.6	5.3	5.0	6.1
▪ Services	14.3	21.3	16.0	24.1
▪ Government	20.0	17.3	17.1	15.9

Wholesale and retail trade accounted for the largest share of total employment in 1989, as shown in Table 5-14. Wholesale trade accounted for approximately one-fourth of employment in trade and increased at an annual rate of 2.6 percent from 1970 through 1987. Employment in retail trade increased at a rate of 3.7 percent per year during the same period.

Eating and drinking establishments accounted for 35 percent of employment in retail trade. This was also the fastest growing category of employment in retail trade, increasing at an annual rate of 6.0 percent from 1970 through 1987. The increase in household consumption of food away from home reflects the increase in household income and the increase in the participation of women in the labor force. In addition, a larger proportion of household budgets for persons aged 25 to 44 is spent on food away from home than for other groups. The rapid growth of persons in this age group during the past twenty years contributed to rapid growth in this sector. Because this age group is growing slower in the future than it has over the last 20 years, the rate of employment growth in this sector is expected to slow.

Other fast-growing retail-trade categories included clothing stores, food stores and miscellaneous retail stores, which includes specialty stores and mail-order houses. Employment in these categories increased at average annual rates slightly over 4 percent from 1970 through 1987.

The government sector was the third largest employment category in the region in 1989, as shown in Table 5-14. State and local government accounted for more than 80 percent of employment in government. From 1970 through 1987, employment in the federal government in-

creased 1.1 percent per year, while state and local government employment increased 2.4 percent per year. Education accounts for the largest proportion of state and local government employment. The outlook for future employment changes in this sector depends on the level of population growth and policy decisions.

Employment in transportation, communications and public utilities increased at an annual rate of 2.5 percent from 1970 to 1987. The fastest growing category was transportation services, which include travel agencies, freight forwarding services, and shipping agents and brokers. Employment in transportation services increased at an average annual rate of 9.1 percent from 1970 to 1987. The largest categories of transportation and public utilities employment in 1987 were trucking and warehousing, and communication services, with 29 percent and 32 percent respectively. Trucking and warehousing employment increased at an average annual rate of 3.6 percent. Employment in communications increased at an average annual rate of 1.7 percent.

The discussion of non-manufacturing industries presented thus far has centered on industries as defined by the Standard Industrial Classification (SIC) system. Industries such as the travel industry and port activity are not separated from other economic data to allow historical analysis of their importance to the regional economy.

The travel industry, which includes tourism and business travel, has impacts on retail trade sectors, such as eating and drinking places, retail stores and service stations. It affects transportation industries, such as transportation services, and air or rail transportation. It has an impact on the services industry, which includes hotels and lodging places, personal services, and amusement and rec-

recreation services. It also has an impact on the government sector, through parks and recreation, national parks, national and state forests, and the highway system. Because all of these services are consumed by the local population as well as out-of-state travelers, it is difficult to measure the impact of the travel industry on the economy.

Nevertheless, the travel industry is an important activity in the region. The beauty and diversity of the region's natural environment provide opportunities for a variety of recreational activities. Factors that will aid the growth of the travel industry in the future include increases in real income and changes in the age composition of the population. State and local governments in the region have developed programs to promote tourism and conventions, which will add to the industry's growth.

Another economic activity that appears to have increased in importance is port activity related to trade with Alaska and other countries. The expansion of the economies of the Pacific Rim countries and the region's proximity to these countries point to increased trade and transportation activity. The employment impacts are difficult to measure because they are spread across a number of SIC categories. Port activity affects the transportation, wholesale trade, services and financial industries. It has an impact on manufacturing industries, as well, by providing markets for goods produced in the region. A study by the Port of Seattle⁷ showed a direct impact of 55,800 jobs resulting from the harbor and airport facilities. This estimate was for 1982, which was a year of worldwide economic slowdown. In addition, the estimate included jobs in King County only, which would underestimate the impact of the port on the state of Washington and the region.

In recent years, more attention has focused on the non-manufacturing industries as an increasing source of jobs to the economy. The traditional approach to understanding regional economic development emphasized manufacturing, agriculture and extractive industries as the basis for economic growth. Other industries were treated as secondary, providing support services to these industries and to the local population. A recent study of the services sector in the central Puget Sound region⁸ disputes this approach. The study interviewed firms from selected industries in the services sector and estimated that approximately one-third of the employment in these industries is linked to export markets. The study points out many areas where the dynamics of location and growth of non-manufacturing industries have remained largely unexplored.

In developing the range of forecasts of employment growth in the non-manufacturing industries, the Council and Bonneville have relied on national forecasts developed by the WEFA Group and the Bureau of Labor Statistics, comparing them to historical regional growth rates by industry. Table 5-15 shows a comparison of the forecasts of non-manufacturing employment by industry with historical growth rates.

Changes in Productivity Growth

The early phases of an economic recovery often show large gains in productivity. The conditions may exist at this time, however, for a more sustained growth in labor productivity in the United States that could last well beyond the cyclical impacts of recession and recovery. Some of the factors encouraging higher productivity growth were brought about by the recession. Intense foreign competition and a high value of the U.S. dollar against foreign currencies in the early 1980s put downward pressure on prices. Efforts to increase profitability have focused on improving productivity.

Over the long-term, demographic factors will have an impact on labor productivity growth. With the maturation of the baby-boom generation, there will be fewer young, inexperienced workers in the labor force.

The impact of developments in high technology is just beginning to be observed in office automation, robotics, electronic technology and telecommunications. Spurred by foreign competition and tempted by numerous success stories, U.S. companies are turning to new technology to remain competitive in world markets.

Two factors that may have dampened productivity growth in the 1970s may have contributed to productivity growth in the 1980s by their absence. These are energy price shocks and new federal regulations. The costs of adjusting to higher prices and higher environmental standards diverted funds from investments that contribute more directly to measures of productivity during the 1970s. These factors may have slowed down labor productivity growth in the 1970s.

Table 5-16 shows rates of growth in real output per employee for manufacturing. As shown, productivity growth in the 1970s was slow compared to previous decades. The WEFA Group's long-term forecasts show a continuation of the trends established over the last 20-years. Table 5-A-4 of Appendix 5-A shows productivity forecasts by industry for manufacturing industries.

7. Port of Seattle. *1982 Economic Impact Study*. October 1984.

8. Beyers, William B.; Alvine, Michael J.; and Johnsen, Erik G.; Central Puget Sound Economic Development District. *The Service Economy: Export of Services in the Central Puget Sound Region*. April 1985.

Table 5-15
Non-manufacturing Employment Projections—Average Annual Rate of Growth (%)

	1970-1987 ^a	1989-2010				
		High	Medium-High	Medium	Medium-Low	Low
Construction	2.7	2.3	1.7	0.9	0.6	0.3
Transportation, Communications and Public Utilities	2.3	1.7	1.0	0.9	0.7	0.2
Trade	3.3	3.3	2.6	2.0	1.7	1.2
▪ Wholesale Trade	2.6	3.1	2.5	1.9	1.5	0.9
▪ Retail Trade	3.7	3.3	2.6	2.1	1.7	1.3
• Food Stores	3.8	2.8	1.9	1.2	0.9	0.6
• Eating and Drinking Places	6.0	4.1	3.6	3.2	2.8	2.3
Finance, Insurance and Real Estate	3.7	3.5	2.7	1.9	1.5	0.9
Services	5.5	3.8	2.9	2.6	2.3	2.0
▪ Hotels and Lodging Places	2.5	2.9	2.5	2.1	1.6	1.2
▪ Business Services	7.7	5.0	3.9	3.5	3.3	3.0
▪ Health Services	5.3	4.2	3.3	3.0	2.8	2.4
Government	2.2	2.5	1.8	1.2	0.9	0.7
▪ Federal Government	1.1	1.9	1.3	0.7	0.3	0.0
▪ State and Local Government	2.4	2.6	1.9	1.3	1.1	0.8

^a Historical data except government employment is based on *County Business Patterns*. The employment figures shown in this table are based on a survey of employment during the pay period including March 12. As such, they are not comparable to annual average data used in other segments of this report. They are used for illustration purposes in this table and in the text, because they are available at the level of industry detail needed.

Table 5-16
Real Output per Employee, U.S. Manufacturing—Average Annual Rate of Growth (%)

Years	Percent
1959-1969	2.6
1969-1979	2.3
1979-1989	3.4
1969-1989	2.9
Forecast 1989-2010	Percent
High	3.0
Medium	2.9
Low	2.7

Population, Households and Housing Stock

Total population in the region was 9.0 million in 1990. Regional population increased at an average annual rate of 1.2 percent from 1980 to 1990, higher than the rate of U.S. population growth (1.0 percent) in the same period. In the 1970s, population growth in the region was twice the rate of U.S. population growth, and more than one-third faster than during the 1950s and 1960s. Washington was the fastest growing state in the region during the 1980s, while Idaho was the fastest growing during the 1970s. Table 5-17 summarizes historical data on population and households.

The number of households in the region and the nation grew at a higher rate than population. Growth in the number of households was most rapid in the 1970s. During

the 1970s, the baby-boom generation reached the 20 to 29 year age group, where household formation rates are high. Smaller families also became more common.

Householder rates, or the proportion of the population in an age group designated to represent a household, increased rapidly with the rise in divorce rates and single-person households. In the 1970s, householder rates increased dramatically for females over the age of 65, as more women in this group have maintained their own household, rather than move in with family or to group quarters. In addition, women in the 20 to 29 age group have maintained households at a higher rate. The combination of shifts in age composition and of changes in householder rates lowered average household size in the region from 3.1 in 1970 to 2.7 in 1980. During the 1980s, average household size continued to drop, but at a much slower pace, to 2.5 in 1990.

*Table 5-17
Total Population and Households*

	Total Population (thousands)				Average Annual Rate of Growth (%)		
	1960	1970	1980	1990	1960-1970	1970-1980	1980-1990
Washington	2,853.2	3,409.2	4,132.2	4,866.7	1.80	1.94	1.65
Oregon	1,768.7	2,091.4	2,633.1	2,842.3	1.69	2.33	0.77
Idaho	667.2	712.6	944.0	1,006.7	0.67	2.85	0.65
Western Montana	231.7	253.5	294.5	303.3	0.90	1.51	0.30
Pacific Northwest	5,520.8	6,466.7	8,003.8	9,019.0	1.59	2.16	1.20
United States	180,671.0	204,878.0	227,020.0	248,710.0	1.27	1.03	0.92
	Total Households (thousands)				Average Annual Rate of Growth (%)		
	1960	1970	1980	1990 ^a	1960-1970	1970-1980	1980-1990
Washington	894.0	1,106.0	1,540.5	1,938.9	2.15	3.37	2.33
Oregon	558.0	692.0	991.6	1,155.4	2.18	3.66	1.54
Idaho	194.0	219.0	324.1	367.4	1.22	4.00	1.26
Western Montana	70.0	79.0	106.4	114.9	1.25	3.47	0.77
Pacific Northwest	1,716.0	2,096.0	2,962.6	3,576.6	2.02	3.52	1.90
United States	53,021.0	63,450.0	80,377.0	93,500.0	1.81	2.39	1.52
	Persons per Household						
	1960	1970	1980	1990			
Pacific Northwest	3.22	3.09	2.70	2.52			
United States	3.41	3.23	2.82	2.66			

^a Estimate.

The population forecast is derived from the forecast of total employment by using an average employment to population ratio. Changes in the employment to population ratio reflect changes in labor force participation, unemployment rates and age composition of the population. The participation of women in the labor force increased rapidly in the 1960s and 1970s. From 1960 to 1989, women in the labor force increased from 33 percent to 57 percent. The employment to population ratios of this forecast incorporate the impacts of continued increases in female labor force participation, although at slower rates than in the past. The range of projections was based on national trends as forecast by the WETA Group and the U.S. Bureau of Labor Statistics. Changes in employment to population ratios implied in the national forecasts were tracked in the state-level forecasts, maintaining historical differences between the state and national ratios. Table 5-A-1 in Appendix 5-A shows employment to population ratios for each state for the ranges.

The forecast for total households is obtained from the forecast of population after dividing by average household size. Changes in average household size reflect changes in the age composition of the population and householder rates by age group. The projections are based on national trends as forecast by the U.S. Bureau of the Census. The high and medium cases assume that householder rates will continue to increase, but at much slower rates than in the 1970s. This results in part because of increases in the relative cost of housing and in a slowing of increases in the divorce rate. The low case assumes that householder rates do not increase, but average household size decreases slightly because of changes in age composition. Average household size projections by state for the ranges are shown in Appendix 5-A, Table 5-A-2.

Table 5-18 shows the forecasts of population and households that result from the assumptions described. There were 2.963 million occupied housing units in the region in 1980. Results from the 1980 U.S. Census indicated that approximately 78 percent of the occupied housing stock was single family units (1 to 4 units per building). An additional 14 percent was multifamily units, and 8 percent were manufactured homes. Change in the housing stock is the result of change in total households plus replacement of existing units. The proportion of new housing units by type is projected for each state. Table 5-A-3 in Appendix 5-A shows the proportion of housing additions by type for each state and scenario. Changes in the stock of housing by type are shown in Table 5-19.

Personal Income

Real per capita income is an important input to many econometric models of energy demand. It plays a far less critical role in the more structural end-use models used by the Council. The only sector it affects directly is the residential sector, where it influences the penetration rate of certain types of appliances and the long-run expected use of appliances. In 1980, the personal income per capita of the Pacific Northwest was \$10,392. That was 4.8 percent greater than the U.S. average of \$9,916.

Table 5-20 shows historical and forecast growth of real personal income per capita in the Pacific Northwest and for the United States. During the 1960s, income per capita increased at a slightly slower rate in the region than in the United States. In fact, the region's real income per capita dipped below the United States in 1970. Income per capita increased faster in the region than in the United States during the 1970s. Over the entire 20-year period from 1960 to 1980, the region's per capita income increased at almost the identical rate as the United States average. From 1980 to 1989, regional real income per capita increased at half the national rate. The forecasts for 1989 to 2010 are shown in Table 5-20 as well.

Alternative Fuel Prices

Assumptions about the future prices of natural gas, oil and coal are important determinants of demand for electricity. These fuel price assumptions are important for two reasons. First, because these fuels are alternatives to electricity in many uses of energy, their prices will affect the demand for electricity. This is particularly true for the residential and commercial sectors, where electricity, natural gas and oil compete for space heating, water heating, air conditioning and cooking.

The second reason that fuel prices are important is that they are highly uncertain. In the last 20 years, crude oil prices have varied between a low of less than \$3 a barrel in 1970 and a high of \$37 a barrel in 1981. Electricity demand forecasts are much less sensitive to fuel price changes than to changes in economic activity. (Sensitivity tests show that reducing fuel prices by one-half would reduce electricity demand by less than 5 percent.) Nevertheless, the large uncertainty about fuel prices causes them to be a substantial factor in the risks facing electricity planning.

The forecasts of fuel prices reflect an assumption that natural gas prices will tend to follow oil prices in the long run, although the current natural gas bubble is recognized in the forecast. The linkage of oil and natural gas prices results from the competition between residual oil and interruptible natural gas in the industrial sector boiler markets. Coal is not currently competitive in industrial markets in the Northwest. However, as oil and natural gas prices rise, coal could become a third competitor in the industrial market.

Table 5-18
Forecast of Population and Households 1989-2010

Scenario	1980	1990	2010	Average Annual Rate of Growth (%)
Total Population (thousands)				
High			13,799.4	2.1
Medium-High			12,365.5	1.6
Medium	8,003.7	9,019.0	11,641.7	1.3
Medium-Low			11,007.7	1.0
Low			10,260.3	0.6
Total Households (thousands)				
High			6,274.2	2.9
Medium-High			5,343.3	2.0
Medium	2,962.6	3,576.6	5,030.8	1.7
Medium-Low			4,755.2	1.4
Low			4,021.8	0.6

Table 5-19
Housing Stock Projections—Share of Occupied Housing Units (%) 1980-2010

	1980	2010				
		High	Medium-High	Medium	Medium-Low	Low
Single-Family (1-4 units)	77.8	77.1	72.4	70.5	69.1	67.4
Multifamily (5 and more units)	14.4	15.2	17.2	18.5	19.4	21.8
Manufactured Housing	7.8	7.7	10.4	11.0	11.5	10.8

Table 5-20
Real Income per Capita—Average Annual Rate of Growth (%)

	Pacific Northwest	United States
Historical		
1960-1970	2.9	3.2
1970-1980	2.7	2.2
1980-1989	1.0	2.0
Forecast 1989-2010		
High	2.9	1.6
Medium-High	2.4	
Medium	1.8	1.4
Medium-Low	1.4	
Low	1.1	1.1

Prices of oil products, such as heating oil or gasoline, follow world crude oil prices. Thus, assumptions about world crude oil prices are the starting point for forecasts of alternative fuel prices. Shortly after the Council's 1986 plan was published, world oil prices collapsed to less than half their previous levels. This event demonstrated, in many analysts' minds, that oil prices of more than \$30 per barrel are not sustainable for long. After 1986, and until Iraq's invasion of Kuwait, oil prices varied between \$14 and \$18 on an annual basis with more variation on a monthly basis.

Iraq's invasion of Kuwait, and the subsequent blockade of those countries, sent oil prices above \$30 during the later part of 1990. Immediately following the beginning of military action against Iraq, oil prices dropped well below \$30 and are now back near \$20 a barrel. Nearly all analysts agree that future oil prices are likely to be volatile. Recent events in the Middle East are a good example of such volatility that can cause prices to move temporarily above or below the proposed range of assumptions. The potential for such volatility is not reflected in the proposed assumptions. Instead, the assumptions are meant to bracket alternative trends in oil prices about which fluctuations would likely occur.

The range of world oil price assumptions proposed in this paper encompasses the recent forecasts of many analysts. The range is illustrated in Figure 5-3 and Table 5-21. Figure 5-3 also illustrates the historical pattern of oil

prices from 1970 to 1990, including the large increases of 1973 and 1979 and the collapse in 1986. It is also clear from Figure 5-3 that the real oil price decreased dramatically between 1981 and 1985 even though that decrease did not cause the stir that resulted from the 1986 collapse.

The medium forecast shows real world oil prices (in 1990 dollars) growing at 3.2 percent per year from current levels, reaching \$35 per barrel by the year 2010. The range about this medium forecast reflects a judgment that there is slightly more risk on the high side than on the low side. In 2010 the high oil price is \$19 above the medium, while the low oil price is \$17 below the medium.

The low forecast assumes that oil prices remain near 1989 levels in real terms; that is, they increase at about the same rate as general economic price inflation. This scenario would be consistent with very favorable oil and natural gas supplies combined with significant progress in improved energy efficiency even with low price incentives. Under such conditions, the Organization of Petroleum Exporting Countries (OPEC) would not be able to exercise effective control of world oil markets.

In the high scenario, per barrel prices recover into the low-20s by 1990 and continue to make significant real gains, reaching \$54 by 2010. Such a future could be consistent with OPEC having a fairly secure control of oil markets. That could happen if new oil and gas discoveries are disappointing, the world experiences strong economic growth, and efficiency improvements are slow in being

World Oil Prices

Figure 5-3
World Oil Prices—
Historical and
Forecast Range to
2010

Table 5-21
World Oil Prices (1990 Dollars per Barrel)

	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	18	18	18	18	18
1995	32	27	20	17	14
2000	43	35	28	23	17
2005	52	39	32	25	17
2010	54	43	35	27	18
Growth Rates (%)					
1989-2010	5.4	4.2	3.2	1.9	0.0

realized. The medium-low and medium-high forecasts bound a more likely long-term range that spans from \$27 to \$43 per barrel in 2010.

The range of oil price assumptions is significantly lower than those used for the Council's 1986 Power Plan. Figure 5-4 compares the new assumptions with the Council's 1986 plan range, which is shown with dashed lines. The figure shows that actual oil prices fell below the 1986 low case after 1986. The price assumptions were revised for the Council's 1989 Power Plan Supplement and the August 1989 Bonneville white book forecast. The assumptions for the 1991 Power Plan are similar to those used in these recent forecasts.

As described above, oil price assumptions provide the basis for forecasting retail prices of the important fuel competitors to electricity. Some important assumptions and forecast characteristics can be illustrated by focusing on the industrial sector where the most important inter-fuel competition takes place. The relative forecasts of crude oil prices and the retail prices of fuels are illustrated for the industrial sector medium forecast in Figure 5-5.

Industrial interruptible natural gas prices are expected to eventually equate to residual oil prices, but remain below that equilibrium condition until the year 2000, reflecting a prolonged weakness in natural gas markets. This weakness reflects the "gas bubble" and the existence of large gas supplies in western Canada with limited transportation to eastern markets. The shaded area in Figure 5-5 shows the near-term weakness in interruptible natural gas price forecasts compared to residual oil.

Coal prices are currently set at a floor that approximates the cost of coal production. There is currently a large amount of excess capacity in western coal mining. This large surplus, combined with slow growth in coal demand, serves to keep coal prices depressed. Only in the later years of the higher oil price scenarios is there significant strengthening of coal prices.

The retail price forecasts for each consuming sector are related to the industrial residual fuel oil price and interruptible natural gas price using average historical price differences. Tables in Appendix 3-C show forecasts of retail prices for the residential, commercial and industrial sectors, respectively. These price forecasts are used in forecasting electricity demand.

World Oil Prices

Figure 5-4
World Oil Prices—
Compared to
Council's 1986
Power Plan

Price Comparison

Figure 5-5
Industry Price
Comparisons—
Medium Case

APPENDIX 5-A

DETAIL ON
ECONOMIC INPUT ASSUMPTIONS

Table 5-A-1
Employment-Population Ratios

	1985	1990	1995	2000	2005	2010
Washington						
High	.414	.462	.480	.495	.505	.515
Medium-High	.414	.462	.467	.477	.485	.493
Medium	.414	.462	.456	.462	.468	.473
Medium-Low	.414	.462	.445	.452	.459	.466
Low	.414	.462	.428	.438	.447	.457
Oregon						
High	.422	.474	.493	.510	.520	.531
Medium-High	.422	.474	.479	.490	.500	.508
Medium	.422	.474	.468	.474	.480	.485
Medium-Low	.422	.474	.455	.462	.469	.475
Low	.422	.474	.440	.450	.459	.468
Idaho						
High	.400	.445	.460	.475	.485	.495
Medium-High	.400	.445	.450	.460	.468	.474
Medium	.400	.445	.443	.449	.455	.460
Medium-Low	.400	.445	.436	.438	.439	.440
Low	.400	.445	.423	.427	.430	.433
Western Montana						
High	.321	.354	.370	.385	.395	.405
Medium-High	.321	.354	.359	.370	.378	.386
Medium	.321	.354	.358	.364	.370	.375
Medium-Low	.321	.354	.348	.349	.350	.351
Low	.321	.354	.331	.335	.339	.342
Pacific Northwest						
High	.412	.463	.478	.494	.504	.514
Medium-High	.412	.463	.465	.476	.484	.492
Medium	.412	.463	.455	.461	.467	.472
Medium-Low	.412	.463	.444	.450	.456	.462
Low	.412	.463	.428	.437	.445	.454

Table 5-A-2
Average Household Size

	1980	1985	1990	1995	2000	2005	2010
Washington							
High		2.61	2.51	2.40	2.30	2.22	2.18
Medium	2.68	2.61	2.51	2.42	2.36	2.31	2.29
Low		2.61	2.51	2.56	2.56	2.56	2.56
Oregon							
High		2.56	2.46	2.35	2.28	2.22	2.18
Medium	2.66	2.56	2.46	2.38	2.33	2.29	2.28
Low		2.56	2.46	2.52	2.53	2.54	2.55
Idaho							
High		2.84	2.74	2.54	2.45	2.40	2.36
Medium	2.91	2.84	2.74	2.66	2.60	2.55	2.53
Low		2.84	2.74	2.82	2.84	2.85	2.86
Western Montana							
High		2.70	2.64	2.44	2.35	2.28	2.24
Medium	2.77	2.70	2.64	2.54	2.48	2.42	2.40
Low		2.70	2.64	2.63	2.62	2.61	2.60
Pacific Northwest							
High		2.62	2.52	2.40	2.31	2.24	2.20
Medium	2.70	2.62	2.52	2.44	2.38	2.34	2.31
Low		2.62	2.52	2.52	2.53	2.54	2.55

Table 5-A-3
Share of Housing Additions by Type of Housing Unit 1987-2010 (% of New Housing Starts)

	High	Medium-High	Medium	Medium-Low	Low
Washington					
Single-Family (1-4 units)	75	65	60	55	45
Multifamily (5 and more units)	16	20	23.5	27	35
Manufactured Housing	9	15	16.5	18	20
Oregon					
Single-Family (1-4 units)	76	68	65	62	51
Multifamily (5 and more units)	13	16	17	18	27
Manufactured Housing	11	16	18	20	22
Idaho					
Single-Family (1-4 units)	81	71	67.5	64	55
Multifamily (5 and more units)	8	10	11	12	17
Manufactured Housing	11	19	21.5	24	28
Western Montana					
Single-Family (1-4 units)	82	70	62.5	55	45
Multifamily (5 and more units)	05	10	12.5	15	20
Manufactured Housing	13	20	25	30	35

Table 5-A-4
Production per Employee by Industry^a—Average Annual Rate of Growth (%) 1989–2010

SIC	High	Medium ^b	Low
20	3.1	2.9	2.7
22	4.1	3.9	3.7
23	2.8	2.6	2.4
25	2.4	2.2	2.0
27	1.0	0.8	0.6
29	3.4	3.2	3.0
30	3.2	3.0	2.8
31	2.2	2.0	1.8
32	2.4	2.2	2.0
33XX	1.6	1.5	1.5
34	2.3	2.1	1.9
35	4.7	4.5	4.3
36	4.5	4.3	4.1
37	3.1	2.8	2.6
38	4.1	3.9	3.7
39	4.3	4.3	4.4

^a Refer to Appendix 5-B, Table 5-B-1 for a listing of SIC Codes.

^b Growth rates shown are used in the medium-high, medium and medium-low cases except for the lumber, paper and chemicals industries. Forecasts for production per employee for the lumber, paper and chemicals industries are shown in the sections discussing the outlook for those industries.

APPENDIX 5-B

MANUFACTURING FORECASTS

Table 5-B-1
SIC Code Listings

SIC Code	Industry Name	SIC Code	Industry Name
20	Food and Kindred Products	3334	Primary Aluminum
22	Textiles	40-49	Transportation and Public Utilities
23	Apparel	50-51	Wholesale Trade
25	Furniture	52, 53+	Retail Trade except Food Stores (54) and Eating and Drinking Places (58)
27	Printing and Publishing	54	Food Stores
29	Petroleum Refining	58	Eating and Drinking Places
30	Rubber and Plastics	60-67	Finance, Insurance and Real Estate
31	Leather and Leather Products	70	Hotels and Lodging
32	Stone, Clay, Glass and Concrete	72	Personal Services
33XX	Primary Metals except Aluminum	73	Business Services
34	Fabricated Metals	76	Miscellaneous Repair Services
35	Machinery except Electrical	80	Health Services
36	Electrical Machinery	81	Legal Services
37	Transportation Equipment	82, 941	Educational Services
38	Professional Instruments	83	Social Services
39	Miscellaneous Manufacturing	75, 78+	Other Services
2421	Sawmills and Planing Mills	89	Miscellaneous Services
2436	Softwood Veneer and Plywood	90-99	Government except Education (941)
24XX	Other Lumber and Wood Products		
2611	Pulp Mills		
2621	Paper Mills		
2631	Paperboard Mills		
26XX	Other Paper Products		
2812	Alkalies and Chlorine		
2819	Elemental Phosphorus		
28XX	Other Chemicals		

APPENDIX 5-C

FUEL PRICE FORECASTS

*Table 5-C-1
Residential Fuel Prices*

Natural Gas (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	5.53	5.53	5.53	5.53	5.53
2000	8.65	7.40	6.44	5.65	4.86
2010	10.24	8.65	7.40	6.30	5.02
Growth Rates (%)					
1989-2010	3.00	2.20	1.40	0.60	-0.50
Heating Oil (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	6.43	6.43	6.43	6.43	6.43
2000	9.21	7.69	6.39	5.42	4.44
2010	11.27	9.21	7.69	6.28	4.66
Growth Rates (%)					
1989-2010	2.70	1.70	0.90	-0.10	-1.50

*Table 5-C-2
Commercial Fuel Prices*

Natural Gas (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	4.64	4.64	4.64	4.64	4.64
2000	7.80	6.53	5.58	4.78	3.99
2010	9.39	7.80	6.53	5.43	4.15
Growth Rates (%)					
1989-2010	3.40	2.50	1.60	0.80	-0.50
Oil (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	5.29	5.29	5.29	5.29	5.29
2000	8.77	7.15	5.96	4.98	4.01
2010	10.72	8.77	7.15	5.85	4.22
Growth Rates (%)					
1989-2010	3.40	2.40	1.40	0.50	-1.10

Table 5-C-3
Industrial Fuel Prices

Natural Gas (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	3.37	3.37	3.37	3.37	3.37
2000	6.61	5.34	4.40	3.61	2.80
2010	8.20	6.61	5.34	4.24	2.96
Growth Rates (%)					
1989-2010	4.30	3.30	2.20	1.10	-0.60
Oil (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	4.30	4.30	4.30	4.30	4.30
2000	8.55	6.97	5.79	4.79	3.79
2010	10.54	8.55	6.97	5.59	3.98
Growth Rates (%)					
1989-2010	4.40	3.30	2.30	1.30	-0.40
Coal (1990 dollars per million British thermal units)					
	High	Medium-High	Medium	Medium-Low	Low
Prices					
1989	2.35	2.35	2.35	2.35	2.35
2000	3.09	2.91	2.68	2.42	2.12
2010	3.87	3.48	2.99	2.48	1.95
Growth Rates (%)					
1989-2010	2.40	1.90	1.20	0.30	-0.90

APPENDIX 5-D

DETAILED TABLES

MANUFACTURING EMPLOYMENT (1000'S)		HIGH SCENARIO - REGION												2/22/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
20	73.900	71.965	72.925	75.550	76.475	78.300	80.298	81.347	82.097	82.848	83.600	85.500	87.200	87.900	
22	3.000	2.550	2.900	3.100	3.100	3.500	3.720	3.739	3.859	3.880	4.000	4.100	4.200	4.200	
23	10.025	8.900	8.550	8.950	9.050	9.450	10.666	11.235	11.705	12.177	12.550	13.450	14.400	15.100	
25	6.150	7.240	7.050	7.950	7.850	8.250	9.217	9.736	10.156	10.577	10.950	12.000	12.853	13.450	
27	29.650	34.000	37.925	39.850	41.025	41.775	47.600	49.925	52.150	54.475	56.700	66.400	74.700	82.300	
29	2.800	2.225	2.350	2.450	2.450	2.550	3.076	3.154	3.234	3.316	3.400	3.600	3.700	3.800	
30	6.900	8.575	10.025	11.210	12.010	12.540	14.757	15.966	17.176	17.987	19.000	24.150	28.500	31.750	
31	0.700	0.925	1.080	1.160	1.260	1.140	1.538	1.576	1.616	1.658	1.700	1.800	1.800	1.800	
32	13.100	10.725	11.580	12.490	12.900	14.100	14.906	15.512	15.968	16.424	16.730	18.250	19.371	20.300	
33XX	20.800	15.350	15.550	16.550	17.550	18.450	19.807	20.085	20.305	20.526	20.750	20.900	20.900	20.900	
34	26.750	22.850	22.975	24.350	26.625	27.250	28.368	29.187	30.007	30.728	31.450	34.900	38.150	41.100	
35	37.750	38.625	37.525	40.650	43.175	44.900	52.325	55.050	57.675	59.800	61.800	72.500	79.400	83.300	
36	22.550	28.875	30.175	28.700	32.325	35.025	42.367	44.257	45.866	47.496	49.050	56.075	64.104	70.025	
37	109.450	99.825	118.150	129.500	141.500	142.700	158.123	163.399	166.679	169.962	171.250	174.750	178.450	181.500	
38	25.950	25.725	23.320	28.330	27.940	26.850	29.805	30.771	31.751	32.744	33.750	37.503	41.550	45.100	
39	7.350	7.400	8.600	10.350	11.900	10.650	12.894	13.613	14.458	15.404	16.250	18.100	18.950	19.700	
2421	52.427	44.500	47.250	47.200	47.000	44.900	47.588	48.999	47.761	45.828	45.816	41.016	42.350	42.691	
2436	26.582	20.900	21.900	20.900	20.750	19.125	21.208	21.607	20.701	19.018	18.379	13.606	12.944	12.413	
24XX	61.066	57.100	60.100	63.400	62.550	59.450	63.806	63.577	63.685	63.792	63.900	63.520	62.826	61.868	
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.478	2.458	2.435	2.413	2.393	2.290	2.191	2.097	
2621	14.143	13.410	12.650	12.900	13.700	13.700	13.670	13.647	13.627	13.609	13.587	13.498	13.435	13.391	
2631	5.037	5.000	4.900	4.850	5.447	5.550	5.524	5.498	5.470	5.443	5.418	5.288	5.160	5.036	
26XX	7.896	7.815	8.750	8.500	8.500	8.600	9.173	9.308	9.438	9.563	9.684	10.094	10.205	9.708	
2812	0.763	0.700	0.700	0.700	0.600	0.700	0.702	0.704	0.706	0.708	0.710	0.717	0.708	0.688	
2819	6.567	8.890	8.780	9.780	9.583	9.980	10.684	10.988	11.398	11.794	12.097	12.589	13.090	13.561	
28XX	7.470	7.650	7.650	7.900	8.004	8.600	8.578	8.636	8.680	8.726	8.773	8.982	9.118	9.155	
3334	10.350	7.250	5.850	7.300	7.600	7.500	7.600	7.600	7.600	7.600	7.600	7.600	7.600	7.600	
SUBTOT	592.100	560.870	591.260	626.670	653.468	658.235	720.458	741.573	756.204	768.497	781.287	823.177	867.855	900.331	

HIGH SCENARIO - REGION														2/22/91
NON-MANUFACTURING EMPLOYMENT (1000'S)														
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	179.500	176.500	181.550	187.700	196.700	203.600	211.300	216.014	221.869	227.414	232.654	254.484	270.705	284.046
50-51	194.000	195.700	203.375	213.275	229.000	239.200	249.519	258.487	267.140	277.780	288.756	338.631	385.307	433.276
52-52,53+	275.100	279.300	300.050	314.100	332.675	346.650	359.042	372.210	383.358	398.772	414.807	483.415	544.613	606.233
54	75.100	92.400	105.125	110.800	117.300	123.900	129.400	135.100	139.269	143.432	147.217	167.784	188.374	207.476
58	195.500	218.400	233.275	241.600	250.100	261.300	287.683	302.080	316.274	332.383	349.319	425.862	501.947	584.455
60-67	188.900	193.400	202.450	205.550	210.750	215.550	240.654	251.445	262.719	274.500	286.808	339.045	387.421	437.428
70	40.200	42.600	45.800	48.850	52.300	55.400	57.532	59.733	61.693	64.110	66.489	76.635	86.107	95.482
72	29.600	35.000	36.075	34.100	35.275	37.150	44.698	46.329	48.088	49.933	51.795	58.081	64.199	70.126
73	89.800	109.800	138.475	123.200	133.650	142.750	170.900	180.350	189.500	197.700	205.900	258.874	313.423	376.371
76	9.800	10.500	11.350	12.750	14.225	14.814	16.030	16.755	17.400	17.993	18.641	21.505	24.755	28.150
80	179.800	212.350	231.100	240.600	252.300	269.000	293.972	308.063	322.829	338.040	353.721	435.217	516.158	598.509
81	17.400	22.700	25.700	26.900	27.925	29.300	33.175	35.086	37.096	39.210	41.435	52.669	64.858	79.061
83	31.800	41.800	47.525	56.500	61.000	63.900	69.000	72.265	74.737	77.102	79.934	94.498	109.902	125.413
89	36.400	36.000	39.100	65.800	71.150	75.300	82.039	87.400	92.850	97.369	101.969	118.556	130.331	141.700
75,78+	122.600	141.125	150.850	158.900	168.500	177.600	190.473	198.074	205.960	214.044	222.439	254.751	284.921	315.007
82	19.800	24.200	27.500	32.800	34.600	35.800	35.500	36.300	37.100	37.900	38.700	43.700	49.200	54.800
941	279.700	280.275	291.400	299.600	306.700	317.900	327.700	336.700	345.700	355.000	364.500	414.474	466.337	522.495
90-99	230.300	236.100	248.300	257.500	266.400	276.300	289.358	299.580	310.271	321.686	333.747	380.513	419.350	456.664
Const	161.300	132.600	140.600	153.750	171.050	184.600	181.301	187.171	192.124	196.561	200.985	225.185	250.961	276.406
Agric	292.200	286.600	286.200	285.055	284.100	288.295	288.778	289.158	289.538	289.919	290.300	293.000	295.599	298.100
Mining	13.300	9.875	9.075	10.075	10.900	11.800	13.391	14.187	14.487	14.891	15.200	16.300	17.000	17.500
Fd Gvt	117.300	116.350	118.300	120.550	122.200	127.200	136.251	138.126	139.926	141.951	144.100	155.700	168.200	181.800
SUBTOT	2779.400	2893.575	3073.175	3199.955	3348.800	3497.309	3707.696	3840.613	3969.928	4107.690	4249.417	4908.879	5539.668	6190.498

TOTAL 3371.500 3454.446 3664.435 3826.625 4002.269 4155.544 4428.154 4582.186 4726.132 4876.187 5030.704 5732.057 6407.523 7090.830

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										HIGH SCENARIO - REGION					2/22/91	
1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010			
HOUSING																
SF	2304.022	2428.959	2496.974	2566.797	2648.227	2708.515	2904.320	3011.029	3111.863	3221.097	3336.717	3842.219	4360.053	4834.096		
MF	427.732	492.379	515.462	529.422	544.345	556.469	592.308	611.664	630.040	650.171	671.358	766.310	864.356	953.878		
MO	230.919	280.062	293.064	299.991	306.619	311.642	334.323	345.087	354.773	355.180	376.182	417.407	455.395	486.176		
TOTAL	2962.673	3201.400	3305.500	3396.211	3499.190	3576.626	3830.950	3967.781	4096.676	4236.448	4384.257	5025.936	5679.804	6274.150		
POPUL	8003.820	8389.700	8532.000	8668.200	8860.400	9019.000	9539.356	9790.403	10015.808	10261.819	10520.617	11612.527	12721.094	13799.382		
HHLDS	2962.673	3201.400	3305.500	3396.210	3499.190	3576.626	3830.950	3967.781	4096.676	4236.448	4384.257	5025.936	5679.804	6274.150		
PCI	10360.21	10444.04	10790.19	10978.09	11372.39	11453.48	12078.08	12416.06	12764.35	13124.52	13494.49	15586.98	18004.77	20797.36		

HIGH SCENARIO - WASHINGTON														
2/22/91														
MANUFACTURING EMPLOYMENT (1000'S)														
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	31.900	31.100	32.300	34.200	35.500	35.900	35.700	36.300	36.600	36.900	37.100	38.000	35.000	39.000
22	1.000	0.900	1.000	1.200	1.200	1.300	1.500	1.500	1.600	1.600	1.700	1.700	1.700	1.700
23	6.500	6.200	5.700	6.000	6.000	6.200	7.200	7.700	8.100	8.500	8.800	9.500	10.300	11.000
25	3.300	3.800	3.800	4.200	4.000	4.300	5.100	5.500	5.800	6.100	6.400	7.000	7.500	8.000
27	15.800	17.600	20.100	21.400	22.100	22.000	25.500	26.500	27.500	28.500	29.500	35.000	40.000	45.500
29	2.100	1.800	1.800	1.900	1.900	2.200	2.357	2.416	2.476	2.537	2.600	2.800	2.900	3.000
30	3.500	4.500	5.100	5.800	6.200	6.500	7.300	7.700	8.100	8.400	8.700	10.800	12.500	14.000
31	0.400	0.400	0.400	0.500	0.600	0.500	0.619	0.638	0.658	0.679	0.700	0.800	0.800	0.800
32	6.900	6.400	6.900	7.300	7.500	7.900	8.200	8.500	8.800	9.100	9.300	10.300	11.000	11.600
33XX	9.000	6.900	6.900	7.100	7.300	7.600	8.598	8.697	8.797	8.898	9.000	9.300	9.500	9.600
34	11.800	9.700	10.500	10.900	11.800	12.200	12.600	12.900	13.200	13.700	14.200	16.600	18.500	20.000
35	15.000	17.100	16.200	18.000	19.000	19.500	22.000	23.000	24.000	25.000	26.000	31.000	35.000	37.000
36	11.200	12.100	13.200	10.500	11.700	12.100	16.559	17.139	17.738	18.358	19.000	22.000	26.000	29.000
37	98.350	89.600	106.200	116.200	128.500	128.900	142.000	147.000	150.000	153.000	154.000	156.900	160.000	162.500
38	6.400	10.700	10.800	14.600	14.900	14.700	15.500	16.000	16.500	17.000	17.500	19.000	20.500	21.500
39	4.600	4.500	4.800	5.500	5.900	5.600	6.800	7.200	7.700	8.100	8.500	9.000	9.500	10.000
2421	16.027	13.400	14.500	15.200	15.300	14.700	15.715	15.901	15.301	14.469	14.343	12.302	12.663	12.891
2436	4.982	4.200	3.900	3.600	3.100	3.000	3.198	3.240	3.099	2.844	2.736	2.056	1.991	1.935
24XX	25.991	20.700	22.000	22.800	22.700	21.900	23.055	22.788	22.831	22.875	22.919	22.783	22.534	22.190
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.478	2.458	2.435	2.413	2.393	2.290	2.191	2.097
2621	8.818	9.000	8.400	8.700	9.300	9.300	9.278	9.262	9.247	9.237	9.221	9.161	9.118	9.088
2631	1.637	1.200	1.200	1.200	1.600	1.600	1.593	1.585	1.577	1.569	1.562	1.524	1.488	1.452
26XX	4.171	4.400	4.950	5.100	4.900	5.000	5.452	5.514	5.576	5.639	5.703	5.954	6.081	5.891
2812	0.513	0.500	0.500	0.500	0.400	0.500	0.501	0.503	0.505	0.506	0.507	0.512	0.505	0.491
2819	5.300	7.700	7.700	8.700	8.500	8.900	9.600	9.900	10.307	10.700	11.000	11.500	12.013	12.500
28XX	2.887	3.100	3.300	3.300	3.300	3.500	3.579	3.607	3.636	3.664	3.693	3.817	3.863	3.846
3334	7.700	5.800	4.400	5.600	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900
SUBTOT	308.750	295.400	318.600	342.100	361.600	364.200	397.881	409.348	417.982	426.188	432.977	457.499	483.048	502.481

2/22/91

HIGH SCENARIO - WASHINGTON

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	91.400	93.600	98.500	101.900	107.900	112.000	114.000	115.875	118.983	122.174	125.451	138.362	147.520	155.381
50-51	100.500	105.700	111.400	116.400	124.600	132.100	136.004	140.000	144.645	151.241	158.137	187.458	214.796	243.185
52, 53+	141.000	146.900	161.200	168.800	179.100	189.000	196.001	202.643	206.699	215.082	223.805	261.808	296.068	330.808
54	38.200	49.200	57.400	59.900	62.300	65.400	68.000	71.000	73.000	75.000	77.000	89.000	101.000	110.822
58	101.600	118.900	128.200	132.500	135.000	141.600	158.931	167.234	175.970	185.163	194.836	236.424	282.080	329.680
60-67	91.800	99.600	107.500	109.400	112.300	116.300	128.211	134.083	140.224	146.647	153.363	181.975	208.715	236.532
70	17.800	20.100	21.500	22.900	24.700	26.100	26.755	27.926	29.150	30.426	31.759	37.322	42.391	47.574
72	16.000	19.900	20.800	19.700	20.400	21.500	26.806	27.754	28.736	29.752	30.805	33.847	37.151	40.298
73	52.900	61.000	78.000	70.000	76.500	83.700	98.700	103.000	108.000	112.000	116.000	145.000	175.837	215.147
76	5.500	5.600	5.900	6.900	8.000	8.400	8.807	9.045	9.200	9.400	9.652	11.061	12.922	14.914
80	95.800	117.400	129.300	134.600	140.800	151.200	164.172	171.919	180.032	188.527	197.424	243.545	290.375	342.114
81	9.200	12.400	14.400	15.000	15.600	16.500	18.041	19.055	20.126	21.257	22.452	28.836	35.797	43.905
83	15.600	22.600	25.000	27.200	29.700	31.400	34.000	35.565	36.537	37.402	38.834	46.098	54.302	63.189
89	19.500	21.100	23.100	37.500	40.700	43.000	46.122	49.239	52.397	55.596	58.838	70.102	75.188	80.768
75, 78+	66.800	83.500	89.000	95.400	101.100	106.700	112.616	117.193	121.956	126.912	132.070	151.347	170.235	189.189
82	8.900	12.000	13.100	14.700	15.900	16.700	15.600	16.000	16.400	16.900	17.300	19.700	22.500	25.600
941	145.500	143.600	151.100	156.000	160.600	166.300	170.400	174.900	179.500	184.200	189.100	215.400	245.300	279.400
90-99	117.400	129.100	135.500	141.300	146.800	152.100	158.465	164.597	170.967	177.584	184.456	211.524	234.457	256.758
Const	92.600	80.600	88.900	96.600	106.600	115.300	112.919	115.828	118.813	121.875	125.015	141.160	158.777	176.455
Agric	119.300	115.100	114.400	113.300	112.300	113.812	114.094	114.377	114.661	114.946	115.231	115.840	117.153	118.086
Mining	3.200	2.700	3.000	3.300	3.600	4.000	4.439	4.879	4.919	5.059	5.100	5.200	5.300	5.400
Fd Gvt	67.900	70.100	70.600	71.400	72.000	74.500	82.660	83.940	85.240	86.560	87.900	95.000	102.600	110.900
SUBTOT	1418.400	1530.700	1647.800	1714.700	1796.500	1887.612	1995.743	2066.052	2136.155	2213.703	2294.528	2668.009	3030.464	3416.105

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TOTAL 1727.150 1826.100 1966.400 2056.800 2158.100 2251.812 2393.624 2475.400 2554.137 2639.891 2727.505 3125.508 3513.512 3918.585

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HOUSING, POPULATION, HOUSEHOLDS, AND INCOME	HIGH SCENARIO - WASHINGTON										2/22/91			
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING														
SF	1193.211	1266.263	1310.322	1352.553	1407.204	1444.958	1544.719	1597.752	1649.085	1708.845	1770.317	2059.622	2358.996	2635.070
MF	250.130	298.560	315.713	325.258	337.281	345.690	367.380	379.636	390.390	403.520	417.018	480.649	546.396	607.041
MO	97.169	126.178	134.965	139.189	144.801	148.276	159.084	164.162	168.916	174.562	180.291	205.016	228.595	248.211
TOTAL	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	2071.183	2140.979	2208.391	2286.927	2367.626	2745.286	3133.986	3490.323
POPUL	4132.160	4406.000	4538.000	4619.000	4761.000	4866.700	5136.533	5260.809	5388.475	5534.363	5682.302	6314.158	6957.450	7608.904
HHLDS	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	2071.183	2140.979	2208.391	2286.927	2367.626	2745.286	3133.986	3490.323
PCI	10725.00	10924.00	11258.00	11383.00	11774.00	11798.00	12464.50	12813.50	13172.20	13541.10	13920.20	15981.30	18347.50	21064.10

2/22/91

HIGH SCENARIO - OREGON

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	24.300	23.800	24.000	23.700	23.600	24.900	24.838	24.978	25.118	25.258	25.400	26.000	26.500	27.000
22	2.000	1.600	1.800	1.800	1.800	2.100	2.123	2.139	2.159	2.180	2.200	2.300	2.400	2.400
23	3.200	2.400	2.500	2.600	2.700	2.900	3.058	3.117	3.177	3.238	3.300	3.500	3.600	3.600
25	2.600	2.700	2.500	2.900	3.000	3.200	3.058	3.117	3.177	3.238	3.300	3.600	3.803	3.800
27	10.000	11.500	12.800	13.200	13.500	14.100	15.900	16.900	17.500	19.000	20.000	23.000	25.500	27.000
29	0.600	0.400	0.500	0.500	0.500	0.500	0.619	0.638	0.658	0.679	0.700	0.700	0.700	0.700
30	2.400	3.200	3.800	4.600	4.900	5.000	6.300	7.000	7.700	8.200	8.800	11.500	13.800	15.300
31	0.300	0.400	0.500	0.500	0.500	0.500	0.719	0.738	0.758	0.779	0.800	0.800	0.800	0.800
32	4.500	3.100	3.600	4.000	4.200	4.900	5.100	5.300	5.400	5.500	5.600	6.000	6.400	6.700
33XX	9.600	8.200	8.600	9.300	10.100	10.700	10.800	10.900	11.000	11.100	11.200	11.000	10.800	10.600
34	12.700	11.000	10.200	11.200	12.300	12.400	12.600	13.000	13.400	13.600	13.800	14.500	15.400	16.500
35	17.700	15.500	15.800	16.800	17.600	18.000	22.000	23.000	24.000	24.700	25.300	28.400	30.200	31.000
36	9.800	13.900	13.600	14.100	15.600	17.200	19.500	20.300	21.000	21.700	22.300	25.800	29.400	32.000
37	10.300	9.200	10.800	11.600	11.400	12.200	14.357	14.515	14.675	14.836	15.000	15.500	16.000	16.500
38	19.300	14.600	12.100	13.200	12.500	11.600	13.596	14.003	14.423	14.855	15.300	17.400	19.800	22.200
39	2.200	2.400	3.200	3.800	4.900	3.800	4.800	5.100	5.400	5.900	6.300	7.500	7.800	8.000
2421	23.800	20.500	22.000	21.400	20.800	19.000	20.430	20.643	19.804	18.677	18.488	15.721	16.184	16.442
2436	20.100	15.500	16.800	16.100	16.300	14.900	16.925	17.256	16.487	15.048	14.484	10.367	9.789	9.317
24XX	25.600	27.600	29.200	31.300	29.900	27.300	30.863	30.897	30.932	30.967	31.001	30.817	30.480	30.015
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	5.100	4.100	4.000	3.900	4.100	4.100	4.093	4.086	4.082	4.074	4.069	4.041	4.023	4.009
2631	2.000	2.100	2.000	1.900	2.000	2.000	1.990	1.981	1.971	1.962	1.952	1.905	1.859	1.814
26XX	3.300	2.840	3.200	2.800	3.900	3.000	3.102	3.160	3.213	3.260	3.301	3.417	3.401	3.132
2812	0.250	0.200	0.200	0.200	0.200	0.200	0.201	0.201	0.202	0.202	0.203	0.205	0.202	0.197
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28XX	2.050	1.900	1.900	1.900	2.000	2.300	2.135	2.151	2.155	2.159	2.164	2.185	2.211	2.202
3334	1.400	0.600	0.700	0.900	0.900	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
SUBTOT	215.100	199.300	206.300	214.200	218.300	217.600	239.904	245.921	249.591	251.912	255.763	266.959	281.852	292.028

HIGH SCENARIO - OREGON														2/22/91
NON-MANUFACTURING EMPLOYMENT (1000'S)														
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	60.500	57.300	58.500	60.500	62.800	65.100	69.000	71.000	73.000	74.700	75.900	82.000	86.500	90.000
50-51	67.400	65.800	68.200	72.900	78.200	80.800	86.000	90.000	93.000	96.000	99.000	115.481	131.551	148.069
52-53*	96.200	92.900	98.700	104.200	109.700	112.000	116.541	121.176	125.996	131.007	136.216	158.424	178.109	197.843
54	24.600	29.500	33.800	36.400	39.400	42.000	44.000	46.000	47.500	49.000	50.000	55.423	61.185	67.964
58	67.400	70.400	76.000	78.900	82.300	85.000	92.152	96.846	101.779	106.963	112.412	136.703	160.720	186.661
60-67	70.000	66.800	72.100	73.300	75.300	75.800	85.654	89.422	93.356	97.463	101.750	119.976	136.738	153.982
70	14.800	14.600	15.600	17.100	18.400	19.700	20.000	20.500	20.800	21.500	22.200	25.200	28.200	30.998
72	9.800	10.400	10.800	10.400	10.900	11.600	12.642	13.144	13.665	14.206	14.772	17.022	18.960	20.866
73	24.900	35.000	45.500	43.000	46.700	48.100	59.000	63.000	66.000	69.000	72.000	90.000	108.000	125.862
76	3.000	3.500	4.100	4.400	4.600	4.700	5.400	5.800	6.200	6.500	6.800	7.800	8.800	9.800
80	62.100	69.400	74.400	77.600	82.100	87.200	97.000	102.000	107.000	112.000	117.000	144.000	170.000	192.000
81	5.600	7.300	8.100	8.500	8.700	9.000	10.896	11.554	12.252	12.993	13.778	17.525	21.549	26.177
83	11.400	14.000	16.900	23.300	24.400	25.200	26.900	28.000	29.000	30.000	31.000	36.000	41.000	45.624
89	11.100	10.300	11.300	17.200	19.000	20.500	23.517	25.218	26.953	27.723	28.531	32.054	36.443	40.032
75, 78+	42.200	43.500	47.400	47.900	50.800	53.500	59.463	61.824	64.278	66.830	69.483	80.068	89.184	98.148
82	7.100	8.300	10.300	13.800	14.300	14.600	15.000	15.300	15.600	15.800	16.000	18.000	20.000	21.700
941	94.200	94.600	97.400	99.300	101.200	104.100	108.200	111.400	114.700	118.200	121.700	138.400	154.900	170.000
90-99	78.200	73.500	77.700	80.200	81.700	84.300	89.443	92.726	96.129	99.657	103.314	117.326	128.778	139.688
Const	46.500	33.100	35.300	39.900	45.200	47.900	46.000	48.500	50.000	51.000	52.000	57.000	62.000	66.655
Agric	96.300	98.800	99.700	100.300	101.000	103.272	103.369	103.467	103.565	103.662	103.760	105.318	106.177	107.098
Mining	2.300	1.500	1.400	1.300	1.400	1.400	2.057	2.115	2.175	2.237	2.300	2.500	2.700	2.800
Fd Gvt	30.800	29.600	30.600	31.700	32.200	34.200	34.500	34.800	35.000	35.400	35.900	38.800	41.900	45.200
SUBTOT	926.400	930.100	993.800	1042.100	1090.300	1129.972	1206.734	1253.792	1297.948	1341.843	1385.818	1595.020	1793.394	1987.179

TOTAL 1141.500 1129.400 1200.100 1256.300 1308.600 1347.572 1446.638 1499.713 1547.539 1593.755 1641.581 1861.979 2075.246 2279.207

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										HIGH SCENARIO - OREGON					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
HOUSING																
SF	766.113	797.066	817.839	839.543	863.560	883.597	952.975	988.529	1020.845	1052.323	1087.280	1233.817	1390.702	1528.674		
MF	143.583	154.439	159.705	163.574	166.210	169.693	181.460	187.549	193.096	198.502	204.493	229.595	256.589	280.207		
MO	81.898	92.495	96.456	98.883	100.189	102.117	111.014	114.974	118.376	121.564	125.154	137.773	150.393	160.059		
TOTAL	991.593	1044.000	1074.000	1102.000	1129.959	1155.408	1245.449	1291.053	1332.317	1372.389	1416.927	1601.289	1797.684	1968.941		
POPUL	2633.160	2675.800	2690.000	2741.000	2791.000	2842.300	3026.440	3111.438	3184.237	3252.562	3329.779	3650.939	3990.858	4292.292		
HHLDS	991.593	1044.000	1074.000	1102.000	1129.959	1155.408	1245.449	1291.053	1332.317	1372.389	1416.927	1601.289	1797.684	1968.941		
PCI	9897.80	9845.90	10162.10	10402.20	10731.30	10804.40	11297.50	11636.40	11985.50	12345.10	12715.50	14740.70	17088.50	19810.30		

MANUFACTURING EMPLOYMENT (1000'S)		HIGH SCENARIO - IDAHO											2/22/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	17.000	16.600	16.100	17.100	16.900	17.000	19.200	19.500	19.800	20.100	20.500	20.900	21.100	21.300
22	0.000	0.050	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
23	0.300	0.250	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
25	0.250	0.600	0.600	0.700	0.700	0.600	0.850	0.900	0.950	1.000	1.000	1.100	1.200	1.300
27	3.100	4.200	4.300	4.500	4.600	4.800	5.300	5.600	5.800	6.000	6.200	7.200	7.800	8.300
29	0.100	0.025	0.050	0.050	0.050	0.050	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
30	1.000	0.850	1.100	0.800	0.500	1.000	1.100	1.200	1.300	1.300	1.400	1.700	2.000	2.200
31	0.000	0.100	0.150	0.150	0.150	0.100	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
32	1.300	0.900	0.800	0.900	0.900	1.000	1.300	1.400	1.450	1.500	1.500	1.600	1.600	1.600
33XX	1.200	0.100	0.000	0.100	0.100	0.100	0.259	0.269	0.279	0.289	0.300	0.300	0.300	0.300
34	2.100	1.900	2.000	2.000	2.300	2.400	2.800	2.900	3.000	3.000	3.000	3.300	3.700	4.000
35	5.000	5.800	5.200	5.500	6.200	7.000	7.900	8.600	9.200	9.600	10.000	12.500	13.500	14.500
36	1.500	2.800	3.300	4.000	4.900	5.600	6.200	6.700	7.000	7.300	7.600	8.100	8.500	8.800
37	0.700	0.950	1.100	1.600	1.500	1.500	1.600	1.700	1.800	1.900	2.000	2.000	2.000	2.000
38	0.150	0.300	0.300	0.400	0.400	0.400	0.550	0.600	0.650	0.700	0.750	0.850	0.950	1.050
39	0.400	0.325	0.300	0.400	0.400	0.500	0.519	0.538	0.558	0.579	0.600	0.700	0.700	0.700
2421	8.100	6.400	6.600	6.700	7.000	7.200	7.320	7.982	8.111	8.126	8.321	8.325	8.654	8.562
2436	0.500	0.400	0.400	0.400	0.400	0.400	0.342	0.350	0.351	0.355	0.366	0.373	0.367	0.366
2611	6.775	6.700	6.400	6.800	7.400	7.600	7.131	7.127	7.148	7.169	7.190	7.147	7.069	6.961
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.225	0.250	0.250	0.300	0.300	0.300	0.299	0.299	0.298	0.298	0.298	0.296	0.294	0.293
26XX	0.850	0.950	0.950	1.000	1.100	1.200	1.194	1.189	1.183	1.177	1.171	1.144	1.115	1.089
2812	0.425	0.575	0.600	0.600	0.600	0.600	0.619	0.634	0.649	0.664	0.680	0.722	0.722	0.684
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28XX	1.067	1.000	0.900	0.900	0.900	0.900	0.903	0.906	0.909	0.912	0.914	0.907	0.853	0.884
3334	2.433	2.600	2.400	2.600	2.600	2.700	2.764	2.776	2.788	2.800	2.812	2.873	2.935	2.999
3334	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUBTOT	54.475	54.625	54.200	57.900	60.700	63.350	68.801	71.823	73.874	75.419	77.251	82.688	86.056	88.539

2/22/91

HIGH SCENARIO - IDAHO

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	20.100	19.200	17.900	18.600	19.100	19.500	20.800	21.200	21.700	22.100	22.600	24.500	26.400	27.800
50-51	22.300	20.800	20.500	20.600	22.700	22.700	23.615	24.423	25.260	26.125	27.019	30.329	32.916	35.292
52, 53+	29.900	31.300	31.500	32.400	35.100	36.800	37.200	38.391	39.927	41.524	43.185	49.836	55.591	61.269
54	9.400	10.700	11.100	11.400	12.100	12.700	13.200	13.600	14.069	14.632	15.217	17.561	19.589	21.390
58	19.000	21.600	21.600	22.700	24.400	26.100	27.700	28.800	29.025	30.457	31.960	38.568	44.994	51.852
60-67	23.400	23.600	19.200	19.200	19.300	19.500	22.768	23.748	24.770	25.836	26.948	31.555	35.719	39.949
70	5.100	5.200	5.800	6.000	6.500	6.800	7.500	7.900	8.200	8.500	8.700	9.700	10.600	11.500
72	3.000	3.800	3.600	3.100	3.200	3.300	4.300	4.381	4.555	4.736	4.924	5.674	6.320	6.955
73	11.000	12.100	12.800	8.000	8.800	9.200	11.200	12.100	13.000	14.000	15.000	20.000	25.000	30.000
76	1.000	1.100	1.000	1.100	1.200	1.264	1.323	1.385	1.450	1.518	1.589	1.894	2.183	2.486
80	15.500	17.900	19.100	20.000	20.700	21.800	23.600	24.544	25.797	27.113	28.497	34.672	40.783	47.389
81	2.100	2.400	2.500	2.700	2.900	3.000	3.400	3.600	3.800	4.000	4.200	5.200	6.200	7.444
83	3.400	4.000	4.100	4.500	4.800	5.000	5.500	5.800	6.000	6.300	6.500	7.800	9.100	10.500
89	4.800	3.900	3.900	10.300	10.700	11.000	11.500	12.000	12.500	13.000	13.500	15.000	17.000	19.000
75, 78+	10.300	10.800	11.000	12.100	13.100	13.900	14.500	15.000	15.500	15.900	16.300	18.000	19.500	21.000
82	3.800	3.900	4.100	4.300	4.400	4.500	4.900	5.000	5.100	5.200	5.400	6.000	6.700	7.500
941	31.100	32.300	33.400	34.900	35.300	37.700	38.900	39.800	40.500	41.100	41.700	46.500	50.800	56.700
90-99	26.400	26.100	27.700	28.600	29.900	31.700	32.300	32.800	33.400	34.341	35.533	39.973	43.466	46.696
Const	17.400	15.100	13.600	14.200	16.000	18.000	18.800	19.100	19.400	19.600	19.700	21.980	24.423	26.736
Agric	69.100	65.400	64.800	64.155	63.500	63.911	63.902	63.894	63.885	63.877	63.868	64.403	64.662	65.147
Mining	4.700	3.800	2.600	3.300	3.600	3.800	4.095	4.193	4.293	4.395	4.500	5.000	5.100	5.100
Fd Gvt	13.000	11.800	12.200	12.500	12.900	13.300	13.813	14.030	14.250	14.473	14.700	15.900	17.200	18.600
SUBTOT	345.800	346.800	344.000	354.655	370.200	385.475	404.816	415.689	426.381	438.727	451.540	510.045	564.246	620.565
TOTAL	400.275	401.425	398.200	412.555	430.900	448.825	473.617	487.509	500.255	514.146	528.791	592.733	650.302	709.104

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														HIGH SCENARIO - IDAHO					2/22/91								
														1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING																											
SF	262.386	280.726	283.014	288.209	290.562	292.540	312.507	324.970	336.955	350.031	363.962	413.200	456.982	499.990													
MF	25.070	29.289	29.842	30.395	30.657	30.882	32.873	34.128	35.336	36.652	38.051	43.045	47.501	51.873													
MO	36.714	43.986	44.144	44.395	44.236	43.987	46.168	47.275	48.275	49.382	50.584	53.085	54.196	55.143													
TOTAL	324.170	354.000	357.000	363.000	365.455	367.409	391.548	406.373	420.567	436.064	452.577	509.330	558.678	607.006													
POPUL	944.000	1004.000	1000.500	1004.400	1005.000	1006.700	1057.181	1080.952	1101.884	1125.046	1149.546	1247.858	1340.828	1432.533													
HHLDS	324.170	354.000	357.000	363.000	365.455	367.409	391.548	406.373	420.567	436.064	452.577	509.330	558.678	607.006													
PCI	8611.20	8400.50	8573.30	8785.80	9226.40	9457.00	9726.50	10028.00	10338.90	10659.40	10989.90	12802.20	14913.50	17372.90													

HIGH SCENARIO - WESTERN MONTANA 2/22/91

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	0.700	0.465	0.525	0.550	0.475	0.500	0.560	0.569	0.579	0.590	0.600	0.600	0.600	0.600
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.025	0.050	0.050	0.050	0.050	0.050	0.108	0.118	0.128	0.138	0.150	0.150	0.200	0.200
25	0.000	0.140	0.150	0.150	0.150	0.150	0.209	0.219	0.229	0.239	0.250	0.300	0.350	0.350
27	0.750	0.700	0.725	0.750	0.825	0.875	0.900	0.925	0.950	0.975	1.000	1.200	1.400	1.500
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.025	0.025	0.010	0.010	0.040	0.057	0.066	0.076	0.087	0.100	0.150	0.200	0.250
31	0.000	0.025	0.030	0.010	0.010	0.040	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
32	0.400	0.325	0.280	0.290	0.300	0.300	0.306	0.312	0.318	0.324	0.330	0.350	0.371	0.400
33XX	1.000	0.150	0.050	0.050	0.050	0.050	0.150	0.219	0.229	0.239	0.250	0.300	0.300	0.300
34	0.150	0.250	0.275	0.250	0.225	0.250	0.368	0.387	0.407	0.428	0.450	0.500	0.550	0.600
35	0.050	0.225	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.500	0.600	0.700	0.800
36	0.050	0.075	0.075	0.100	0.125	0.125	0.108	0.118	0.128	0.138	0.150	0.175	0.204	0.225
37	0.100	0.075	0.050	0.100	0.100	0.100	0.166	0.184	0.204	0.226	0.250	0.350	0.450	0.500
38	0.100	0.125	0.120	0.130	0.140	0.150	0.159	0.168	0.178	0.189	0.200	0.253	0.300	0.350
39	0.150	0.175	0.300	0.650	0.700	0.750	0.775	0.775	0.800	0.825	0.850	0.900	0.950	1.000
2421	4.500	4.000	4.150	3.900	3.900	4.000	4.103	4.473	4.545	4.556	4.664	4.667	4.849	4.797
2436	0.800	0.800	0.800	0.800	0.950	0.825	0.742	0.760	0.764	0.771	0.794	0.810	0.797	0.795
24XX	2.700	2.100	2.500	2.500	2.650	2.650	2.757	2.765	2.773	2.781	2.790	2.773	2.743	2.701
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.550	0.750	0.750	0.750	0.747	0.750	0.747	0.743	0.739	0.736	0.732	0.715	0.698	0.681
26XX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	0.200	0.190	0.180	0.180	0.183	0.180	0.181	0.181	0.182	0.182	0.183	0.181	0.180	0.177
28XX	0.100	0.050	0.050	0.100	0.104	0.100	0.101	0.102	0.102	0.103	0.104	0.107	0.109	0.108
3334	1.250	0.850	0.750	0.800	0.800	0.800	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
SUBTOT	13.775	11.545	12.160	12.470	12.868	13.085	13.872	14.434	14.757	14.978	15.296	16.032	16.900	17.284

HIGH SCENARIO - WESTERN MONTANA

NON-MANUFACTURING EMPLOYMENT (1000'S)

2/22/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	7.500	6.400	6.650	6.700	6.900	7.000	7.500	7.939	8.186	8.440	8.703	9.622	10.285	10.859
50-51	3.800	3.400	3.275	3.375	3.500	3.600	3.900	4.064	4.235	4.414	4.600	5.363	6.044	6.730
52, 53+	8.000	8.200	8.650	8.700	8.775	8.850	9.300	10.000	10.736	11.159	11.599	13.347	14.845	16.313
54	2.900	3.000	2.825	3.100	3.500	3.800	4.200	4.500	4.700	4.800	5.000	5.800	6.600	7.100
58	7.500	7.500	7.475	7.500	8.400	8.600	8.500	9.200	9.500	9.800	10.111	12.167	14.153	16.262
60-67	3.700	3.400	3.650	3.650	3.850	3.950	4.021	4.192	4.369	4.554	4.747	5.539	6.249	6.965
70	2.500	2.700	2.900	2.850	2.700	2.800	3.277	3.407	3.543	3.684	3.830	4.413	4.916	5.410
72	0.800	0.900	0.875	0.900	0.775	0.750	0.950	1.050	1.132	1.237	1.294	1.538	1.768	2.007
73	1.000	1.700	2.175	2.200	1.650	1.750	2.000	2.250	2.500	2.700	2.900	3.874	4.586	5.362
76	0.300	0.300	0.350	0.350	0.425	0.450	0.500	0.525	0.550	0.575	0.600	0.750	0.850	0.950
80	6.400	7.650	8.300	8.400	8.700	8.800	9.200	9.600	10.000	10.400	10.800	13.000	15.000	17.000
81	0.500	0.600	0.700	0.700	0.725	0.800	0.838	0.877	0.918	0.960	1.005	1.108	1.312	1.535
83	1.400	1.200	1.525	1.500	2.100	2.300	2.600	2.900	3.200	3.400	3.600	4.600	5.500	6.100
89	1.000	0.700	0.800	0.800	0.750	0.800	0.900	0.943	1.000	1.050	1.100	1.400	1.700	1.900
75, 78+	3.300	3.325	3.450	3.500	3.500	3.500	3.894	4.057	4.226	4.402	4.586	5.335	6.002	6.670
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
941	8.900	9.775	9.500	9.400	9.600	9.800	10.200	10.600	11.000	11.500	12.000	14.174	15.337	16.395
90-99	8.300	7.400	7.400	7.400	8.000	8.200	9.150	9.457	9.775	10.104	10.444	11.690	12.649	13.522
Const	4.800	3.800	2.800	3.050	3.250	3.400	3.582	3.743	3.911	4.086	4.270	5.045	5.761	6.500
Agric	7.500	7.300	7.300	7.300	7.300	7.300	7.413	7.420	7.427	7.434	7.441	7.439	7.607	7.769
Mining	3.100	1.875	2.075	2.175	2.300	2.600	2.800	3.000	3.100	3.200	3.300	3.600	3.900	4.200
Fd Gvt	5.600	4.850	4.900	4.950	5.100	5.200	5.278	5.356	5.436	5.518	5.600	6.000	6.500	7.100
SUBTOT	88.800	85.975	87.575	88.500	91.800	94.250	100.403	105.080	109.444	113.417	117.530	135.805	151.564	166.649

TOTAL	102.575	97.520	99.735	100.970	104.668	107.335	114.275	119.564	124.201	128.395	132.826	151.837	168.464	183.933
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HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														HIGH SCENARIO - WESTERN MONTANA					2/22/91
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010					
HOUSING																			
SF	82.313	84.905	85.799	86.492	86.901	87.420	94.118	99.779	104.978	109.899	115.158	135.580	153.374	170.362					
MF	8.950	10.092	10.201	10.195	10.197	10.205	10.595	10.921	11.218	11.497	11.796	12.921	13.970	14.756					
MO	15.138	17.403	17.500	17.524	17.393	17.262	18.058	18.676	19.205	19.672	20.173	21.529	22.211	22.763					
TOTAL	106.400	112.400	113.500	114.211	114.491	114.886	122.770	129.376	135.401	141.068	147.127	170.030	189.455	207.881					
POPUL	294.500	303.900	303.500	303.800	303.400	303.300	319.203	331.202	341.211	349.849	358.990	399.571	431.958	465.653					
HHLDS	106.400	112.400	113.500	114.211	114.491	114.886	122.770	129.376	135.401	141.068	147.127	170.030	189.455	207.881					
PCI	7793.00	7983.00	8666.10	8983.50	9312.50	9653.50	11555.40	11555.40	11555.40	11555.40	11555.40	13832.00	16557.10	19819.10					

MANUFACTURING EMPLOYMENT (1000'S)					MEDHI SCENARIO - REGION										2/22/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
20	73.900	71.965	72.925	75.550	76.475	78.300	79.000	79.300	79.500	79.500	79.500	79.100	78.800	78.600		
22	3.000	2.550	2.900	3.100	3.100	3.500	3.330	3.309	3.289	3.270	3.250	3.250	3.250	3.250		
23	10.025	8.900	8.550	8.950	9.050	9.450	9.789	9.979	10.169	10.359	10.550	11.075	11.375	11.675		
25	6.150	7.240	7.050	7.950	7.850	8.250	8.345	8.565	8.835	9.080	9.300	9.850	10.403	10.900		
27	29.650	34.000	37.925	39.850	41.025	41.775	45.200	47.225	49.250	50.875	52.600	60.200	65.900	71.000		
29	2.800	2.225	2.350	2.450	2.450	2.340	3.000	3.000	3.100	3.100	3.200	3.300	3.300	3.300		
30	6.900	8.575	10.025	11.210	12.010	12.340	14.354	15.459	16.464	17.169	17.875	22.475	26.300	29.200		
31	0.700	0.925	1.080	1.160	1.260	1.140	1.419	1.438	1.458	1.479	1.500	1.450	1.450	1.450		
32	13.100	10.725	11.580	12.490	12.900	14.100	14.306	14.512	14.618	14.724	14.830	15.450	15.821	16.100		
33XX	20.800	15.350	15.550	16.550	17.550	18.450	19.409	19.519	19.679	19.739	19.800	19.900	19.950	19.850		
34	26.750	22.850	22.975	24.350	26.625	27.250	27.759	28.369	29.058	29.328	29.600	31.300	33.000	34.300		
35	37.750	38.625	37.525	40.650	43.175	44.900	49.125	50.425	51.450	52.575	53.500	58.775	64.150	67.000		
36	22.550	28.875	30.175	28.700	32.325	35.025	40.897	42.101	43.011	44.027	45.150	50.075	53.704	56.625		
37	109.450	99.825	118.150	129.500	141.500	142.700	149.808	154.918	159.928	160.038	159.050	155.000	151.450	147.900		
38	25.950	25.725	23.320	28.330	27.940	26.850	28.372	28.822	29.377	29.837	30.300	33.225	35.953	39.075		
39	7.350	7.400	8.600	10.350	11.900	10.550	11.868	12.412	12.957	13.503	14.050	14.900	15.500	15.900		
2421	52.427	44.300	47.250	47.200	47.000	44.900	45.499	45.095	44.034	42.338	42.414	38.364	39.984	40.714		
2436	26.582	20.900	21.900	20.900	20.750	19.125	20.300	19.914	19.154	17.650	17.097	12.841	12.401	12.066		
24XX	61.066	57.100	60.100	63.400	62.650	59.450	60.829	60.461	60.193	59.927	59.662	57.656	55.651	53.656		
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.470	2.438	2.407	2.377	2.347	2.202	2.066	1.939		
2621	14.143	13.410	12.650	12.900	13.700	13.700	13.634	13.572	13.510	13.454	13.391	13.111	12.863	12.632		
2631	5.037	5.000	4.900	4.850	5.450	5.550	5.508	5.464	5.421	5.378	5.338	5.133	4.937	4.747		
26XX	7.896	7.815	8.750	8.500	8.500	8.600	8.860	8.942	9.005	9.068	9.133	9.330	9.322	8.735		
2812	0.763	0.700	0.700	0.700	0.600	0.700	0.701	0.702	0.703	0.704	0.705	0.709	0.705	0.693		
2819	6.567	8.890	8.780	9.780	9.580	9.980	10.481	10.781	11.082	11.283	11.483	11.673	11.862	12.049		
28XX	7.470	7.650	7.650	7.920	8.000	8.600	8.330	8.304	8.279	8.255	8.243	8.257	8.218	8.137		
3334	10.350	7.250	5.850	7.300	7.600	7.500	7.000	6.900	6.700	6.600	6.500	6.200	6.200	6.200		
SUBTOT	592.100	560.870	591.260	626.670	653.465	657.935	689.612	701.926	712.632	715.638	720.368	734.799	754.515	767.694		

NON-MANUFACTURING EMPLOYMENT (1000'S)										MEDHI SCENARIO - REGION					2/22/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
40-49	179.500	176.500	181.550	187.700	196.700	203.600	207.780	210.204	213.029	215.856	218.986	229.951	237.599	245.424		
50-51	194.000	195.700	203.375	213.275	229.000	239.200	244.570	250.420	256.232	262.077	267.597	304.291	340.394	378.109		
52,53+	275.100	279.300	300.050	314.100	332.675	346.650	354.347	361.767	368.919	375.078	381.095	418.364	460.126	502.775		
54	75.100	92.400	105.125	110.800	117.300	123.900	126.400	129.400	131.200	133.000	134.300	146.469	158.737	172.304		
58	195.500	218.400	233.275	241.600	250.100	261.300	276.556	287.527	298.812	310.626	323.217	385.742	452.712	529.162		
60-67	188.900	193.400	202.450	205.550	210.750	215.550	228.673	235.784	243.113	250.668	258.456	294.176	329.151	366.698		
70	40.200	42.600	45.800	48.850	52.300	55.400	56.500	57.800	59.180	60.738	62.232	70.487	79.325	88.507		
72	29.600	35.000	36.075	34.100	35.275	37.150	42.409	43.396	44.207	45.009	45.822	50.259	54.369	58.575		
73	89.800	109.800	138.475	123.200	133.650	142.750	154.400	160.150	166.050	170.950	176.150	220.000	277.588	305.008		
76	9.800	10.500	11.350	12.750	14.225	14.750	15.485	16.029	16.469	16.810	17.156	18.760	20.225	21.393		
80	179.800	212.350	231.100	240.600	252.300	269.000	282.564	293.885	304.275	313.939	322.982	380.340	439.066	500.444		
81	17.400	22.700	25.700	26.900	27.925	29.300	31.911	33.012	34.063	35.444	36.894	45.154	54.192	64.757		
83	31.800	41.800	47.525	56.500	61.000	63.900	66.800	68.700	70.400	72.300	73.700	84.300	97.000	110.500		
89	36.400	36.000	39.100	65.800	71.150	75.300	79.192	82.511	85.493	88.205	91.217	106.965	119.557	129.652		
75,78+	122.600	141.125	150.850	158.900	168.500	177.600	184.158	188.807	192.483	196.084	199.712	216.158	230.603	244.914		
82	19.800	24.200	27.500	32.800	34.600	35.800	36.600	37.100	37.600	38.000	38.400	41.200	44.200	46.700		
94	279.700	280.275	291.400	299.600	306.700	317.900	333.600	329.200	335.700	342.300	349.000	382.352	418.009	456.865		
90-99	230.300	236.100	248.300	257.500	266.400	276.300	281.635	286.827	292.024	297.625	304.399	336.010	364.837	393.552		
Const	161.300	132.600	140.600	153.750	171.050	184.600	175.163	177.921	180.813	183.963	187.169	202.054	224.255	247.972		
Agric	292.200	286.600	286.200	285.055	284.100	285.061	284.819	284.537	284.257	283.978	283.700	282.300	280.900	279.399		
Mining	13.300	9.875	9.075	10.075	10.900	11.800	12.638	12.778	13.018	13.158	13.300	14.200	14.800	15.000		
Fd Gvt	117.300	116.350	118.300	120.550	122.200	127.200	130.432	131.491	132.830	134.106	135.300	141.800	150.100	158.900		
SUBTOT	2779.400	2893.575	3073.175	3199.955	3348.800	3494.011	3606.632	3679.246	3760.167	3839.915	3920.784	4371.333	4847.745	5316.611		

TOTAL 3371.500 3454.446 3664.435 3826.625 4002.265 4151.946 4296.244 4381.172 4472.799 4555.552 4641.152 5106.132 5602.260 6084.304

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														MEDHI SCENARIO - REGION					2/22/91								
														1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING																											
SF	2304.022	2428.959	2489.849	2549.162	2618.800	2669.739	2759.153	2822.938	2891.608	2955.069	3017.379	3299.969	3605.368	3865.689													
MF	427.732	492.379	518.178	536.073	555.502	571.187	595.374	613.677	633.298	651.673	669.825	752.721	842.754	921.358													
MO	230.919	280.032	297.473	310.976	324.888	335.701	355.668	369.314	383.819	396.807	409.308	461.547	514.882	556.283													
TOTAL	2962.673	3201.400	3305.500	3396.211	3499.190	3576.628	3710.194	3805.930	3908.724	4003.549	4096.512	4514.238	4963.004	5343.310													
POPUL	8003.820	8389.700	8532.000	8668.200	8860.400	9019.000	9313.117	9477.615	9655.058	9812.608	9975.740	10736.523	11569.374	12365.505													
HHLDS	2962.673	3201.400	3305.500	3396.210	3499.190	3576.626	3710.195	3805.930	3908.724	4003.549	4096.513	4514.238	4963.004	5343.311													
PCI	10360.21	10444.04	10785.29	10968.18	11357.44	11433.36	11907.71	12184.28	12467.66	12757.35	13053.39	14680.15	16514.06	18574.33													

MEDHI SCENARIO - WASHINGTON														2/22/91
MANUFACTURING EMPLOYMENT (1000'S)														
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
220	31.900	31.100	32.300	34.200	35.500	35.900	35.400	35.600	35.800	36.000	36.000	36.000	36.000	36.000
222	1.000	0.900	1.000	1.200	1.200	1.300	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
223	6.500	6.200	5.700	6.000	6.000	6.200	6.700	6.900	7.100	7.300	7.500	8.000	8.300	8.600
225	3.300	3.800	3.800	4.200	4.000	4.300	4.700	4.900	5.100	5.300	5.500	6.000	6.500	7.000
227	15.800	17.600	20.100	21.400	22.100	22.000	24.400	25.400	26.300	27.100	28.000	32.000	35.000	38.000
229	2.100	1.800	1.800	1.900	1.900	2.200	2.300	2.300	2.400	2.400	2.500	2.600	2.600	2.600
230	3.500	4.500	5.100	5.800	6.200	6.500	7.200	7.600	8.000	8.300	8.500	10.400	12.000	13.500
231	0.400	0.400	0.400	0.500	0.600	0.500	0.619	0.638	0.658	0.679	0.700	0.700	0.700	0.700
232	6.900	6.400	6.900	7.300	7.500	7.900	8.000	8.100	8.200	8.300	8.400	8.800	9.000	9.100
233XX	9.000	6.900	6.900	7.100	7.300	7.600	8.359	8.419	8.479	8.539	8.600	8.800	9.000	9.100
234	11.800	9.700	10.500	10.900	11.800	12.200	12.400	12.500	12.700	12.800	12.900	13.800	14.700	15.500
235	15.000	17.100	16.200	18.000	19.000	19.500	21.000	21.500	22.000	22.500	23.000	25.000	27.000	28.500
236	11.200	12.100	13.200	10.500	11.700	12.100	15.789	16.083	16.383	16.689	17.000	18.500	19.500	20.300
237	98.350	89.600	106.200	116.200	128.500	128.900	135.000	140.000	145.000	145.000	144.000	140.000	136.500	133.000
238	6.400	10.700	10.800	14.600	14.900	14.700	15.000	15.200	15.500	15.700	15.900	17.300	18.400	19.500
239	4.600	4.500	4.800	5.500	5.900	5.600	6.300	6.600	7.000	7.400	7.800	8.100	8.300	8.500
2421	16.027	13.400	14.500	15.200	15.300	14.700	15.028	14.637	14.106	13.360	13.281	11.507	11.952	12.291
2436	4.982	4.200	3.900	3.600	3.100	3.000	3.062	2.986	2.866	2.637	2.545	1.941	1.909	1.879
24XX	25.991	20.700	22.000	22.800	22.700	21.900	21.782	21.686	21.590	21.494	21.399	20.680	19.961	19.245
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.470	2.438	2.407	2.377	2.347	2.202	2.066	1.939
2621	8.818	9.000	8.400	8.700	9.300	9.300	9.255	9.213	9.173	9.134	9.091	8.900	8.733	8.576
2631	1.637	1.200	1.200	1.200	1.600	1.600	1.587	1.575	1.563	1.550	1.539	1.480	1.423	1.368
26XX	4.171	4.400	4.950	5.100	4.900	5.000	5.341	5.401	5.462	5.523	5.585	5.711	5.662	5.229
2812	0.513	0.500	0.500	0.500	0.400	0.500	0.501	0.501	0.502	0.503	0.504	0.507	0.503	0.495
2819	5.300	7.700	7.700	8.700	8.500	8.900	9.400	9.700	10.000	10.200	10.400	10.600	10.800	11.000
28XX	2.887	3.100	3.300	3.300	3.300	3.500	3.426	3.432	3.437	3.442	3.447	3.458	3.437	3.389
3334	7.700	5.800	4.400	5.600	5.900	5.900	5.400	5.300	5.100	5.000	4.900	4.700	4.700	4.700
SUBTOT	308.750	295.400	318.600	342.100	361.600	364.200	381.819	390.008	398.225	400.627	402.737	409.084	416.047	421.411

MEDHI SCENARIO - WASHINGTON															2/22/91
NON-MANUFACTURING EMPLOYMENT (1000'S)															
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
40-49	91.400	93.600	98.500	101.900	107.900	112.000	113.000	114.000	115.500	117.000	119.000	125.000	129.000	133.000	
50-51	100.500	105.700	111.400	116.400	124.600	132.100	134.000	136.000	138.437	140.879	143.467	164.463	185.440	208.236	
52-53+	141.000	146.900	161.200	168.800	179.100	189.000	194.347	197.665	201.082	204.000	206.601	225.296	248.867	273.774	
54	38.200	49.200	57.400	59.900	62.300	65.400	66.400	68.000	69.000	70.000	70.500	78.000	85.000	91.715	
58	101.600	118.900	128.200	132.500	135.000	141.600	152.738	159.168	165.869	172.852	180.129	215.670	253.929	297.761	
60-67	91.800	99.600	107.500	109.400	112.300	116.300	121.513	125.407	129.425	133.571	137.851	157.257	176.452	197.177	
70	17.800	20.100	21.500	22.900	24.700	26.100	26.500	27.000	27.534	28.471	29.440	33.913	38.425	43.360	
72	16.000	19.900	20.800	19.700	20.400	21.500	25.209	25.691	26.183	26.684	27.194	29.979	32.504	35.095	
73	52.900	61.000	78.000	70.000	76.500	83.700	87.000	90.000	93.000	95.000	97.000	122.230	157.967	170.000	
76	5.500	5.600	5.900	6.900	8.000	8.400	8.600	8.800	9.000	9.200	9.400	10.200	11.000	11.500	
80	95.800	117.400	129.300	134.600	140.800	151.200	155.864	160.985	166.275	171.739	177.382	210.340	245.266	284.828	
81	9.200	12.400	14.400	15.000	15.600	16.500	17.500	18.000	18.439	19.189	19.969	24.492	29.541	35.487	
83	15.600	22.600	25.000	27.200	29.700	31.400	33.000	34.000	34.800	35.700	36.300	41.000	48.000	56.000	
89	19.500	21.100	23.100	37.500	40.700	43.000	45.000	47.000	49.000	51.000	53.000	63.000	70.000	77.000	
75, 78+	66.800	83.500	89.000	95.400	101.100	106.700	109.000	112.000	114.000	116.000	118.000	128.000	136.000	144.018	
82	8.900	12.000	13.100	14.700	15.900	16.700	17.000	17.200	17.400	17.600	17.800	19.000	20.500	21.900	
941	145.500	143.600	151.100	156.000	160.600	166.300	168.100	170.300	173.500	176.800	180.200	198.000	217.500	239.000	
90-99	117.400	129.100	135.500	141.300	146.800	152.100	154.000	157.000	160.000	163.000	167.024	185.034	201.603	218.750	
Const	92.600	80.600	88.900	96.600	106.600	115.300	109.963	111.921	113.914	115.942	118.006	128.015	141.962	158.016	
Agric	119.300	115.100	114.400	113.300	112.300	112.090	112.194	112.298	112.402	112.507	112.611	111.609	111.327	110.678	
Mining	3.200	2.700	3.000	3.300	3.600	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	
Fd Gvt	67.900	70.100	70.600	71.400	72.000	74.500	78.080	78.969	79.869	80.779	81.700	86.500	91.600	96.900	
SUBTOT	1418.400	1530.700	1647.800	1714.700	1796.500	1885.890	1933.008	1975.404	2018.629	2061.913	2106.574	2358.768	2635.883	2908.195	
=====															
TOTAL	1727.150	1826.100	1966.400	2056.800	2158.100	2250.690	2314.827	2365.412	2416.854	2462.540	2509.311	2767.852	3051.930	3329.606	

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										MEDHI SCENARIO - WASHINGTON										2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010							
HOUSING																					
SF	1193.211	1266.263	1305.589	1341.154	1387.480	1419.142	1458.186	1493.915	1530.662	1564.674	1599.835	1753.968	1926.726	2073.886							
MF	250.130	298.560	317.582	329.759	345.070	355.887	368.996	381.105	393.547	405.166	417.158	470.708	530.383	582.485							
MO	97.169	126.178	137.830	146.087	156.737	163.895	172.669	180.573	188.610	195.906	203.361	234.064	266.977	292.871							
TOTAL	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1999.851	2055.593	2112.820	2165.746	2220.354	2458.740	2724.086	2949.242							
POPUL	4132.160	4406.000	4538.000	4619.000	4761.000	4866.700	4999.627	5097.871	5197.536	5284.421	5373.257	5802.625	6292.638	6753.765							
HHLDS	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1999.851	2055.593	2112.820	2165.746	2220.354	2458.740	2724.086	2949.242							
PCI	10725.00	10924.00	11258.00	11383.00	11774.00	11798.00	12343.50	12627.40	12917.80	13214.90	13518.90	15146.70	16970.60	19014.10							

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MEDHI SCENARIO - OREGON

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	24.300	23.800	24.000	23.700	23.600	24.900	24.700	24.700	24.700	24.700	24.700	24.800	24.900	25.000
22	2.000	1.600	1.800	1.800	1.800	2.100	1.800	1.859	1.839	1.820	1.800	1.800	1.800	1.800
23	3.200	2.400	2.500	2.600	2.700	2.900	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.800
25	2.600	2.700	2.500	2.900	3.000	3.200	2.700	2.740	2.760	2.780	2.800	2.800	2.800	2.800
27	10.000	11.500	12.800	13.200	13.500	14.100	14.800	15.600	16.500	17.200	17.900	20.400	22.400	23.900
29	0.600	0.400	0.500	0.500	0.500	0.500	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
30	2.400	3.200	3.800	4.600	4.900	5.000	6.200	6.800	7.400	7.800	8.300	10.800	12.800	14.100
31	0.300	0.400	0.500	0.500	0.500	0.500	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
32	4.500	3.100	3.600	4.000	4.200	4.900	4.800	4.900	5.000	5.000	5.100	5.300	5.400	5.500
33XX	9.600	8.200	8.600	9.300	10.100	10.700	10.700	10.700	10.800	10.800	10.800	10.700	10.600	10.400
34	12.700	11.000	10.200	11.200	12.300	12.400	12.500	12.900	13.379	13.539	13.700	14.300	15.000	15.500
35	17.700	15.500	15.800	16.800	17.600	18.000	20.500	21.000	21.300	21.700	21.900	24.000	26.000	27.000
36	9.800	13.900	13.600	14.100	15.600	17.200	19.000	19.600	20.000	20.500	21.100	24.000	26.200	28.000
37	10.300	9.200	10.800	11.600	11.400	12.200	13.200	13.200	13.200	13.200	13.200	13.200	13.200	13.200
38	19.300	14.600	12.100	13.200	12.500	11.600	12.713	12.800	13.149	13.373	13.600	15.000	16.500	18.400
39	2.200	2.400	3.200	3.800	4.900	3.800	4.400	4.600	4.700	4.800	4.900	5.400	5.800	6.000
2421	23.800	20.500	22.000	21.400	20.800	19.000	19.546	18.997	18.260	17.256	17.112	14.708	15.280	15.681
2436	20.100	15.500	16.800	16.100	16.300	14.900	16.200	15.903	15.257	13.969	13.473	9.783	9.378	9.057
24XX	25.600	27.600	29.200	31.300	29.900	27.300	29.463	29.333	29.203	29.074	28.945	27.972	26.999	26.031
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	5.100	4.160	4.000	3.900	4.100	4.100	4.081	4.062	4.042	4.025	4.006	3.924	3.848	3.779
2631	2.000	2.100	2.000	1.900	2.000	2.000	1.985	1.970	1.954	1.939	1.924	1.850	1.779	1.712
26XX	3.300	2.840	3.200	2.800	3.000	3.000	2.936	2.935	2.933	2.932	2.930	2.990	3.022	2.881
2812	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.201	0.201	0.201	0.202	0.203	0.201	0.198
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28XX	2.050	1.900	1.900	1.900	2.000	2.300	2.078	2.048	2.018	1.990	1.973	1.980	1.967	1.940
3334	1.400	0.600	0.700	0.900	0.900	0.800	0.800	0.800	0.800	0.800	0.800	0.700	0.700	0.700
SUBTOT	215.100	199.300	206.300	214.200	218.300	217.600	229.402	231.776	233.395	233.397	235.165	240.609	250.579	257.580

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MEDHI SCENARIO - OREGON

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	60.500	57.300	58.500	60.500	62.800	65.100	67.000	68.000	69.000	70.000	70.800	73.900	76.000	78.500
50-51	67.400	65.800	68.200	72.900	78.200	80.800	83.500	86.500	89.000	91.500	93.500	105.000	116.000	126.483
52, 53+	96.200	92.900	98.700	104.200	109.700	112.000	114.000	117.000	120.000	122.500	125.000	138.000	151.000	163.329
54	24.600	29.500	33.800	36.400	39.400	42.000	43.000	44.000	44.500	45.000	45.400	48.066	51.330	56.108
58	67.400	70.400	76.000	78.900	82.300	85.000	88.318	91.859	95.543	99.374	103.359	122.563	142.914	165.966
60-67	70.000	66.800	72.100	73.300	75.300	75.800	81.440	83.883	86.399	88.991	91.660	104.055	116.186	129.199
70	14.800	14.600	15.600	17.100	18.400	19.700	19.700	20.000	20.400	20.700	21.000	23.400	26.300	28.644
72	9.800	10.400	10.800	10.400	10.900	11.600	12.200	12.500	12.800	13.000	13.200	14.336	15.466	16.617
73	24.900	35.000	45.500	43.000	46.700	48.100	55.000	57.000	59.000	61.000	63.000	79.000	94.000	105.176
76	3.000	3.500	4.100	4.400	4.600	4.700	5.200	5.500	5.700	5.800	5.900	6.500	7.000	7.500
80	62.100	69.400	74.400	77.600	82.100	87.200	94.500	99.500	103.400	106.800	109.300	126.000	142.000	157.316
81	5.600	7.300	8.100	8.500	8.700	9.000	10.311	10.787	11.284	11.805	12.350	15.074	18.094	21.632
83	11.400	14.000	16.900	23.300	24.400	25.200	26.000	26.500	27.000	27.500	28.000	32.000	36.000	40.000
89	11.100	10.300	11.300	17.200	19.000	20.500	22.022	23.029	23.700	24.200	25.000	29.000	33.000	35.000
75, 78+	42.200	43.500	47.400	47.900	50.800	53.500	57.183	58.355	59.552	60.773	62.019	66.578	71.477	76.418
82	7.100	8.300	10.300	13.800	14.300	14.600	14.800	15.000	15.200	15.300	15.400	16.500	17.500	18.000
941	94.200	94.600	97.400	99.300	101.200	104.100	116.700	109.000	111.400	113.900	116.400	127.800	139.600	151.500
90-99	78.200	73.500	77.700	80.200	81.700	84.300	86.800	88.400	90.000	92.000	94.045	103.524	112.075	120.832
Const	46.500	33.100	35.300	39.900	45.200	47.900	43.100	43.600	44.199	45.121	46.063	49.439	54.934	60.788
Agric	96.300	98.800	99.700	100.300	101.000	102.338	102.150	101.962	101.775	101.588	101.401	101.472	100.897	100.380
Mining	2.300	1.500	1.400	1.300	1.400	1.400	1.938	1.978	2.018	2.058	2.100	2.300	2.500	2.500
Fd Gvt	30.800	29.600	30.600	31.700	32.200	34.200	34.052	34.108	34.368	34.532	34.600	35.300	37.400	39.600
SUBTOT	926.400	930.100	993.800	1042.100	1090.300	1129.038	1178.914	1198.461	1226.238	1253.442	1279.497	1419.807	1561.673	1701.488
TOTAL	1141.500	1129.400	1200.100	1256.300	1308.600	1346.638	1408.316	1430.237	1459.633	1486.839	1514.662	1660.416	1812.251	1959.068

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														MEDHI SCENARIO - OREGON					2/22/91								
														1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING																											
SF	766.113	797.066	816.018	834.922	856.126	873.533	910.996	929.122	951.992	973.921	992.752	1080.791	1171.484	1248.725													
MF	143.583	154.439	160.388	165.307	168.999	173.471	182.592	187.247	193.007	198.558	203.398	226.290	249.931	270.534													
MO	81.898	92.495	97.594	101.770	104.834	108.403	116.565	120.133	124.721	129.003	132.477	147.255	161.337	172.159													
TOTAL	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1210.154	1236.502	1269.721	1301.482	1328.628	1454.326	1582.752	1691.418													
POPUL	2633.160	2675.800	2690.000	2741.000	2791.000	2842.300	2964.876	3004.700	3060.028	3110.543	3162.134	3388.604	3624.503	3856.433													
HHLDS	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1210.154	1236.502	1269.721	1301.482	1328.628	1454.336	1582.752	1691.418													
PCI	9897.80	9845.90	10162.10	10402.20	10731.30	10804.40	11188.10	11467.80	11754.50	12048.40	12349.60	13972.40	15808.50	17885.90													

2/22/91

MEDHI SCENARIO - IDAHO

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	17.000	16.600	16.100	17.100	16.900	17.000	18.400	18.500	18.500	18.300	18.300	17.800	17.400	17.100
22	0.000	0.050	0.100	0.100	0.100	0.100	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
23	0.300	0.250	0.300	0.300	0.300	0.300	0.239	0.219	0.219	0.229	0.229	0.200	0.200	0.200
25	0.250	0.600	0.600	0.700	0.700	0.600	0.750	0.750	0.800	0.800	0.800	0.800	0.800	0.800
27	3.100	4.200	4.300	4.500	4.600	4.500	5.100	5.300	5.500	5.600	5.700	6.600	7.200	7.700
29	0.100	0.025	0.050	0.050	0.050	0.050	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
30	1.000	0.850	1.100	0.800	0.900	0.800	0.900	1.000	1.000	1.000	1.000	1.200	1.400	1.500
31	0.000	0.100	0.150	0.150	0.150	0.100	0.150	0.150	0.150	0.150	0.150	0.100	0.100	0.100
32	1.300	0.900	0.800	0.900	0.900	1.000	1.200	1.200	1.100	1.100	1.000	1.000	1.050	1.100
33XX	1.200	0.100	0.000	0.100	0.100	0.100	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.200
34	2.100	1.900	2.000	2.000	2.300	2.400	2.600	2.700	2.700	2.700	2.700	2.900	3.000	3.000
35	5.000	5.800	5.200	5.500	6.200	7.000	7.200	7.500	7.700	7.900	8.100	9.200	10.500	10.800
36	1.500	2.800	3.300	4.000	4.900	5.600	6.000	6.300	6.500	6.700	6.900	7.400	7.800	8.100
37	0.700	0.950	1.100	1.600	1.500	1.500	1.500	1.600	1.600	1.700	1.700	1.600	1.500	1.400
38	0.150	0.300	0.300	0.400	0.400	0.400	0.418	0.525	0.550	0.575	0.600	0.700	0.800	0.900
39	0.400	0.325	0.300	0.400	0.400	0.400	0.418	0.437	0.457	0.478	0.500	0.500	0.500	0.500
2421	8.100	6.400	6.600	6.700	7.000	7.200	7.002	7.345	7.476	7.512	7.703	7.786	8.171	8.166
2436	0.500	0.400	0.400	0.400	0.400	0.400	0.327	0.323	0.325	0.329	0.340	0.352	0.351	0.356
24XX	6.775	6.700	6.400	6.800	7.400	7.600	6.932	6.803	6.773	6.743	6.713	6.488	6.262	6.037
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.225	0.250	0.250	0.300	0.300	0.300	0.299	0.297	0.296	0.295	0.293	0.287	0.282	0.277
2631	0.850	0.950	0.950	1.000	1.100	1.200	1.191	1.181	1.172	1.162	1.154	1.109	1.067	1.026
26XX	0.425	0.575	0.600	0.600	0.600	0.600	0.603	0.606	0.610	0.614	0.618	0.630	0.637	0.624
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	1.067	1.000	0.900	0.900	0.900	0.900	0.901	0.901	0.901	0.902	0.903	0.894	0.885	0.874
28XX	2.433	2.600	2.400	2.600	2.600	2.700	2.725	2.724	2.723	2.723	2.722	2.718	2.713	2.709
3334	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUBTOT	54.475	54.625	54.200	57.900	60.700	63.050	65.337	66.772	67.453	67.892	68.496	70.664	72.969	73.620

MEDHI SCENARIO - IDAHO															2/22/91
NON-MANUFACTURING EMPLOYMENT (1000'S)															
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
40-49	20.100	19.200	17.900	18.600	19.100	19.500	20.500	20.800	21.000	21.200	21.400	22.800	24.000	25.000	
50-51	22.300	20.800	20.500	20.600	22.700	22.700	22.367	24.109	24.874	25.663	26.478	30.161	33.793	37.707	
52, 53+	29.900	31.300	31.500	32.400	35.100	36.800	36.800	37.500	38.000	38.500	39.169	43.713	47.979	52.445	
54	9.400	10.700	11.100	11.400	12.100	12.700	13.000	13.200	13.400	13.600	13.900	15.403	16.907	18.481	
58	19.000	21.600	21.600	22.700	24.400	26.100	26.700	27.500	28.200	29.000	29.976	35.718	41.851	48.838	
60-67	23.400	23.600	19.200	19.200	19.300	19.500	21.720	22.394	23.089	23.806	24.545	27.964	31.113	34.597	
70	5.100	5.200	5.800	6.000	6.500	6.800	7.300	7.600	7.800	8.000	8.100	8.900	9.734	10.985	
72	3.000	3.800	3.600	3.100	3.200	3.300	4.100	4.200	4.197	4.276	4.356	4.779	5.155	5.539	
73	11.000	12.100	12.800	8.000	8.800	9.200	10.500	11.100	11.800	12.500	13.500	17.500	21.500	25.000	
76	1.000	1.100	1.000	1.100	1.200	1.200	1.210	1.239	1.269	1.300	1.331	1.460	1.575	1.693	
80	15.500	17.900	19.100	20.000	20.700	21.800	23.200	24.100	25.000	25.600	26.300	32.000	38.000	43.000	
81	2.100	2.400	2.500	2.700	2.900	3.000	3.300	3.400	3.500	3.600	3.700	4.600	5.400	6.288	
83	3.400	4.000	4.100	4.500	4.800	5.000	5.300	5.500	5.700	6.000	6.200	7.400	8.600	9.800	
89	4.800	3.900	3.900	10.300	10.700	11.000	11.300	11.600	11.900	12.100	12.300	14.000	15.500	16.500	
75, 78+	10.300	10.800	11.000	12.100	13.100	13.900	14.300	14.700	15.100	15.400	15.700	17.200	18.400	19.400	
82	3.800	3.900	4.100	4.300	4.400	4.500	4.800	4.900	5.000	5.100	5.200	5.700	6.200	6.800	
941	31.100	32.300	33.400	34.900	35.300	37.700	38.700	39.500	40.100	40.600	41.100	44.000	47.500	52.100	
90-99	26.400	26.100	27.700	28.600	29.900	31.700	32.100	32.500	32.900	33.300	33.800	37.100	40.100	42.205	
Const	17.400	15.100	13.600	14.200	16.000	18.000	18.600	18.800	19.000	19.100	19.200	20.300	22.659	24.068	
Agric	69.100	65.400	64.800	64.155	63.500	63.333	63.149	62.965	62.781	62.598	62.416	62.051	61.447	61.060	
Mining	4.700	3.800	2.600	3.300	3.600	3.800	4.000	4.000	4.100	4.100	4.100	4.500	4.700	4.700	
Fd Gvt	13.000	11.800	12.200	12.500	12.900	13.300	13.100	13.214	13.374	13.536	13.700	14.500	15.300	16.200	
SUBTOT	345.800	346.800	344.000	354.655	370.200	384.833	397.046	404.821	412.084	418.879	426.471	471.649	517.413	562.406	
TOTAL	400.275	401.425	398.200	412.555	430.900	447.883	462.383	471.593	479.537	486.771	494.967	542.313	590.382	636.026	

MEDHI SCENARIO - IDAHO														2/22/91	
HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
HOUSING															
SF	262.386	280.726	282.675	287.023	288.875	290.394	300.300	307.289	313.637	318.579	324.136	354.114	385.426	412.750	
MF	25.070	29.289	29.910	30.632	30.995	31.312	32.807	33.895	34.995	35.699	36.592	41.387	46.407	50.899	
MO	36.714	43.986	44.415	45.345	45.585	45.703	48.045	49.563	50.870	51.760	52.778	57.937	62.873	66.718	
TOTAL	324.170	354.000	357.000	363.000	365.455	367.409	381.152	390.747	399.401	406.039	413.506	453.439	494.706	530.367	
POPUL	944.000	1004.000	1000.500	1004.400	1005.000	1006.700	1036.733	1055.017	1070.396	1084.123	1099.926	1178.940	1261.500	1341.827	
HHLDS	324.170	354.000	357.000	363.000	365.455	367.409	381.152	390.747	399.401	406.039	413.506	453.439	494.706	530.367	
PCI	8611.20	8400.50	8573.30	8785.80	9226.40	9457.00	9613.60	9854.00	10100.30	10352.80	10611.70	12006.10	13583.80	15368.80	

MEDHI SCENARIO - WESTERN MONTANA 2/22/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	0.700	0.465	0.525	0.550	0.475	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.025	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.075	0.075
25	0.000	0.140	0.150	0.150	0.150	0.150	0.175	0.175	0.175	0.200	0.200	0.250	0.300	0.300
27	0.750	0.700	0.725	0.750	0.825	0.875	0.900	0.925	0.950	0.975	1.000	1.200	1.300	1.400
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.025	0.025	0.010	0.010	0.040	0.054	0.059	0.064	0.069	0.075	0.075	0.100	0.100
31	0.000	0.025	0.030	0.010	0.010	0.040	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
32	0.400	0.325	0.280	0.290	0.300	0.300	0.306	0.312	0.318	0.324	0.330	0.350	0.371	0.400
33XX	1.000	0.150	0.050	0.050	0.050	0.300	0.100	0.150	0.150	0.150	0.150	0.150	0.150	0.150
34	0.150	0.250	0.275	0.250	0.225	0.250	0.259	0.269	0.279	0.289	0.300	0.300	0.300	0.300
35	0.050	0.225	0.325	0.350	0.375	0.400	0.425	0.425	0.450	0.475	0.500	0.575	0.650	0.700
36	0.050	0.075	0.075	0.100	0.125	0.125	0.108	0.118	0.128	0.138	0.150	0.175	0.204	0.225
37	0.100	0.075	0.050	0.100	0.100	0.100	0.108	0.118	0.128	0.138	0.150	0.200	0.250	0.300
38	0.100	0.125	0.120	0.130	0.140	0.150	0.159	0.168	0.178	0.189	0.200	0.225	0.253	0.275
39	0.150	0.175	0.300	0.650	0.700	0.750	0.750	0.775	0.800	0.825	0.850	0.900	0.900	0.900
2421	4.500	4.000	4.150	3.900	3.900	4.000	3.923	4.117	4.192	4.209	4.319	4.363	4.580	4.576
2436	1.000	0.800	0.800	0.800	0.950	0.825	0.710	0.701	0.706	0.716	0.739	0.765	0.763	0.773
24XX	2.700	2.100	2.500	2.500	2.650	2.650	2.651	2.639	2.628	2.616	2.605	2.517	2.425	2.342
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.550	0.750	0.750	0.750	0.750	0.750	0.744	0.738	0.732	0.727	0.721	0.693	0.667	0.641
26XX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	0.200	0.190	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.181	0.179	0.177	0.175
28XX	0.100	0.050	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.101	0.101	0.101	0.100	0.099
3334	1.250	0.850	0.750	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
SUBTOT	13.775	11.545	12.160	12.470	12.865	13.085	13.053	13.370	13.558	13.721	13.970	14.443	14.921	15.082

NON-MANUFACTURING EMPLOYMENT (1000'S) MEDHI SCENARIO - WESTERN MONTANA 2/22/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	7.500	6.400	6.650	6.700	6.900	7.000	7.280	7.404	7.529	7.656	7.786	8.251	8.599	8.924
50-51	3.800	3.400	3.275	3.375	3.500	3.600	3.703	3.811	3.921	4.035	4.152	4.667	5.161	5.683
52,53+	8.000	8.200	8.650	8.700	8.775	8.850	9.200	9.602	9.837	10.078	10.325	11.355	12.280	13.227
54	2.900	3.000	2.825	3.100	3.500	3.800	4.000	4.200	4.300	4.400	4.500	5.000	5.500	6.000
58	7.500	7.500	7.475	7.500	8.400	8.600	8.600	9.000	9.200	9.400	9.753	11.791	14.018	16.597
60-67	3.700	3.400	3.650	3.650	3.850	3.950	4.000	4.100	4.200	4.300	4.400	5.000	5.400	5.725
70	2.500	2.700	2.900	2.850	2.700	2.800	3.000	3.200	3.446	3.567	3.692	4.274	4.866	5.518
72	0.800	0.900	0.875	0.900	0.775	0.750	0.900	1.005	1.027	1.049	1.072	1.165	1.244	1.324
73	1.000	1.700	2.175	2.200	1.650	1.750	1.900	2.050	2.250	2.450	2.650	3.500	4.121	4.832
76	0.300	0.300	0.350	0.350	0.425	0.450	0.475	0.490	0.500	0.510	0.525	0.600	0.650	0.700
80	6.400	7.650	8.300	8.400	8.700	8.800	9.000	9.300	9.600	9.800	10.000	12.000	13.800	15.300
81	0.500	0.600	0.700	0.700	0.725	0.800	0.800	0.825	0.840	0.850	0.875	0.988	1.157	1.350
83	1.400	1.200	1.525	1.500	2.100	2.300	2.500	2.700	2.900	3.100	3.200	3.900	4.400	4.700
89	1.000	0.700	0.800	0.800	0.750	0.800	0.870	0.882	0.893	0.905	0.917	0.965	1.057	1.152
75,78+	3.300	3.325	3.450	3.500	3.500	3.500	3.675	3.752	3.831	3.911	3.993	4.380	4.726	5.078
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
941	8.900	9.775	9.500	9.400	9.600	9.800	10.100	10.400	10.700	11.000	11.300	12.552	13.409	14.265
90-99	8.300	7.400	7.400	7.400	8.000	8.200	8.735	8.927	9.124	9.325	9.530	10.352	11.059	11.765
Const	4.800	3.800	2.800	3.050	3.250	3.400	3.500	3.600	3.700	3.800	3.900	4.300	4.700	5.100
Agric	7.500	7.300	7.300	7.300	7.300	7.300	7.326	7.312	7.299	7.285	7.272	7.168	7.229	7.281
Mining	3.100	1.875	2.075	2.175	2.300	2.600	2.700	2.800	2.900	3.000	3.100	3.400	3.600	3.800
Fd Gvt	5.600	4.850	4.900	4.950	5.100	5.200	5.200	5.200	5.219	5.259	5.300	5.500	5.800	6.200
SUBTOT	88.800	85.975	87.575	88.500	91.800	94.250	97.664	100.560	103.216	105.680	108.242	121.108	132.776	144.521

TOTAL	102.575	97.520	99.735	100.970	104.665	107.335	110.717	113.930	116.774	119.401	122.212	135.551	147.697	159.603
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	HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										MEDHI SCENARIO - WESTERN MONTANA					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010			
HOUSING																	
SF	82.313	84.905	85.568	86.062	86.319	86.669	89.671	92.612	95.316	97.895	100.656	111.097	121.731	130.308			
MF	8.950	10.092	10.297	10.374	10.439	10.518	10.978	11.430	11.849	12.249	12.677	14.337	16.033	17.440			
MO	15.138	17.403	17.634	17.775	17.732	17.700	18.389	19.045	19.618	20.138	20.691	22.290	23.695	24.535			
TOTAL	106.400	112.400	113.500	114.211	114.491	114.886	119.038	123.088	126.783	130.282	134.025	147.723	161.460	172.283			
POPUL	294.500	303.900	303.500	303.800	303.400	303.300	311.880	320.027	327.099	333.522	340.423	366.354	390.732	413.480			
HHLDS	106.400	112.400	113.500	114.211	114.491	114.886	119.038	123.088	126.783	130.282	134.025	147.723	161.460	172.283			
PCI	7793.00	7983.00	8527.20	8697.80	8871.70	9049.10	9991.00	9991.00	9991.00	9991.00	9991.00	11030.90	12179.00	13446.70			

MANUFACTURING EMPLOYMENT (1000'S) 2/12/91

MEDIUM SCENARIO - REGION

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	73.900	71.965	72.925	75.550	76.475	78.300	76.895	76.690	76.885	76.880	76.675	75.275	73.750	72.450
22	3.000	2.550	2.900	3.100	3.100	3.550	3.050	3.050	3.050	2.950	2.950	2.800	2.800	2.800
23	10.025	8.900	8.550	8.950	9.050	9.500	9.050	9.179	9.269	9.359	9.550	9.825	10.125	10.425
25	6.150	7.240	7.050	7.950	7.850	8.320	8.050	8.050	8.150	8.250	8.350	8.875	9.177	9.475
27	29.650	34.000	37.925	39.850	41.025	41.775	42.400	44.125	46.325	48.150	49.275	57.600	62.500	66.300
29	2.800	2.225	2.350	2.450	2.450	2.750	2.875	2.775	2.875	2.875	2.875	2.825	2.775	2.775
30	6.900	8.575	10.025	11.210	12.010	12.390	13.840	14.742	15.545	15.947	16.850	20.450	23.463	25.463
31	0.700	0.925	1.080	1.160	1.260	1.150	1.238	1.317	1.307	1.298	1.288	1.288	1.288	1.288
32	13.100	10.725	11.580	12.490	12.900	14.100	13.603	13.706	13.709	13.812	13.815	13.725	13.636	13.550
33XX	20.800	15.350	15.550	16.550	17.550	18.450	18.330	18.500	18.625	18.525	18.525	18.450	18.200	18.000
34	26.750	22.850	22.975	24.350	26.625	27.250	26.155	26.260	26.865	27.070	27.175	28.775	30.575	31.475
35	37.750	38.625	37.525	40.650	43.175	44.900	45.200	46.500	47.425	48.050	48.350	51.900	55.150	57.950
36	22.550	28.875	30.175	28.700	32.325	35.075	39.108	40.418	41.628	42.038	42.150	45.175	47.804	49.925
37	109.450	99.825	118.150	129.500	141.500	142.700	142.205	144.909	148.314	149.020	148.725	142.850	135.175	125.600
38	25.950	25.725	23.320	28.330	27.940	26.850	26.459	26.718	26.828	27.039	26.350	29.625	31.653	33.925
39	7.350	7.400	8.600	10.350	11.900	10.550	11.450	11.775	12.000	12.100	12.400	13.400	13.800	14.000
2421	52.427	44.300	47.250	47.200	47.000	44.900	43.349	40.997	40.026	38.489	38.557	34.867	36.363	37.018
2436	26.582	20.900	21.900	20.900	20.750	19.125	19.344	18.110	17.408	16.044	15.541	11.681	11.270	10.966
24XX	61.066	57.100	60.100	63.400	62.650	59.450	59.634	58.234	57.523	56.821	56.128	53.403	50.812	48.345
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.459	2.421	2.384	2.347	2.310	2.135	1.974	1.824
2621	14.143	13.410	12.650	12.900	13.700	13.700	13.623	13.546	13.475	13.400	13.328	12.982	12.671	12.382
2631	5.037	5.000	4.900	4.850	5.450	5.550	5.501	5.453	5.404	5.357	5.310	5.080	4.862	4.651
26XX	7.896	7.815	8.750	8.500	8.500	8.600	8.525	8.508	8.480	8.479	8.492	8.440	8.441	8.113
2812	0.763	0.700	0.700	0.700	0.600	0.700	0.701	0.701	0.702	0.703	0.704	0.712	0.715	0.714
2819	6.567	8.890	8.780	9.780	9.580	9.980	10.174	10.167	10.061	10.054	10.048	9.418	8.988	8.459
28XX	7.470	7.650	7.650	7.900	8.000	8.600	7.950	7.926	7.903	7.879	7.856	7.753	7.639	7.514
3334	10.350	7.250	5.850	7.300	7.600	7.600	6.300	6.100	6.000	5.940	5.900	5.650	5.600	5.600
SUBTOT	592.100	560.870	591.260	626.670	653.465	658.315	657.527	660.878	668.166	668.877	669.475	674.959	681.204	680.988

MEDIUM SCENARIO - REGION															2/12/91	
NON-MANUFACTURING EMPLOYMENT (1000'S)																
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
40-49	179.500	176.500	181.550	187.700	196.700	203.600	204.671	206.456	209.641	211.828	214.516	225.080	233.048	238.793		
50-51	194.000	195.700	203.375	213.275	229.000	239.200	240.097	242.084	244.472	247.888	252.628	276.361	305.383	336.067		
52,52,53+	275.100	279.300	300.050	314.100	332.675	346.650	348.779	352.050	355.124	357.101	359.806	385.344	408.412	437.912		
54	75.100	92.400	105.125	110.800	117.300	123.900	124.850	125.900	126.950	127.800	128.550	134.700	141.984	150.972		
58	195.500	218.400	233.275	241.600	250.100	261.300	269.308	277.712	286.781	296.260	306.249	361.689	420.417	486.845		
60-67	188.900	193.400	202.450	205.550	210.750	215.550	216.900	222.950	230.200	234.650	237.500	262.789	289.285	316.502		
70	40.200	42.600	45.800	48.850	52.300	55.400	55.800	56.500	57.000	57.572	58.631	64.948	72.400	80.124		
72	29.600	35.000	36.075	34.100	35.275	37.150	40.800	42.500	43.050	43.604	43.921	46.998	49.804	52.533		
73	89.800	109.800	138.475	123.200	133.650	142.750	146.850	151.950	157.050	161.700	166.350	208.000	246.600	281.000		
76	9.800	10.500	11.350	12.750	14.225	14.750	14.950	15.360	15.680	16.111	16.243	17.181	17.886	18.390		
80	179.800	212.350	231.100	240.600	252.300	269.000	279.500	289.833	300.909	309.600	317.700	370.000	420.200	469.200		
81	17.400	22.700	25.700	26.900	27.925	29.300	30.873	31.555	32.389	33.340	34.455	41.317	48.855	57.541		
83	31.800	41.800	47.525	56.500	61.000	63.900	65.700	67.500	68.700	70.300	71.850	81.250	93.600	105.206		
89	36.400	36.000	39.100	65.800	71.150	75.300	78.375	81.285	83.805	86.125	88.546	103.446	117.244	127.746		
75,75,78+	122.600	141.125	150.850	158.900	168.500	177.600	181.490	185.475	189.467	192.468	195.478	210.256	224.782	236.012		
82	19.800	24.200	27.500	32.800	34.600	35.800	35.900	36.200	36.700	37.100	37.300	39.700	41.500	43.600		
941	279.700	280.275	291.400	299.600	306.700	317.900	320.982	324.361	329.143	334.029	338.818	363.783	383.228	399.854		
90-99	230.300	236.100	248.300	257.500	266.400	276.300	279.052	281.787	284.524	287.363	290.505	311.035	330.121	348.998		
Const	161.300	132.600	140.600	153.750	171.050	184.600	171.050	172.400	176.139	178.400	175.840	188.400	199.600	209.888		
Agric	292.200	286.600	286.200	285.055	284.100	283.357	282.463	281.580	280.700	279.824	278.950	274.551	270.151	265.850		
Mining	13.300	9.875	9.075	10.075	10.900	11.800	11.770	11.589	11.309	11.380	11.500	11.650	11.800	11.900		
Fd Cvt	117.300	116.350	118.300	120.550	122.200	127.200	125.400	124.500	123.919	124.137	124.350	129.200	134.500	140.950		
SUBTOT	2779.400	2893.575	3073.175	3199.955	3348.800	3492.307	3525.560	3581.527	3643.652	3698.580	3749.687	4107.678	4460.800	4815.883		
=====																
TOTAL	3371.500	3454.446	3664.435	3826.625	4002.265	4150.623	4193.086	4242.405	4311.818	4367.457	4419.162	4782.637	5142.004	5496.871		

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME	MEDIUM SCENARIO - REGION										2/12/91			
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING														
SF	2304.022	2428.959	2486.587	2541.383	2603.354	2649.937	2707.672	2759.719	2814.922	2860.251	2900.775	3131.736	3356.560	3548.464
MF	427.732	492.379	520.091	540.652	564.686	582.969	604.561	623.759	644.392	661.644	677.336	765.107	852.057	929.785
MO	230.919	280.062	298.822	314.176	331.171	343.720	359.378	373.311	387.903	399.466	409.479	464.406	513.570	562.512
TOTAL	2962.673	3201.400	3305.500	3396.210	3499.190	3576.626	3671.611	3756.789	3847.218	3921.361	3987.590	4361.248	4722.187	5030.761
POPUL	8003.820	8389.700	8532.000	8668.200	8860.400	9019.000	9216.418	9354.876	9503.011	9611.076	9710.118	10372.261	11007.329	11641.684
HHLDS	2962.673	3201.400	3305.500	3396.210	3499.190	3576.626	3671.611	3756.789	3847.218	3921.361	3987.590	4361.248	4722.187	5030.761
PCI	10360.21	10444.04	10785.29	10968.18	11357.44	11433.36	11779.98	11984.38	12194.09	12405.44	12619.33	13786.26	15063.38	16459.67

INDUSTRY	MANUFACTURING EMPLOYMENT (1000'S)							MEDIUM SCENARIO - WASHINGTON					2/12/91				2017
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005				
20	31.900	31.100	32.300	34.200	35.500	35.900	35.100	35.000	34.900	34.700	34.600	34.000	33.500	33.000			
22	1.000	0.900	1.000	1.200	1.200	1.300	1.300	1.300	1.300	1.200	1.200	1.150	1.150	1.150			
23	6.500	6.200	5.700	6.000	6.000	6.200	6.200	6.300	6.400	6.500	6.700	7.100	7.400	7.700			
25	3.300	3.800	3.800	4.200	4.000	4.300	4.500	4.600	4.700	4.800	4.900	5.400	5.700	6.000			
27	15.800	17.600	20.100	21.400	22.100	22.000	22.100	23.100	24.500	25.500	26.000	31.000	34.000	36.000			
29	2.100	1.800	1.800	1.900	1.900	2.200	2.200	2.200	2.300	2.300	2.300	2.300	2.300	2.300			
30	3.500	4.500	5.100	5.800	6.200	6.500	7.000	7.300	7.600	7.700	7.900	9.500	11.000	12.000			
31	0.400	0.400	0.400	0.500	0.600	0.500	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600			
32	6.900	6.400	6.900	7.300	7.500	7.900	7.900	7.800	7.900	8.000	8.000	8.000	8.000	8.000			
33XX	9.000	6.900	6.900	7.100	7.300	7.600	7.500	7.600	7.600	7.600	7.600	7.600	7.600	7.600			
34	11.800	9.700	10.500	10.900	11.800	12.200	12.000	11.800	12.000	12.200	12.300	12.800	13.400	13.900			
35	15.000	17.100	16.200	18.000	19.000	19.500	19.900	20.600	21.000	21.100	21.200	22.500	23.700	24.950			
36	11.200	12.100	13.200	10.500	11.700	12.100	15.300	15.400	15.500	15.600	15.700	16.400	17.000	17.600			
37	98.350	89.600	106.200	116.200	128.500	128.900	129.800	131.500	134.300	134.600	134.200	128.000	120.000	109.900			
38	6.400	10.700	10.800	14.600	14.900	14.700	14.800	15.000	15.000	15.000	14.500	15.500	16.200	17.000			
39	4.600	4.500	4.800	5.500	5.900	5.600	6.100	6.300	6.500	6.700	7.000	7.500	7.500	7.500			
2421	16.027	13.400	14.500	15.200	15.300	14.700	14.321	13.309	12.819	12.148	12.075	10.454	10.868	11.179			
2436	4.982	4.200	3.900	3.600	3.100	3.000	2.916	2.716	2.605	2.398	2.313	1.765	1.734	1.709			
24XX	25.991	20.700	22.000	22.800	22.700	21.900	21.582	21.000	20.706	20.417	20.131	19.154	18.225	17.340			
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.459	2.421	2.384	2.347	2.310	2.135	1.974	1.824			
2621	8.818	9.000	8.400	8.700	9.300	9.300	9.250	9.196	9.147	9.096	9.048	8.813	8.601	8.405			
2631	1.637	1.200	1.200	1.200	1.600	1.600	1.586	1.571	1.557	1.544	1.531	1.464	1.401	1.340			
26XX	4.171	4.400	4.950	5.100	4.900	5.000	5.068	5.081	5.094	5.107	5.120	5.090	5.093	4.881			
2812	0.513	0.500	0.500	0.500	0.400	0.500	0.500	0.501	0.502	0.502	0.503	0.508	0.511	0.510			
2819	5.300	7.700	7.700	8.700	8.500	8.900	9.100	9.100	9.000	9.000	9.000	8.400	8.000	7.500			
28XX	2.887	3.100	3.300	3.300	3.300	3.500	3.280	3.271	3.261	3.251	3.242	3.202	3.155	3.101			
3334	7.700	5.800	4.400	5.600	5.900	5.900	4.800	4.700	4.600	4.540	4.500	4.300	4.300	4.300			
SUBTOT	308.750	295.400	318.600	342.100	361.600	364.200	367.162	369.267	373.776	374.450	374.473	374.636	372.910	367.289			

MEDIUM SCENARIO - WASHINGTON															2/12/91
NON-MANUFACTURING EMPLOYMENT (1000'S)															
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
43-49	91.400	93.600	98.500	101.900	107.900	112.000	112.600	113.500	115.000	116.000	118.000	123.000	127.000	130.000	
50-51	100.500	105.700	111.400	116.400	124.600	132.100	133.000	134.500	136.000	138.200	140.631	151.340	167.748	185.170	
52, 53+	141.000	146.900	161.200	168.800	179.100	189.000	191.000	193.000	195.000	196.000	197.000	210.783	221.371	238.315	
54	38.200	49.200	57.400	59.900	62.300	65.400	65.600	66.000	66.500	67.000	67.400	70.000	74.160	79.836	
58	101.600	118.900	128.200	132.500	135.000	141.600	148.108	153.519	159.128	164.942	170.969	202.189	235.761	273.869	
60-67	91.800	99.600	107.500	109.400	112.300	116.300	115.500	120.200	125.800	128.500	129.300	144.189	158.885	174.307	
70	17.800	20.100	21.500	22.900	24.700	26.100	26.300	26.600	26.800	27.072	27.831	31.592	35.361	39.418	
72	16.000	19.900	20.800	19.700	20.400	21.500	24.000	25.300	25.600	25.800	26.000	28.000	29.800	31.518	
73	52.900	61.000	78.000	70.000	76.500	83.700	86.000	88.500	91.000	93.000	95.000	118.000	140.000	158.900	
76	5.500	5.600	5.900	6.900	8.000	8.400	8.300	8.500	8.700	9.000	9.000	9.500	9.800	10.100	
80	95.800	117.400	129.300	134.600	140.800	151.200	154.000	159.033	165.009	170.000	175.000	205.000	233.000	261.000	
81	9.200	12.400	14.400	15.000	15.600	16.500	17.100	17.400	17.800	18.200	18.732	22.530	26.720	31.561	
83	15.600	22.600	25.000	27.200	29.700	31.400	32.500	33.500	34.000	34.800	35.600	40.000	47.000	54.406	
89	19.500	21.100	23.100	37.500	40.700	43.000	44.800	46.800	48.500	50.000	51.500	60.500	68.000	74.000	
75, 78+	66.800	83.500	89.000	95.400	101.100	106.700	109.000	112.000	115.000	117.000	119.000	127.000	135.800	141.000	
82	8.900	12.000	13.100	14.700	15.900	16.700	16.800	17.000	17.200	17.400	17.500	18.500	19.500	20.700	
941	145.500	143.600	151.100	156.000	160.600	166.300	167.000	168.200	170.700	173.300	175.900	189.300	198.000	205.500	
90-99	117.400	129.100	135.500	141.300	146.800	152.100	153.000	154.000	155.000	156.000	157.300	168.700	178.954	189.914	
Const	92.600	80.600	88.900	96.600	106.600	115.300	106.300	106.800	110.089	111.900	108.890	118.000	126.000	133.000	
Agric	119.300	115.100	114.400	113.300	112.300	111.402	111.266	111.131	110.996	110.861	110.726	108.545	107.066	105.311	
Mining	3.200	2.700	3.000	3.300	3.600	4.000	3.800	3.600	3.300	3.300	3.300	3.300	3.300	3.300	
Fd Gvt	67.900	70.100	70.600	71.400	72.000	74.500	74.700	74.800	74.900	75.000	75.000	78.000	81.000	85.000	
SUBTOT	1418.400	1530.700	1647.800	1714.700	1796.500	1885.202	1900.674	1933.883	1972.022	2003.284	2029.579	2227.968	2424.226	2626.125	
TOTAL	1727.150	1826.100	1966.400	2056.800	2158.100	2249.402	2267.836	2303.150	2345.798	2377.734	2404.052	2602.604	2797.136	2993.414	

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										MEDIUM SCENARIO - WASHINGTON					2/12/91	
1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010			
HOUSING																
SF	1193.211	1266.263	1303.362	1335.748	1377.932	1406.557	1440.932	1468.327	1500.162	1523.942	1545.052	1665.803	1782.353	1884.547		
MF	250.130	298.560	319.108	333.483	351.732	364.707	379.971	392.537	406.878	418.100	428.311	485.828	542.486	594.206		
MD	97.169	126.178	138.530	147.769	159.622	167.680	177.190	184.707	193.348	199.675	205.168	235.378	262.514	284.815		
TOTAL	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1998.094	2045.572	2100.389	2141.717	2178.531	2387.009	2587.354	2763.568		
POPUL	4132.160	4406.000	4538.000	4619.000	4761.000	4866.700	4995.234	5073.018	5166.957	5225.790	5272.044	5633.342	5976.787	6328.571		
HHLDS	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1998.094	2045.572	2100.389	2141.717	2178.531	2387.009	2587.354	2763.568		
PCI	10725.00	10924.00	11258.00	11383.00	11774.00	11798.00	12191.90	12395.50	12602.50	12813.00	13027.00	14151.70	15373.50	16700.80		

MANUFACTURING EMPLOYMENT (1000'S) MEDIUM SCENARIO - OREGON 2/12/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	24.300	23.800	24.000	23.700	23.600	24.900	24.400	24.300	24.300	24.500	24.500	24.000	23.500	23.200
22	2.000	1.600	1.800	1.800	1.800	2.100	1.700	1.700	1.700	1.700	1.700	1.600	1.600	1.600
23	3.200	2.400	2.500	2.600	2.700	2.900	2.700	2.600	2.600	2.600	2.600	2.500	2.500	2.500
25	2.600	2.700	2.500	2.900	3.000	3.200	2.700	2.600	2.600	2.600	2.600	2.600	2.602	2.600
27	10.000	11.500	12.800	13.200	13.500	14.100	14.400	14.900	15.700	16.400	16.900	19.500	20.800	22.000
29	0.600	0.400	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.450	0.400	0.400
30	2.400	3.200	3.800	4.600	4.900	5.000	6.000	6.500	7.000	7.300	8.000	10.000	11.500	12.500
31	0.300	0.400	0.500	0.500	0.500	0.500	0.500	0.579	0.569	0.560	0.550	0.550	0.550	0.550
32	4.500	3.100	3.600	4.000	4.200	4.900	4.300	4.600	4.600	4.600	4.600	4.500	4.400	4.300
33XX	9.600	8.200	8.600	9.300	10.100	10.700	10.600	10.600	10.700	10.600	10.600	10.500	10.300	10.100
34	12.700	11.000	10.200	11.200	12.300	12.400	11.500	11.700	12.100	12.000	12.000	13.000	14.200	14.600
35	17.700	15.500	15.800	16.800	17.600	18.000	17.800	18.200	18.500	18.900	19.000	20.500	22.000	23.000
36	9.800	13.900	13.600	14.100	15.600	17.250	17.900	18.900	19.800	20.000	20.000	21.800	23.400	24.600
37	10.300	9.200	10.800	11.600	11.400	12.200	10.900	11.800	12.500	12.900	13.000	13.500	14.000	14.500
38	19.300	14.600	12.100	13.200	12.500	11.600	11.000	11.000	11.100	11.300	11.100	13.300	14.550	15.950
39	2.200	2.400	3.200	3.800	4.900	3.800	4.200	4.300	4.300	4.200	4.200	4.700	5.100	5.300
2421	23.800	20.500	22.000	21.400	20.800	19.000	18.620	17.269	16.598	15.686	15.552	13.366	13.901	14.254
2436	20.100	15.500	16.800	16.100	16.300	14.900	15.440	14.463	13.866	12.696	12.247	8.900	8.523	8.231
24XX	25.600	27.600	29.200	31.300	29.900	27.300	28.700	28.203	27.875	27.551	27.230	25.909	24.651	23.455
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	5.100	4.160	4.000	3.900	4.100	4.100	4.076	4.053	4.033	4.011	3.988	3.884	3.792	3.706
2631	2.000	2.100	2.000	1.900	2.000	2.000	1.983	1.965	1.947	1.930	1.913	1.831	1.752	1.676
26XX	3.300	2.840	3.200	2.800	3.000	3.000	2.893	2.859	2.814	2.796	2.792	2.793	2.784	2.686
2812	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.201	0.201	0.201	0.203	0.204	0.204
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28XX	2.050	1.900	1.900	1.900	2.000	2.300	1.878	1.872	1.867	1.861	1.856	1.833	1.806	1.775
3334	1.400	0.600	0.700	0.900	0.900	0.900	0.800	0.700	0.700	0.700	0.700	0.650	0.600	0.600
SUBTOT	215.100	199.300	206.300	214.200	218.300	217.750	215.690	216.364	218.468	218.092	218.328	222.369	229.415	234.287

2/12/91

MEDIUM SCENARIO - OREGON

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	60.500	57.300	58.500	60.500	62.800	65.100	64.900	65.500	67.000	69.000	68.500	72.000	75.000	77.000
50-51	67.400	65.800	68.200	72.900	78.200	80.800	81.000	81.100	81.300	81.816	83.079	92.645	101.887	111.589
52,53+	96.200	92.900	98.700	104.200	109.700	112.000	112.500	113.000	113.500	114.000	115.325	123.250	132.188	141.146
54	24.600	29.500	33.800	36.400	39.400	42.000	42.500	43.000	43.300	43.500	43.700	46.000	48.000	50.000
58	67.400	70.400	76.000	78.900	82.300	85.000	86.000	88.593	91.653	94.818	98.093	114.888	132.670	152.625
60-67	70.000	66.800	72.100	73.300	75.300	75.800	77.300	78.400	79.500	80.500	82.000	89.000	98.000	107.000
70	14.800	14.600	15.600	17.100	18.400	19.700	19.500	19.600	19.700	19.800	19.900	21.100	23.500	25.759
72	9.800	10.400	10.800	10.400	10.900	11.600	12.000	12.200	12.400	12.600	12.700	13.400	14.100	14.754
73	24.900	35.000	45.500	43.000	46.700	48.100	49.000	51.000	53.000	55.000	57.000	72.000	85.000	97.000
76	3.000	3.500	4.100	4.400	4.600	4.700	5.000	5.200	5.300	5.400	5.500	5.800	6.100	6.200
80	62.100	69.400	74.400	77.600	82.100	87.200	93.700	98.200	102.500	105.500	108.000	124.000	140.000	155.000
81	5.600	7.300	8.100	8.500	8.700	9.000	9.923	10.305	10.703	11.116	11.545	13.786	16.231	19.039
83	11.400	14.000	16.900	23.300	24.400	25.200	25.600	26.100	26.500	27.000	27.500	31.000	35.000	38.000
89	11.100	10.300	11.300	17.200	19.000	20.500	21.500	22.000	22.500	23.000	23.500	27.000	31.000	33.500
75,78+	42.200	43.500	47.400	47.900	50.800	53.500	54.827	55.461	56.101	56.749	57.405	62.578	67.137	72.000
82	7.100	8.300	10.300	13.800	14.300	14.600	14.500	14.600	14.800	14.900	15.000	16.000	16.500	17.000
941	94.200	94.600	97.400	99.300	101.200	104.100	105.500	107.000	108.600	110.300	111.900	120.000	127.800	134.400
90-99	78.200	73.500	77.700	80.200	81.700	84.300	85.600	86.900	88.200	89.500	90.800	97.300	103.500	109.000
Const	46.500	33.100	35.300	39.900	45.200	47.900	42.800	43.500	44.000	44.500	45.000	47.000	49.000	51.000
Agric	96.300	98.800	99.700	100.300	101.000	101.710	101.305	100.902	100.501	100.101	99.703	98.687	97.036	95.512
Wining	2.300	1.500	1.400	1.300	1.400	1.400	1.670	1.689	1.709	1.730	1.750	1.850	1.950	1.950
Fd Gvt	30.800	29.600	30.600	31.700	32.200	34.200	33.000	32.000	31.300	31.339	31.450	32.450	34.050	35.700
SUBTOT	926.400	930.100	993.800	1042.100	1090.300	1128.410	1139.625	1156.250	1174.067	1191.169	1209.350	1321.734	1435.649	1545.174

TOTAL 1141.500 1129.400 1200.100 1256.300 1308.600 1346.160 1355.315 1372.614 1392.535 1409.261 1427.678 1544.103 1665.064 1779.461

	HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										MEDIUM SCENARIO - OREGON					2/12/91
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
HOUSING																
SF	766.113	797.066	815.229	833.166	851.116	867.474	884.640	902.438	918.703	935.139	949.374	1025.965	1103.232	1166.036		
MF	143.583	154.439	160.683	165.922	171.176	176.024	181.095	186.341	191.197	196.108	200.454	223.712	247.407	267.453		
MO	81.898	92.495	98.088	102.912	107.668	111.908	116.294	120.774	124.748	128.687	131.934	148.535	164.158	175.719		
TOTAL	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1182.029	1209.553	1234.648	1259.934	1281.762	1398.112	1514.796	1609.207		
POPUL	2633.160	2675.800	2690.000	2741.000	2791.000	2842.300	2895.972	2939.215	2975.503	3011.242	3050.594	3257.601	3468.884	3668.991		
HHLDS	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1182.029	1209.553	1234.648	1259.934	1281.762	1398.112	1514.796	1609.207		
PCI	9897.80	9845.90	10162.10	10402.20	10731.30	10804.40	11057.50	11267.60	11481.70	11699.80	11922.10	13098.60	14391.20	15811.30		

MANUFACTURING EMPLOYMENT (1000'S)				MEDIUM SCENARIO - IDAHO										2/12/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
20	17.000	16.600	16.100	17.100	16.900	17.000	16.900	16.900	17.200	17.200	17.100	16.800	16.300	15.800	
22	0.000	0.050	0.100	0.100	0.100	0.150	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	
23	0.300	0.250	0.300	0.300	0.300	0.350	0.239	0.229	0.219	0.209	0.200	0.150	0.150	0.150	
25	0.250	0.600	0.600	0.700	0.700	0.670	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700	
27	3.100	4.200	4.300	4.500	4.600	4.800	5.000	5.200	5.200	5.300	5.400	6.000	6.500	7.000	
29	0.100	0.025	0.050	0.050	0.050	0.050	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	
30	1.000	0.850	1.100	0.800	0.900	0.850	0.800	0.900	0.900	0.900	0.900	0.900	0.900	0.900	
31	0.500	0.100	0.150	0.150	0.150	0.110	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	
32	1.300	0.900	0.800	0.900	0.900	1.000	1.100	1.000	0.900	0.900	0.900	0.900	0.900	0.900	
33XX	1.200	0.000	0.000	0.100	0.100	0.100	0.200	0.250	0.250	0.250	0.250	0.250	0.200	0.200	
34	2.100	1.900	2.000	2.000	2.300	2.400	2.400	2.500	2.500	2.600	2.600	2.700	2.700	2.700	
35	5.000	5.800	5.200	5.500	6.200	7.000	7.100	7.300	7.500	7.600	7.700	8.400	8.900	9.400	
36	1.500	2.800	3.300	4.000	4.900	5.600	5.800	6.000	6.200	6.300	6.300	6.800	7.200	7.500	
37	0.700	0.950	1.100	1.600	1.500	1.500	1.400	1.500	1.400	1.400	1.400	1.200	1.000	1.000	
38	0.150	0.300	0.300	0.400	0.400	0.400	0.500	0.550	0.550	0.550	0.550	0.600	0.650	0.700	
39	0.400	0.325	0.300	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	
2421	8.100	6.400	6.600	6.700	7.000	7.200	6.671	6.676	6.798	6.829	7.006	7.079	7.431	7.423	
2436	0.500	0.400	0.400	0.400	0.400	0.400	0.311	0.294	0.295	0.299	0.309	0.320	0.319	0.324	
24XX	6.775	6.700	6.400	6.800	7.400	7.600	6.802	6.507	6.442	6.379	6.316	6.009	5.717	5.440	
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2621	0.225	0.250	0.250	0.300	0.300	0.300	0.298	0.297	0.295	0.293	0.292	0.284	0.277	0.271	
2631	0.850	0.950	0.950	1.000	1.100	1.200	1.189	1.179	1.169	1.159	1.148	1.099	1.051	1.006	
26XX	0.425	0.575	0.600	0.600	0.600	0.600	0.564	0.568	0.572	0.576	0.580	0.558	0.565	0.547	
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2819	1.067	1.000	0.900	0.900	0.900	0.900	0.895	0.889	0.884	0.879	0.873	0.849	0.823	0.799	
28XX	2.433	2.600	2.400	2.600	2.600	2.700	2.692	2.684	2.676	2.668	2.660	2.621	2.583	2.544	
3334	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
SUBTOT	54.475	54.625	54.200	57.900	60.700	63.280	62.186	62.748	63.275	63.616	63.809	64.843	65.492	65.929	

NON-MANUFACTURING EMPLOYMENT (1000'S)		MEDIUM SCENARIO - IDAHO												2/12/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	2015
40-49	20.100	19.200	17.900	18.600	19.100	19.500	20.100	20.300	20.400	20.500	20.600	22.300	23.000	23.500	23.500
50-51	22.300	20.600	20.500	20.600	22.700	22.700	22.500	22.800	23.400	24.000	24.962	27.972	30.914	34.024	34.024
52, 53+	29.900	31.300	31.500	32.400	35.100	36.800	36.200	36.800	37.200	37.500	37.700	40.700	43.500	46.359	46.359
54	9.400	10.700	11.100	11.400	12.100	12.700	12.900	13.000	13.200	13.300	13.400	14.300	15.224	16.336	16.336
58	19.000	21.600	21.600	22.700	24.400	26.100	26.500	26.800	27.100	27.500	28.000	33.694	39.194	45.419	45.419
60-67	23.400	23.600	19.200	19.200	19.300	19.500	20.100	20.300	20.800	21.500	22.000	25.000	27.500	29.900	29.900
70	5.100	5.200	5.800	6.000	6.500	6.800	7.100	7.300	7.400	7.500	7.600	8.300	9.100	9.986	9.986
72	3.000	3.800	3.600	3.100	3.200	3.300	4.000	4.100	4.100	4.200	4.200	4.500	4.740	5.031	5.031
73	11.000	12.100	12.800	8.000	8.800	9.200	10.000	10.500	11.000	11.500	12.000	15.000	18.000	21.000	21.000
76	1.000	1.100	1.000	1.100	1.200	1.200	1.200	1.200	1.210	1.231	1.253	1.351	1.436	1.520	1.520
80	15.500	17.900	19.100	20.000	20.700	21.800	22.900	23.600	24.200	24.700	25.200	30.000	35.000	40.000	40.000
81	2.100	2.400	2.500	2.700	2.900	3.000	3.100	3.100	3.136	3.257	3.382	4.058	4.801	5.657	5.657
83	3.400	4.000	4.100	4.500	4.800	5.000	5.200	5.400	5.600	5.800	6.000	7.000	8.000	9.000	9.000
89	4.800	3.900	3.900	10.300	10.700	11.000	11.300	11.700	12.000	12.300	12.700	15.000	17.200	19.100	19.100
75, 78+	10.300	10.800	11.000	12.100	13.100	13.900	14.100	14.400	14.700	15.000	15.300	16.600	17.500	18.400	18.400
82	3.800	3.900	4.100	4.300	4.400	4.500	4.600	4.600	4.700	4.800	4.800	5.200	5.500	5.900	5.900
941	31.100	32.300	33.400	34.900	35.300	37.700	38.500	39.000	39.500	39.900	40.300	42.800	45.100	47.000	47.000
90-99	26.400	26.100	27.700	28.600	29.900	31.700	32.000	32.300	32.600	33.000	33.400	35.400	37.500	39.400	39.400
Const	17.400	15.100	13.600	14.200	16.000	18.000	18.500	18.600	18.500	18.400	18.300	19.500	20.500	21.586	21.586
Agric	69.100	65.400	64.800	64.155	63.500	62.945	62.627	62.311	61.996	61.683	61.371	60.348	59.096	58.099	58.099
Mining	4.700	3.800	2.600	3.300	3.600	3.800	3.800	3.800	3.800	3.800	3.800	3.750	3.700	3.700	3.700
Fd Gvt	13.000	11.800	12.200	12.500	12.900	13.300	12.600	12.600	12.600	12.639	12.700	13.350	13.950	14.650	14.650
SUBTOT	345.800	346.800	344.000	354.655	370.200	384.445	389.827	394.511	399.142	404.010	408.968	446.123	480.455	515.569	515.569
TOTAL	400.275	401.425	398.200	412.555	430.900	447.725	452.013	457.259	462.417	467.626	472.777	510.966	545.947	581.498	581.498

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME										MEDIUM SCENARIO - IDAHO					2/12/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
HOUSING																
SF	262.386	280.726	282.559	286.612	288.292	289.653	294.926	300.430	305.005	309.504	313.007	338.706	362.270	383.255		
MF	25.070	29.289	29.947	30.747	31.164	31.531	32.539	33.587	34.649	35.376	36.107	41.132	45.869	50.238		
MO	36.714	43.926	44.494	45.641	45.999	46.225	47.663	49.139	50.601	51.366	52.095	57.858	62.403	66.162		
TOTAL	324.170	354.000	357.000	363.000	365.455	367.409	375.127	383.156	391.256	396.246	401.209	437.696	470.543	499.654		
POPUL	944.000	1004.000	1000.500	1004.400	1005.000	1006.700	1020.345	1034.521	1048.566	1057.976	1067.216	1138.010	1199.864	1264.125		
HHLDS	324.170	354.000	357.000	363.000	365.455	367.409	375.127	383.156	391.256	396.246	401.209	437.696	470.543	499.654		
PCI	8611.20	8400.50	8573.30	8785.80	9226.40	9457.00	9531.30	9727.60	9928.00	10132.50	10341.30	11451.20	12680.30	14041.30		

MANUFACTURING EMPLOYMENT (1000'S) MEDIUM SCENARIO - WESTERN MONTANA 2/12/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	0.700	0.465	0.525	0.550	0.475	0.500	0.495	0.490	0.485	0.480	0.475	0.475	0.450	0.450
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.025	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.075	0.075
25	0.000	0.140	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.175	0.175	0.175
27	0.750	0.700	0.725	0.750	0.825	0.875	0.900	0.925	0.900	0.950	0.975	1.100	1.200	1.300
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.025	0.025	0.010	0.010	0.040	0.040	0.040	0.040	0.040	0.040	0.050	0.063	0.063
31	0.000	0.025	0.030	0.010	0.010	0.040	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
32	0.400	0.325	0.280	0.290	0.300	0.300	0.303	0.306	0.309	0.312	0.315	0.325	0.336	0.350
33XX	1.000	0.150	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.075	0.075	0.100	0.100	0.100
34	0.150	0.250	0.275	0.250	0.225	0.250	0.255	0.260	0.265	0.270	0.275	0.275	0.275	0.275
35	0.050	0.225	0.325	0.350	0.375	0.400	0.400	0.400	0.425	0.450	0.450	0.500	0.550	0.600
36	0.050	0.075	0.075	0.100	0.125	0.125	0.108	0.118	0.128	0.138	0.150	0.175	0.204	0.225
37	0.100	0.075	0.050	0.100	0.100	0.100	0.105	0.109	0.114	0.120	0.125	0.150	0.175	0.200
38	0.100	0.125	0.120	0.130	0.140	0.150	0.159	0.168	0.178	0.189	0.200	0.225	0.253	0.275
39	0.150	0.175	0.300	0.650	0.700	0.750	0.750	0.775	0.800	0.800	0.800	0.800	0.800	0.800
2421	4.500	4.000	4.150	3.900	3.900	4.000	3.738	3.743	3.811	3.827	3.925	3.968	4.163	4.161
2436	1.000	0.800	0.800	0.800	0.950	0.825	0.676	0.638	0.642	0.650	0.672	0.695	0.694	0.703
24XX	2.700	2.100	2.500	2.500	2.650	2.650	2.550	2.524	2.459	2.475	2.450	2.331	2.218	2.111
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.550	0.750	0.750	0.750	0.750	0.750	0.743	0.737	0.731	0.724	0.718	0.687	0.657	0.629
26XX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	0.200	0.190	0.180	0.180	0.180	0.180	0.179	0.178	0.177	0.176	0.175	0.170	0.165	0.160
28XX	0.100	0.050	0.050	0.100	0.100	0.100	0.100	0.099	0.099	0.099	0.099	0.097	0.096	0.094
3334	1.250	0.850	0.750	0.800	0.800	0.800	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700
SUBTOT	13.775	11.545	12.160	12.470	12.865	13.085	12.489	12.500	12.646	12.719	12.866	13.111	13.386	13.483

MEDIUM SCENARIO - WESTERN MONTANA															2/12/91
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
40-49	7.500	6.400	6.650	6.700	6.900	7.000	7.071	7.156	7.241	7.328	7.416	7.780	8.048	8.293	
50-51	3.800	3.400	3.275	3.375	3.500	3.600	3.597	3.684	3.772	3.863	3.956	4.404	4.834	5.284	
52-53+	8.000	8.200	8.650	8.700	8.775	8.850	9.079	9.250	9.424	9.601	9.781	10.611	11.353	12.092	
54	2.900	3.000	2.825	3.100	3.500	3.800	3.850	3.900	3.950	4.000	4.050	4.400	4.600	4.800	
58	7.500	7.500	7.475	7.500	8.400	8.600	8.700	8.800	8.900	9.000	9.187	10.918	12.792	14.932	
60-67	3.700	3.400	3.650	3.650	3.850	3.950	4.000	4.050	4.100	4.150	4.200	4.600	4.900	5.295	
70	2.500	2.700	2.900	2.850	2.700	2.800	2.900	3.000	3.100	3.200	3.300	3.956	4.439	4.961	
72	0.800	0.900	0.875	0.900	0.775	0.750	0.800	0.900	0.950	1.004	1.021	1.098	1.164	1.230	
73	1.000	1.700	2.175	2.200	1.650	1.750	1.850	1.950	2.050	2.200	2.350	3.000	3.600	4.100	
76	0.300	0.300	0.350	0.350	0.425	0.450	0.450	0.460	0.470	0.480	0.490	0.530	0.550	0.570	
80	6.400	7.650	8.300	8.400	8.700	8.800	8.900	9.000	9.200	9.400	9.500	11.000	12.200	13.200	
81	0.500	0.600	0.700	0.700	0.725	0.800	0.750	0.750	0.750	0.767	0.796	0.943	1.103	1.284	
83	1.400	1.200	1.525	1.500	2.100	2.300	2.400	2.500	2.600	2.700	2.750	3.250	3.600	3.800	
89	1.000	0.700	0.800	0.800	0.750	0.800	0.775	0.785	0.805	0.825	0.846	0.946	1.044	1.146	
75, 78+	3.300	3.325	3.450	3.500	3.500	3.500	3.563	3.614	3.666	3.719	3.773	4.078	4.345	4.612	
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
941	8.900	9.775	9.500	9.400	9.600	9.800	9.982	10.161	10.343	10.529	10.718	11.683	12.328	12.954	
90-99	8.300	7.400	7.400	7.400	8.000	8.200	8.452	8.587	8.724	8.863	9.005	9.635	10.167	10.684	
Const	4.800	3.800	2.800	3.050	3.250	3.400	3.450	3.500	3.550	3.600	3.650	4.100	4.300	4.500	
Agric	7.500	7.300	7.300	7.300	7.300	7.300	7.265	7.236	7.207	7.179	7.150	6.971	6.953	6.928	
Mining	3.100	1.875	2.075	2.175	2.300	2.600	2.500	2.500	2.500	2.550	2.650	2.750	2.850	2.950	
Fd Gvt	5.600	4.850	4.900	4.950	5.100	5.200	5.100	5.100	5.119	5.159	5.200	5.400	5.500	5.600	
SUBTOT	88.800	85.975	87.575	88.500	91.800	94.250	95.434	96.883	98.421	100.117	101.789	111.853	120.470	129.015	
TOTAL	102.575	97.520	99.735	100.970	104.665	107.335	107.923	109.383	111.067	112.836	114.655	124.964	133.856	142.498	

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME

MEDIUM SCENARIO - WESTERN MONTANA

2/12/91

	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING														
SF	82.313	84.905	85.437	85.857	86.014	86.253	87.174	88.524	90.052	91.686	93.343	101.362	108.705	114.626
MF	8.950	10.092	10.354	10.500	10.594	10.706	10.956	11.293	11.667	12.059	12.464	14.435	16.294	17.889
MO	15.138	17.403	17.709	17.854	17.882	17.927	18.231	18.691	19.206	19.739	20.282	22.634	24.494	25.816
TOTAL	106.400	112.400	113.500	114.211	114.491	114.886	116.361	118.508	120.925	123.464	126.088	138.431	149.493	158.331
POPUL	294.500	303.900	303.500	303.800	303.400	303.300	304.867	308.121	311.985	316.068	320.264	343.308	361.774	379.995
HHLDS	106.400	112.400	113.500	114.211	114.491	114.886	116.361	118.508	120.925	123.464	126.088	138.431	149.493	158.331
PCI	7793.00	7983.00	8527.20	8697.80	8871.70	9049.10	9991.00	9991.00	9991.00	9991.00	9991.00	11030.90	12179.00	13446.70

2/22/91

MEDLO SCENARIO - REGION

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	73.900	71.965	72.925	75.550	76.475	78.300	74.490	73.979	73.369	72.760	71.950	68.950	67.100	65.900
22	3.000	2.550	2.900	3.100	3.100	3.550	2.450	2.450	2.450	2.450	2.450	2.450	2.450	2.450
23	10.025	8.900	8.550	8.950	9.050	9.470	8.197	7.796	7.796	7.747	7.700	8.075	8.250	8.475
25	6.150	7.240	7.050	7.950	7.850	8.310	7.008	6.858	6.888	6.918	6.950	7.000	7.050	7.150
27	29.650	34.000	37.925	39.850	41.025	41.775	40.750	41.550	42.275	43.000	43.600	46.800	49.750	52.600
29	2.800	2.225	2.350	2.450	2.450	2.750	2.450	2.350	2.250	2.150	2.050	1.750	1.650	1.550
30	6.900	8.575	10.025	11.210	12.010	12.340	12.275	12.475	12.675	12.875	13.075	14.175	14.975	15.475
31	0.700	0.925	1.080	1.160	1.260	1.140	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
32	13.100	10.725	11.580	12.490	12.900	14.100	11.200	10.800	10.300	10.300	10.300	10.300	10.300	10.300
33XX	20.800	15.350	15.550	16.550	17.550	18.450	16.940	15.958	16.038	16.120	16.200	16.625	16.850	16.850
34	26.750	22.850	22.975	24.350	26.625	27.250	24.409	23.109	23.189	23.269	23.350	23.800	24.000	24.250
35	37.750	38.625	37.525	40.650	43.175	44.900	42.650	41.050	41.175	41.700	42.100	44.325	46.450	48.475
36	22.550	28.875	30.175	28.700	32.325	35.025	33.208	31.718	32.528	33.338	34.150	36.175	37.904	39.825
37	109.450	99.825	118.150	129.500	141.500	142.700	136.798	126.497	116.397	111.298	106.100	101.500	97.200	93.100
38	25.950	25.725	23.320	28.330	27.940	26.850	25.626	25.354	25.484	25.716	25.850	27.225	28.703	30.275
39	7.350	7.400	8.600	10.350	11.900	10.550	9.850	9.375	9.100	9.225	9.325	9.625	9.825	10.025
2421	52.427	44.300	47.250	47.200	47.000	44.900	39.005	36.896	36.041	34.641	34.701	31.374	32.727	33.309
2436	26.582	20.900	21.900	20.900	20.750	19.125	17.405	16.304	15.663	14.436	13.986	10.507	10.142	9.877
24XX	61.066	57.100	60.100	63.400	62.650	59.450	57.709	56.966	56.233	55.509	54.794	51.369	48.147	45.117
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.450	2.404	2.356	2.310	2.266	2.052	1.860	1.685
2621	14.143	13.410	12.650	12.900	13.700	13.700	13.554	13.414	13.277	13.136	13.000	12.359	11.769	11.226
2631	5.037	5.000	4.900	4.850	5.450	5.550	5.475	5.400	5.326	5.253	5.181	4.836	4.515	4.215
26XX	7.896	7.815	8.750	8.500	8.500	8.600	8.441	8.454	8.466	8.479	8.492	8.440	8.441	8.113
2812	0.763	0.700	0.700	0.700	0.600	0.700	0.701	0.701	0.702	0.703	0.704	0.698	0.691	0.714
2819	6.567	8.890	8.780	9.780	9.580	9.980	5.469	5.359	5.248	5.138	5.028	4.978	4.930	4.885
28XX	7.470	7.650	7.650	7.900	8.000	8.600	7.844	7.806	7.767	7.728	7.690	7.505	7.321	7.139
3334	10.350	7.250	5.850	7.300	7.600	7.200	5.100	4.780	4.720	4.660	4.600	4.500	4.500	4.500
SUBTOT	592.100	560.870	591.260	626.670	653.465	657.765	612.554	590.952	578.814	571.959	566.692	558.494	558.625	558.581

1991 NORTHWEST POWER PLAN—VOLUME II

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														MEDLO SCENARIO - REGION										2/22/91					
																1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
HOUSING																													
SF	2304.022																2428.959	2483.225	2532.928	2591.588	2633.923	2676.055	2714.749	2745.018	2773.581	2800.527	2974.687	3147.574	3284.533
MF	427.732																492.379	522.134	545.683	571.859	592.672	613.153	631.793	647.003	661.823	676.377	762.498	849.478	924.336
WO	230.919																280.062	300.141	317.599	335.744	350.032	364.296	377.287	387.274	396.437	404.919	458.048	507.345	544.060
TOTAL	2962.673																3201.400	3305.500	3396.210	3499.191	3576.626	3653.504	3723.829	3779.295	3831.842	3881.823	4195.233	4504.397	4752.928
POPUL	8003.820																8389.700	8532.000	8668.200	8860.400	9019.000	9170.988	9272.746	9335.019	9391.394	9452.263	9978.13610501	97211002.465	
HHLDS	2962.673																3201.400	3305.500	3396.210	3499.190	3576.626	3653.504	3723.829	3779.295	3831.842	3881.823	4195.233	4504.397	4752.927
PCI	10360.21																10444.04	10785.29	10968.18	11357.44	11433.36	11700.75	11864.47	12029.36	12196.81	12366.47	13281.23	14264.67	15322.29

MANUFACTURING EMPLOYMENT (1,000'S) MEDLO SCENARIO - WASHINGTON 2/22/91

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	31.900	31.100	32.300	34.200	35.500	35.900	34.000	33.800	33.500	33.300	33.000	32.000	31.200	30.500
22	1.000	0.900	1.000	1.200	1.200	1.300	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
23	6.500	6.200	5.700	6.000	6.000	6.200	5.800	5.500	5.500	5.500	5.500	5.900	6.100	6.300
25	3.300	3.800	3.800	4.200	4.000	4.300	3.900	3.740	3.760	3.780	3.800	3.900	4.000	4.100
26	15.800	17.600	20.100	21.400	22.100	22.600	21.500	22.000	22.300	22.600	22.900	24.800	26.700	28.500
27	2.100	1.800	1.800	1.900	1.900	2.200	2.000	1.900	1.800	1.700	1.600	1.400	1.300	1.200
29	3.500	4.500	5.100	5.800	6.200	6.500	6.500	6.600	6.700	6.800	6.900	7.500	7.800	8.000
30	0.400	0.400	0.400	0.500	0.600	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
31	6.900	6.400	6.900	7.300	7.500	7.900	6.100	6.100	6.100	6.100	6.100	6.100	6.100	6.100
32	9.000	6.900	6.900	7.100	7.300	7.600	7.040	7.079	7.119	7.160	7.200	7.400	7.600	7.600
33XX	11.800	9.700	10.500	10.900	11.800	12.200	11.500	10.240	10.260	10.280	10.300	10.500	10.600	10.700
34	15.000	17.100	16.200	18.000	19.000	19.500	18.500	18.000	18.000	18.400	18.800	19.500	20.500	21.400
35	11.200	12.100	13.200	10.500	11.700	12.100	11.500	11.000	11.500	12.000	12.500	13.400	14.100	14.900
36	98.350	89.600	106.200	116.200	128.500	128.900	125.000	115.000	105.000	100.000	95.000	90.800	86.800	83.000
37	6.400	10.700	10.800	14.600	14.900	14.700	14.400	14.000	14.000	14.100	14.100	14.600	15.200	15.800
38	4.600	4.500	4.800	5.500	5.900	5.600	5.300	5.000	5.100	5.200	5.300	5.600	5.800	6.000
39	16.027	13.400	14.500	15.200	15.300	14.700	12.884	11.982	11.544	10.935	10.859	9.412	9.785	10.057
2421	4.982	4.200	3.900	3.600	3.100	3.000	2.625	2.443	2.345	2.157	2.083	1.589	1.561	1.538
2436	25.991	20.700	22.000	22.800	22.700	21.900	20.699	20.432	20.169	19.910	19.653	18.425	17.269	16.182
24XX	2.974	2.100	2.050	2.100	2.500	2.500	2.450	2.404	2.356	2.310	2.266	2.052	1.860	1.685
2611	8.818	9.000	8.400	8.700	9.300	9.300	9.200	9.106	9.012	8.917	8.822	8.388	7.988	7.620
2621	1.637	1.200	1.200	1.200	1.600	1.600	1.579	1.557	1.536	1.515	1.494	1.395	1.302	1.215
2631	4.171	4.400	4.950	5.100	4.900	5.000	5.068	5.081	5.094	5.107	5.120	5.090	5.093	4.881
26XX	0.513	0.500	0.500	0.500	0.400	0.500	0.500	0.501	0.502	0.502	0.503	0.495	0.486	0.510
2812	5.300	7.700	7.700	8.700	8.500	8.900	4.400	4.300	4.200	4.100	4.000	4.000	4.000	4.000
2819	2.887	3.100	3.300	3.300	3.300	3.500	3.225	3.209	3.193	3.178	3.162	3.086	3.011	2.935
28XX	7.700	5.800	4.400	5.600	5.900	5.900	4.000	3.680	3.620	3.560	3.500	3.400	3.400	3.400
3334	308.750	295.400	318.600	342.100	361.600	364.200	341.170	326.154	315.710	310.610	305.962	302.232	301.055	299.623
SUBTOT														

MEDLO SCENARIO - WASHINGTON

2/22/91

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	91.400	93.600	98.500	101.900	107.900	112.000	112.000	112.000	113.500	115.000	116.500	119.500	123.000	126.000
50-51	100.500	105.700	111.400	116.400	124.600	132.100	131.000	131.500	133.500	135.500	138.000	148.000	158.000	168.372
52, 53+	141.000	146.900	161.200	168.800	179.100	189.000	187.000	187.000	189.000	192.000	195.000	204.000	215.000	226.241
54	38.200	49.200	57.400	58.900	62.300	65.400	65.000	65.300	65.800	66.000	66.200	69.200	72.200	75.400
58	101.600	118.900	128.200	132.500	135.000	141.600	143.581	148.027	152.611	157.338	162.210	189.470	218.796	251.705
60-67	91.800	99.600	107.500	109.400	112.300	116.300	114.000	114.611	119.618	122.660	125.737	137.077	148.846	160.855
70	17.800	20.100	21.500	22.900	24.700	26.100	26.200	26.400	26.500	26.600	26.800	29.401	32.508	35.797
72	16.000	19.900	20.800	19.700	20.400	21.500	23.453	23.609	23.767	23.926	24.086	26.000	27.500	29.000
73	52.900	61.000	78.000	70.000	76.500	83.700	85.500	87.500	89.500	91.200	92.900	115.500	137.000	154.100
76	5.500	5.600	5.900	6.900	8.000	8.400	8.200	8.300	8.500	8.700	8.800	9.200	9.500	9.800
80	95.800	117.400	129.300	134.600	140.800	151.200	153.000	157.000	162.000	166.000	170.000	197.000	223.000	251.000
81	9.200	12.400	14.400	15.000	15.600	16.500	16.800	17.000	17.100	17.300	17.570	20.722	24.163	28.061
83	15.600	22.600	25.000	27.200	29.700	31.400	32.200	33.000	33.400	34.000	34.600	39.000	44.000	49.000
89	19.500	21.100	23.100	37.500	40.700	43.000	44.000	45.500	47.000	48.500	50.500	58.000	64.000	69.000
75, 78+	66.800	83.500	89.000	95.400	101.100	106.700	108.000	111.000	113.000	115.000	117.000	124.000	130.000	135.000
82	8.900	12.000	13.100	14.700	15.900	16.700	16.700	16.800	16.900	17.000	17.100	17.900	18.600	19.200
941	145.500	143.600	151.100	156.000	160.600	166.300	166.800	167.800	169.000	170.628	172.326	182.633	191.300	200.000
90-99	117.400	129.100	135.500	141.300	146.800	152.100	152.500	152.500	153.000	153.500	154.000	163.000	171.000	179.000
Const	92.600	80.600	88.900	96.600	106.600	115.300	100.000	98.000	100.000	102.000	103.000	111.000	117.000	122.000
Agric	119.300	115.100	114.400	113.300	112.300	110.714	110.337	109.961	109.586	109.213	108.841	105.481	102.806	99.943
Mining	3.200	2.700	3.000	3.300	3.600	4.000	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
Fd Gvt	67.900	70.100	70.600	71.400	72.000	74.500	71.000	71.500	71.500	71.500	71.500	72.700	75.300	78.000
SUBTOT	1418.400	1530.700	1647.800	1714.700	1796.500	1884.514	1870.171	1887.208	1917.682	1946.465	1975.570	2141.684	2306.419	2470.374

TOTAL 1727.150 1826.100 1966.400 2056.800 2158.100 2248.714 2211.342 2213.363 2233.392 2257.076 2281.532 2443.916 2607.473 2769.998

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME														MEDLO SCENARIO - WASHINGTON					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010						

HOUSING																				
SF	1193.211	1266.263	1300.855	1329.754	1367.751	1393.316	1418.433	1439.091	1454.088	1468.608	1483.746	1570.665	1655.455	1722.570						
MF	250.130	298.560	320.920	337.800	358.989	374.112	389.070	401.886	411.969	421.870	432.129	489.725	547.510	597.732						
MO	97.169	126.178	139.225	149.446	162.546	171.496	180.220	187.398	192.635	197.628	202.736	230.667	256.242	275.420						
TOTAL	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1987.723	2028.375	2058.691	2088.106	2118.611	2291.057	2459.208	2595.721						
POPUL	4132.160	4406.000	4538.000	4619.000	4761.000	4866.700	4969.307	5030.370	5064.381	5094.979	5127.038	5406.894	5680.770	5944.201						
HHLDS	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1987.723	2028.375	2058.691	2088.106	2118.611	2291.057	2459.208	2595.721						
PCI	10725.00	10924.00	11258.00	11383.00	11774.00	11798.00	12115.30	12278.90	12444.60	12612.60	12782.90	13669.40	14617.30	15631.00						

MEDLO SCENARIO - OREGON															2/22/91	
MANUFACTURING EMPLOYMENT (1000'S)																
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
20	24.300	23.800	24.000	23.700	23.600	24.900	23.600	23.500	23.400	23.300	23.100	22.000	21.500	21.000		
22	2.000	1.600	1.800	1.800	1.800	2.100	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400		
23	3.200	2.400	2.500	2.600	2.700	2.900	2.158	2.118	2.078	2.038	2.000	2.000	2.000	2.000		
25	2.600	2.700	2.500	2.900	3.000	3.200	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400		
27	10.000	11.500	12.800	13.200	13.500	14.100	13.600	13.600	13.900	14.200	14.500	15.400	16.200	17.000		
29	0.600	0.400	0.500	0.500	0.500	0.500	0.400	0.400	0.400	0.400	0.400	0.300	0.300	0.300		
30	2.400	3.200	3.800	4.600	4.900	5.000	5.000	5.100	5.200	5.300	5.400	5.900	6.400	6.700		
31	0.300	0.400	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500		
32	4.500	3.100	3.600	4.000	4.200	4.900	4.000	3.600	3.100	3.100	3.100	3.100	3.100	3.100		
33XX	9.600	8.200	8.600	9.300	10.100	10.700	9.700	8.679	8.719	8.760	8.800	9.000	9.000	9.000		
34	12.700	11.000	10.200	11.200	12.300	12.400	10.559	10.619	10.679	10.739	10.800	11.000	11.100	11.200		
35	17.700	15.500	15.800	16.800	17.600	18.000	17.000	16.500	16.500	16.500	16.500	17.500	18.200	18.900		
36	9.800	13.900	13.600	14.100	15.600	17.200	16.000	15.500	15.600	15.700	15.800	16.500	17.200	18.000		
37	10.300	9.200	10.800	11.600	11.400	12.200	10.398	10.297	10.197	10.098	10.000	9.700	9.500	9.200		
38	19.300	14.600	12.100	13.200	12.500	11.600	10.717	10.836	10.956	11.077	11.200	12.000	12.800	13.700		
39	2.200	2.400	3.200	3.800	4.900	3.800	3.600	3.400	3.000	3.000	3.000	3.000	3.000	3.000		
2421	23.800	20.500	22.000	21.400	20.800	19.000	16.755	15.540	14.949	14.116	14.005	12.024	12.508	12.828		
2436	20.100	15.500	16.800	16.100	16.300	14.900	13.890	13.022	12.475	11.424	11.021	8.005	7.668	7.416		
24XX	25.600	27.600	29.200	31.300	29.900	27.300	27.997	27.637	27.281	26.930	26.584	24.922	23.359	21.889		
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
2621	5.100	4.160	4.000	3.900	4.100	4.100	4.057	4.015	3.975	3.931	3.894	3.760	3.524	3.360		
2631	2.000	2.100	2.000	1.900	2.000	2.000	1.972	1.946	1.918	1.892	1.866	1.742	1.626	1.519		
26XX	3.300	2.840	3.200	2.800	3.000	3.000	2.809	2.805	2.800	2.796	2.792	2.793	2.784	2.686		
2812	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.201	0.201	0.201	0.203	0.204	0.204		
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
28XX	2.050	1.900	1.900	1.900	2.000	2.300	1.846	1.837	1.828	1.819	1.810	1.767	1.723	1.680		
3334	1.400	0.600	0.700	0.900	0.900	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500		
SUBTOT	215.100	199.300	206.300	214.200	218.300	217.300	201.060	195.951	193.956	192.122	191.572	187.356	188.496	189.481		

NON-MANUFACTURING EMPLOYMENT (1000'S)		MEDLO SCENARIO - OREGON											2/22/91	
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	60.500	57.300	58.500	60.500	62.800	65.100	64.000	62.000	63.400	64.400	65.000	67.700	70.000	72.100
50-51	67.400	65.800	68.200	72.900	78.200	80.800	78.000	77.000	78.200	79.500	80.665	88.751	97.836	105.200
52,53+	96.200	92.900	98.700	104.200	109.700	112.000	110.000	110.500	111.000	111.500	112.500	120.000	128.000	136.000
54	24.600	29.500	33.800	36.400	39.400	42.000	41.500	41.600	41.700	41.900	42.100	43.100	44.100	45.000
58	67.400	70.400	76.000	78.900	82.300	85.000	84.500	85.418	87.892	90.438	93.058	107.678	123.201	140.386
60-67	70.000	66.800	72.100	73.300	75.300	75.800	74.800	75.400	76.000	77.000	78.000	85.000	91.000	96.000
70	14.800	14.600	15.600	17.100	18.400	19.700	19.000	18.800	18.900	19.000	19.100	20.300	21.210	23.127
72	9.800	10.400	10.800	10.400	10.900	11.600	11.101	11.195	11.289	11.385	11.481	12.101	12.612	13.089
73	24.900	35.000	45.500	43.000	46.700	48.100	48.800	50.000	51.300	53.000	55.000	68.000	81.000	93.000
76	3.000	3.500	4.100	4.400	4.600	4.700	4.500	4.500	4.500	4.600	4.600	4.700	4.800	4.900
80	62.100	69.400	74.400	77.600	82.100	87.200	92.200	96.200	100.000	102.500	104.500	119.000	134.000	148.000
81	5.600	7.300	8.100	8.500	8.700	9.000	9.707	9.965	10.230	10.502	10.781	12.592	14.541	16.728
83	11.400	14.000	16.900	23.300	24.400	25.200	25.000	24.800	25.100	25.500	25.900	29.000	32.500	36.000
89	11.100	10.300	11.300	17.200	19.000	20.500	21.000	21.400	21.800	22.200	22.600	25.600	28.600	31.000
75, 78+	42.200	43.500	47.400	47.900	50.800	53.500	53.000	53.400	54.000	54.800	55.600	60.000	64.000	68.000
82	7.100	8.300	10.300	13.800	14.300	14.600	14.400	14.500	14.700	14.800	14.800	15.300	15.700	16.000
941	94.200	94.600	97.400	99.300	101.200	104.100	104.000	105.000	106.200	107.500	108.800	117.000	124.000	130.000
90-99	78.200	73.500	77.700	80.200	81.700	84.300	85.000	85.000	86.000	87.300	88.600	94.600	100.600	105.000
Const	46.500	33.100	35.300	39.900	45.200	47.900	36.000	35.603	36.200	38.000	40.000	43.000	46.000	49.000
Agric	96.300	98.800	99.700	100.300	101.000	101.082	100.459	99.840	99.224	98.613	98.005	95.901	93.174	90.644
Mining	2.300	1.500	1.400	1.300	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Fd Gvt	30.800	29.600	30.600	31.700	32.200	34.200	32.000	31.000	30.000	30.100	30.200	31.000	32.400	33.500
SUBTOT	926.400	930.100	993.800	1042.100	1090.300	1127.782	1110.367	1114.521	1129.035	1145.936	1162.690	1261.723	1360.674	1454.074
TOTAL	1141.500	1129.400	1200.100	1256.300	1308.600	1345.082	1311.427	1310.472	1322.991	1338.060	1354.262	1449.079	1549.170	1643.555

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															MEDLO SCENARIO - OREGON					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010							
HOUSING																					
SF	766.113	797.066	814.652	831.457	850.551	865.985	878.701	892.054	903.450	914.823	923.751	992.648	1042.468	1088.948							
MF	143.583	154.439	160.844	166.463	170.859	175.989	180.357	184.922	188.942	192.969	196.311	217.294	238.833	256.783							
MO	81.898	92.495	98.505	104.080	108.549	113.432	117.373	121.443	124.812	128.097	130.526	146.210	161.116	171.865							
TOTAL	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1176.432	1198.420	1217.204	1235.889	1250.588	1346.152	1442.417	1517.595							
POPUL	2633.160	2675.800	2690.000	2741.000	2791.000	2842.300	2882.258	2912.161	2933.462	2953.774	2976.400	3136.534	3303.135	3460.117							
HHLDS	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1176.432	1198.420	1217.204	1235.889	1250.588	1346.152	1442.417	1517.595							
PCI	9897.80	9845.90	10162.10	10402.20	10731.30	10804.40	10981.70	11151.90	11324.70	11500.30	11678.50	12612.10	13620.30	14709.10							

MANUFACTURING EMPLOYMENT (1000'S)		MEDLO SCENARIO - IDAHO										2/22/91		
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	17.000	16.600	16.100	17.100	16.900	17.000	16.400	16.200	16.000	15.700	15.400	14.500	14.000	14.000
22	0.000	0.050	0.100	0.100	0.100	0.150	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
23	0.300	0.250	0.300	0.300	0.300	0.320	0.189	0.178	0.168	0.159	0.150	0.100	0.100	0.100
25	0.250	0.600	0.600	0.700	0.700	0.660	0.600	0.700	0.600	0.600	0.600	0.550	0.500	0.500
27	3.100	4.200	4.300	4.500	4.600	4.800	4.800	5.100	5.200	5.300	5.300	5.600	5.800	6.000
29	0.100	0.025	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
30	1.000	0.850	1.100	0.800	0.900	0.800	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750
31	0.000	0.100	0.150	0.150	0.150	0.100	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
32	1.300	0.900	0.800	0.900	0.900	1.000	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
33XX	1.200	0.100	0.000	0.100	0.100	0.100	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
34	2.100	1.900	2.000	2.000	2.300	2.400	2.100	2.000	2.000	2.000	2.000	2.050	2.050	2.100
35	5.000	5.800	5.200	5.500	6.200	7.000	6.800	6.200	6.300	6.400	6.400	6.900	7.300	7.700
36	1.500	2.800	3.300	4.000	4.900	5.600	5.600	5.100	5.300	5.500	5.700	6.100	6.400	6.700
37	0.700	0.950	1.100	1.600	1.500	1.500	1.300	1.100	1.100	1.100	1.000	0.900	0.800	0.800
38	0.150	0.300	0.300	0.400	0.400	0.400	0.350	0.350	0.350	0.350	0.350	0.400	0.450	0.500
39	0.400	0.325	0.300	0.400	0.400	0.400	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
2421	8.100	6.400	6.600	6.700	7.000	7.200	6.002	6.007	6.119	6.145	6.304	6.368	6.687	6.680
2436	0.500	0.400	0.400	0.400	0.400	0.400	0.280	0.264	0.266	0.269	0.278	0.288	0.287	0.291
24XX	6.775	6.700	6.400	6.800	7.400	7.600	6.493	6.410	6.327	6.246	6.166	5.780	5.418	5.077
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.225	0.250	0.250	0.300	0.300	0.300	0.297	0.294	0.291	0.288	0.285	0.271	0.258	0.246
2631	0.850	0.950	0.950	1.000	1.100	1.200	1.184	1.168	1.152	1.136	1.120	1.046	0.977	0.912
26XX	0.425	0.575	0.600	0.600	0.600	0.600	0.564	0.568	0.572	0.576	0.580	0.558	0.565	0.547
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	1.067	1.000	0.900	0.900	0.900	0.900	0.891	0.882	0.874	0.865	0.856	0.815	0.775	0.738
28XX	2.433	2.600	2.400	2.600	2.600	2.700	2.673	2.660	2.647	2.634	2.621	2.557	2.494	2.433
3334	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUBTOT	54.475	54.625	54.200	57.900	60.700	63.180	58.693	57.256	57.441	57.443	57.285	56.957	57.035	57.498

2/22/91

MEDLO SCENARIO - IDAHO

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	20.100	19.200	17.900	18.600	19.100	19.500	19.600	19.700	19.800	19.900	20.000	21.000	21.500	22.000
50-51	22.300	20.800	20.500	20.600	22.700	22.700	22.100	22.300	22.652	23.082	23.521	26.000	29.000	32.000
52, 53+	29.900	31.300	31.500	32.400	35.100	36.800	36.700	36.400	36.700	36.900	37.000	39.800	42.300	44.500
54	9.400	10.700	11.100	11.400	12.100	12.700	12.700	12.800	12.900	13.000	13.100	13.900	14.700	15.300
58	19.000	21.600	21.600	22.700	24.400	26.100	25.000	25.300	25.700	26.385	27.202	31.774	35.691	42.210
60-67	23.400	23.600	19.200	19.200	19.300	19.500	19.500	19.700	20.000	20.500	21.000	23.500	25.500	27.000
70	5.100	5.200	5.800	6.000	6.500	6.800	7.000	7.100	7.200	7.300	7.400	8.200	8.900	9.500
72	3.000	3.800	3.600	3.100	3.200	3.300	3.800	3.800	3.797	3.842	3.888	4.139	4.357	4.567
73	11.000	12.100	12.800	8.000	8.600	9.200	9.600	9.800	10.000	10.300	10.600	13.600	16.400	19.000
76	1.000	1.100	1.000	1.100	1.200	1.200	1.128	1.141	1.153	1.166	1.179	1.249	1.308	1.364
80	15.500	17.900	19.100	20.000	20.700	21.800	22.200	22.600	22.900	23.200	23.500	26.000	32.500	37.000
81	2.100	2.400	2.500	2.700	2.900	3.000	2.900	3.000	3.100	3.200	3.300	3.900	4.500	5.063
83	3.400	4.000	4.100	4.500	4.800	5.000	5.100	5.200	5.300	5.400	5.500	6.400	7.200	8.000
89	4.800	3.900	3.900	10.300	10.700	11.000	11.200	11.500	11.700	11.900	12.200	14.200	16.100	18.000
75, 78+	10.300	10.800	11.000	12.100	13.100	13.900	14.000	14.300	14.500	14.700	14.900	15.600	16.600	17.300
82	3.800	3.900	4.100	4.300	4.400	4.500	4.450	4.470	4.500	4.550	4.600	4.800	5.000	5.200
941	31.100	32.300	33.400	34.900	35.300	37.700	38.300	38.700	39.100	39.400	39.700	41.700	43.500	45.000
90-99	26.400	26.100	27.700	28.600	29.900	31.700	31.900	32.000	32.100	32.200	32.300	33.900	35.300	37.400
Const	17.400	15.100	13.600	14.200	16.000	18.000	18.000	17.500	17.700	17.900	18.100	19.000	19.800	20.500
Agric	69.100	65.400	64.800	64.155	63.500	62.556	62.104	61.654	61.208	60.766	60.326	58.644	56.744	55.138
Mining	4.700	3.800	2.600	3.300	3.600	3.800	2.959	2.918	2.878	2.839	2.800	2.700	2.700	2.700
Fd Gvt	13.000	11.800	12.200	12.500	12.900	13.300	12.400	12.200	12.300	12.400	12.500	13.000	13.500	13.900
SUBTOT	345.800	346.800	344.000	354.655	370.200	384.056	381.941	384.083	387.188	390.830	394.616	425.206	454.100	482.662

TOTAL	400.275	401.425	398.200	412.555	430.900	447.236	440.640	441.339	444.629	448.273	451.901	482.163	511.135	540.160
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HOUSING POPULATION, HOUSEHOLDS, AND INCOME										MEDLO SCENARIO - IDAHO					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
HOUSING																
SF	262.386	280.726	282.438	286.192	287.693	288.891	292.606	296.416	299.481	301.299	303.132	325.179	347.133	366.072		
MF	25.070	29.289	29.978	30.870	31.332	31.742	32.625	33.530	34.300	34.840	35.386	40.576	45.831	50.598		
MD	36.714	43.986	44.584	45.938	46.429	46.776	48.041	49.308	50.262	50.710	51.132	57.640	63.630	68.562		
TOTAL	324.170	354.000	357.000	363.000	365.455	367.409	373.272	379.255	384.042	386.849	389.650	423.395	456.595	485.231		
POPUL	944.000	1004.000	1000.500	1004.400	1005.000	1006.700	1015.299	1023.988	1029.233	1032.887	1036.470	1100.828	1164.316	1227.635		
HHLDS	324.170	354.000	357.000	363.000	365.455	367.409	373.272	379.255	384.042	386.849	389.650	423.395	456.595	485.231		
PCI	8611.20	8400.50	8573.30	8785.80	9226.40	9457.00	9427.00	9568.40	9711.90	9857.60	10005.40	10778.70	11611.70	12509.10		

2/22/91

MEDLO SCENARIO - WESTERN MONTANA

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	0.700	0.465	0.525	0.550	0.475	0.500	0.490	0.479	0.469	0.460	0.450	0.450	0.400	0.400
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.025	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.075	0.075
25	0.000	0.140	0.150	0.150	0.150	0.150	0.108	0.118	0.128	0.138	0.150	0.150	0.150	0.150
27	0.750	0.700	0.725	0.750	0.825	0.875	0.850	0.850	0.875	0.900	0.900	1.000	1.050	1.100
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.025	0.025	0.010	0.010	0.040	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
31	0.000	0.025	0.030	0.010	0.010	0.040	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
32	0.400	0.325	0.280	0.290	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
33XX	1.000	0.150	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.100	0.100
34	0.150	0.250	0.275	0.250	0.225	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
35	0.050	0.225	0.325	0.350	0.375	0.400	0.350	0.350	0.375	0.400	0.400	0.425	0.450	0.475
36	0.050	0.075	0.075	0.100	0.125	0.125	0.108	0.118	0.128	0.138	0.150	0.175	0.204	0.225
37	0.100	0.075	0.050	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
38	0.100	0.125	0.120	0.130	0.140	0.150	0.159	0.168	0.178	0.189	0.200	0.225	0.253	0.275
39	0.150	0.175	0.300	0.650	0.700	0.750	0.650	0.675	0.700	0.725	0.725	0.725	0.725	0.725
2421	4.500	4.000	4.150	3.900	3.900	4.000	3.364	3.367	3.428	3.444	3.533	3.570	3.747	3.743
2436	1.000	0.800	0.800	0.800	0.950	0.825	0.609	0.574	0.578	0.585	0.604	0.626	0.625	0.633
24XX	2.700	2.100	2.500	2.500	2.650	2.650	2.519	2.487	2.455	2.423	2.392	2.243	2.102	1.970
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.550	0.750	0.750	0.750	0.750	0.750	0.740	0.730	0.720	0.710	0.700	0.654	0.610	0.570
26XX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	0.200	0.190	0.180	0.180	0.180	0.180	0.178	0.176	0.175	0.173	0.171	0.163	0.155	0.148
28XX	0.100	0.050	0.050	0.100	0.100	0.100	0.100	0.099	0.099	0.098	0.098	0.095	0.093	0.091
3334	1.250	0.850	0.750	0.800	0.800	0.800	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
SUBTOT	13.775	11.545	12.160	12.470	12.865	13.085	11.625	11.591	11.707	11.783	11.873	11.950	12.039	11.979

MEDLO SCENARIO - WESTERN MONTANA 2/22/91

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	7.500	6.400	6.650	6.700	6.900	7.000	7.000	7.050	7.100	7.150	7.200	7.400	7.600	7.698
50-51	3.800	3.400	3.275	3.375	3.500	3.600	3.494	3.561	3.629	3.698	3.768	4.152	4.524	4.909
52, 53+	8.000	8.200	8.650	8.700	8.775	8.850	8.908	8.918	9.028	9.140	9.254	9.899	10.471	11.030
54	2.900	3.000	2.825	3.100	3.500	3.800	3.700	3.750	3.800	3.850	3.900	4.150	4.300	4.400
58	7.500	7.500	7.475	7.500	8.400	8.600	8.500	8.550	8.600	8.650	8.700	10.103	11.667	13.422
60-67	3.700	3.400	3.650	3.650	3.850	3.950	3.800	3.693	3.740	3.788	3.837	4.197	4.539	4.889
70	2.500	2.700	2.900	2.850	2.700	2.800	2.800	2.800	2.900	3.000	3.100	3.659	4.045	4.455
72	0.800	0.900	0.875	0.900	0.775	0.750	0.750	0.775	0.800	0.850	0.900	1.000	1.100	1.142
73	1.000	1.700	2.175	2.200	1.650	1.750	1.800	1.850	1.900	2.000	2.100	2.600	3.100	3.500
76	0.300	0.300	0.350	0.350	0.425	0.450	0.425	0.425	0.425	0.425	0.425	0.450	0.450	0.450
80	6.400	7.650	8.300	8.400	8.700	8.800	8.853	8.900	9.000	9.100	9.200	10.600	12.000	12.800
81	0.500	0.600	0.700	0.700	0.725	0.800	0.700	0.693	0.716	0.740	0.754	0.901	1.051	1.220
83	1.400	1.200	1.525	1.500	2.100	2.300	2.300	2.200	2.300	2.400	2.450	2.900	3.200	3.300
89	1.000	0.700	0.800	0.800	0.750	0.800	0.753	0.770	0.788	0.806	0.824	0.926	1.029	1.139
75, 78+	3.300	3.325	3.450	3.500	3.500	3.500	3.399	3.440	3.481	3.522	3.564	3.794	3.994	4.186
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
941	8.900	9.775	9.500	9.400	9.600	9.800	9.912	10.010	10.110	10.210	10.312	10.863	11.327	11.756
90-99	8.300	7.400	7.400	7.400	8.000	8.200	8.300	8.400	8.500	8.600	8.700	9.200	9.600	10.000
Const	4.800	3.800	2.800	3.050	3.250	3.400	3.400	3.200	3.300	3.400	3.500	3.700	3.800	3.900
Agric	7.500	7.300	7.300	7.300	7.300	7.300	7.204	7.160	7.116	7.072	7.028	6.774	6.676	6.575
Mining	3.100	1.875	2.075	2.175	2.361	2.600	2.400	2.300	2.300	2.300	2.300	2.300	2.300	2.300
Fd Gvt	5.600	4.850	4.900	4.950	5.100	5.200	5.300	5.000	5.000	5.000	5.000	5.000	5.000	5.000
SUBTOT	88.800	85.975	87.575	88.500	91.800	94.250	93.298	93.445	94.533	95.701	96.826	104.574	111.773	118.071

TOTAL 102.575 97.520 99.735 100.970 104.665 107.335 104.923 105.036 106.240 107.484 108.699 116.524 123.812 130.050

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															MEDLO SCENARIO - WESTERN MONTANA										2/22/91							
																	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
HOUSING																																
	SF	82.313	84.905	85.280	85.525	85.593	85.731	86.315	87.188	87.999	88.851	89.897	96.195	102.518	106.943																	
	MF	8.950	10.092	10.393	10.551	10.679	10.828	11.101	11.454	11.793	12.145	12.551	14.903	17.304	19.224																	
	MO	15.138	17.403	17.827	18.135	18.219	18.328	18.662	19.138	19.566	20.001	20.526	23.531	26.356	28.213																	
	TOTAL	106.400	112.400	113.500	114.211	114.491	114.886	116.078	117.780	119.357	120.997	122.974	134.629	146.178	154.380																	
	POPUL	294.500	303.900	303.500	303.800	303.400	303.300	304.124	306.227	307.941	309.753	312.354	333.880	353.750	370.512																	
	HHLDS	106.400	112.400	113.500	114.211	114.491	114.886	116.078	117.780	119.357	120.997	122.974	134.629	146.178	154.380																	
	PCI	7793.00	7983.00	8527.20	8697.80	8871.70	9049.10	9991.00	9991.00	9991.00	9991.00	9991.00	11030.90	12179.00	13446.70																	

2/22/91

LOW SCENARIO - REGION

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	73.900	71.965	72.925	75.550	76.475	78.300	72.945	71.240	70.250	69.387	68.525	65.000	62.200	59.600
22	3.000	2.550	2.900	3.100	3.100	3.500	2.229	2.209	2.189	2.169	2.150	2.050	1.950	1.950
23	10.025	8.900	8.550	7.950	9.050	9.450	7.880	7.509	7.255	7.127	7.000	6.925	6.825	6.725
25	6.150	7.240	7.050	7.950	7.850	8.250	6.500	6.300	6.137	6.218	6.250	6.300	6.300	6.300
27	29.650	34.000	37.925	39.850	41.025	41.775	39.600	39.200	39.625	39.950	40.150	41.900	43.500	45.000
29	2.800	2.225	2.350	2.450	2.450	2.750	2.278	1.957	1.837	1.718	1.600	1.400	1.300	1.200
30	6.900	8.575	10.025	11.210	12.010	12.340	11.700	11.300	11.200	11.200	11.200	11.400	11.600	11.800
31	0.700	0.925	1.080	1.160	1.260	1.140	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750
32	13.100	10.725	11.580	12.490	12.900	14.100	10.739	10.029	9.519	9.409	9.300	9.100	8.900	8.600
33XX	20.800	15.350	15.550	16.550	17.550	18.450	16.000	14.895	14.295	13.756	13.600	13.300	13.100	13.100
34	26.750	22.850	22.975	24.350	26.625	27.250	23.100	21.700	21.700	21.800	21.900	22.000	22.100	22.100
35	37.750	38.625	37.525	40.650	43.175	44.900	40.350	39.150	39.050	39.050	39.050	39.950	40.950	41.950
36	22.550	28.875	30.175	28.700	32.325	35.025	31.608	30.618	30.828	31.038	31.150	32.275	33.104	33.825
37	109.450	99.825	118.150	129.500	141.500	142.700	121.148	110.847	100.647	91.535	89.250	84.050	79.250	74.750
38	25.950	25.725	23.320	28.330	27.940	26.850	24.409	23.918	24.028	24.239	24.350	25.425	26.353	27.275
39	7.350	7.400	8.600	10.350	11.900	10.550	8.900	8.050	7.479	7.439	7.400	7.100	6.800	6.500
2421	52.427	44.300	47.250	47.200	47.000	44.900	34.673	32.790	32.028	30.792	30.841	27.899	29.080	29.612
2436	26.582	20.900	21.900	20.900	20.750	19.125	15.493	14.542	14.018	12.929	12.554	9.534	9.295	9.130
24XX	61.066	57.100	60.100	63.400	62.650	59.450	55.829	54.779	53.750	52.739	51.748	47.970	44.436	41.133
2611	2.974	2.100	2.050	2.100	2.500	2.500	2.446	2.394	2.342	2.292	2.242	2.011	1.804	1.618
2621	14.143	13.410	12.650	12.900	13.700	13.700	13.514	13.332	13.149	12.978	12.801	11.993	11.251	10.569
2631	5.037	5.000	4.900	4.850	5.450	5.550	5.457	5.367	5.277	5.189	5.104	4.692	4.316	3.968
26XX	7.896	7.815	8.750	8.500	8.500	8.600	7.979	7.925	7.862	7.804	7.747	7.321	7.207	7.054
2812	0.763	0.700	0.700	0.700	0.600	0.700	0.695	0.691	0.686	0.681	0.676	0.680	0.680	0.644
2819	6.567	8.890	8.780	9.780	9.580	9.980	4.807	4.734	4.662	4.589	4.517	3.977	3.937	3.899
28XX	7.470	7.650	7.650	7.900	8.000	8.600	7.564	7.497	7.427	7.359	7.292	7.051	6.817	6.590
3334	10.350	7.250	5.850	7.300	7.600	7.100	4.050	3.770	3.730	3.690	3.650	3.650	3.650	3.650
SUBTOT	592.100	560.870	591.260	626.670	653.465	657.535	572.644	547.489	531.719	517.828	512.799	495.703	487.455	479.291

2/22/91

LOW SCENARIO - REGION

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	179.500	176.500	181.550	187.700	196.700	203.600	200.910	196.002	195.300	196.100	196.800	200.000	202.800	205.400
50-51	194.000	195.700	203.375	213.275	229.000	239.200	233.378	230.918	232.158	234.398	236.739	249.105	261.559	274.190
52,53+	275.100	279.300	300.050	314.100	332.675	346.650	338.429	327.986	330.744	334.690	337.461	354.690	370.825	385.096
54	75.100	92.400	105.125	110.800	117.300	123.900	121.609	121.726	122.244	122.762	123.180	126.611	130.025	133.217
58	195.500	218.400	233.275	241.600	250.100	261.300	259.808	260.717	263.518	266.562	271.001	316.463	361.050	405.864
60-67	188.900	193.400	202.450	205.550	210.750	215.550	208.439	207.899	209.117	211.539	214.761	228.300	240.800	253.102
70	40.200	42.600	45.800	48.850	52.300	55.400	54.100	53.900	54.250	54.607	54.932	59.006	62.900	66.601
72	29.600	35.000	36.075	34.100	35.275	37.150	37.543	37.663	37.901	38.137	38.377	40.813	42.929	44.812
73	89.800	109.800	138.475	123.200	133.650	142.750	143.950	146.400	149.250	152.200	155.650	187.000	218.350	249.747
76	9.800	10.500	11.350	12.750	14.225	14.750	13.609	13.537	13.671	13.804	13.938	14.495	14.912	15.284
80	179.800	212.350	231.100	240.600	252.300	269.000	272.992	280.917	289.244	294.673	300.104	339.848	378.228	415.600
81	17.400	22.700	25.700	26.900	27.925	29.300	29.085	29.373	29.716	30.064	30.469	35.711	40.673	45.441
83	31.800	41.800	47.525	56.500	61.000	63.900	63.800	63.800	64.500	65.300	66.100	73.919	81.629	89.032
89	36.400	36.000	39.100	65.800	71.150	75.300	76.216	77.325	79.133	81.142	83.251	93.607	103.261	111.910
75,78+	122.600	141.125	150.850	158.900	168.500	177.600	177.438	178.467	180.096	182.226	183.856	193.061	201.548	209.508
82	19.800	24.200	27.500	32.800	34.600	35.800	35.300	35.250	35.470	35.500	35.600	36.500	37.500	38.300
941	279.700	280.275	291.400	299.600	306.700	317.900	317.600	318.800	320.179	321.970	323.762	337.888	351.943	365.709
90-99	230.300	236.100	248.300	257.500	266.400	276.300	275.700	275.200	276.200	277.300	279.600	289.500	300.300	311.000
Const	161.300	132.600	140.600	153.750	171.050	184.600	152.600	146.046	148.002	150.974	152.961	164.328	174.698	184.644
Agric	292.200	286.600	286.200	285.055	284.100	280.288	278.211	276.236	274.276	272.330	270.400	260.700	250.900	241.400
Mining	13.300	9.875	9.075	10.075	10.900	11.800	9.700	8.700	8.400	8.400	8.400	8.400	8.400	8.400
Fd Gvt	117.300	116.350	118.300	120.550	122.200	127.200	117.800	114.500	114.000	114.500	115.000	117.700	119.900	122.000
SUBTOT	2779.400	2893.575	3073.175	3199.955	3348.800	3489.239	3417.317	3401.362	3427.369	3459.090	3492.342	3727.645	3955.130	4176.257

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TOTAL	3371.500	3454.446	3664.435	3826.625	4002.265	4146.773	3989.961	3948.851	3959.088	3976.918	4005.141	4223.348	4442.585	4655.548
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HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															LOW SCENARIO - REGION					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010							

HOUSING																					
SF	2304.022	2428.959	2475.489	2513.748	2559.629	2591.688	2606.216	2614.939	2621.308	2624.187	2632.905	2660.743	2689.617	2709.297							
MF	427.732	492.379	528.236	560.778	597.102	626.083	644.096	657.515	669.575	679.088	692.415	751.523	814.844	875.513							
MO	230.919	280.062	301.774	321.685	342.460	358.878	367.396	373.226	377.891	380.817	386.111	404.419	421.193	435.109							
TOTAL	2962.673	3201.400	3305.500	3396.211	3499.190	3576.626	3617.708	3645.680	3668.774	3684.092	3711.430	3816.684	3925.654	4019.918							
POPUL	8003.820	8389.700	8532.000	8668.200	8860.400	9019.000	9121.738	9192.005	9250.031	9288.363	9356.587	9660.864	9976.585	10255.690							
HHLDS	2962.673	3201.400	3305.500	3396.210	3499.190	3576.626	3617.708	3645.680	3668.774	3684.092	3711.430	3816.685	3925.654	4019.918							
PCI	10360.21	10444.04	10783.52	10964.63	11352.17	11426.33	11602.90	11724.70	11847.46	11969.99	12094.40	12754.33	13450.51	14184.24							

2/22/91

LOW SCENARIO - WASHINGTON

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	31.900	31.100	32.300	34.200	35.500	35.900	33.500	33.000	32.500	32.000	31.500	30.000	29.000	28.000
22	1.000	0.900	1.000	1.200	1.200	1.300	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
23	6.500	6.200	5.700	6.000	6.000	6.200	5.700	5.400	5.200	5.100	5.000	5.000	5.000	5.000
25	3.300	3.800	3.800	4.200	4.000	4.300	3.700	3.600	3.500	3.600	3.650	3.700	3.700	3.700
26	15.800	17.600	20.100	21.400	22.100	22.000	21.000	21.000	21.200	21.300	21.400	22.600	23.800	25.000
27	2.100	1.800	1.800	1.900	1.900	2.200	1.900	1.600	1.500	1.400	1.300	1.200	1.100	1.000
29	3.500	4.500	5.100	5.800	6.200	6.500	6.200	6.200	6.200	6.200	6.200	6.300	6.400	6.500
30	0.400	0.400	0.400	0.500	0.600	0.500	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
31	6.900	6.400	6.900	7.300	7.300	7.900	6.000	6.000	5.900	5.800	5.700	5.500	5.400	5.200
32	9.000	6.900	6.900	7.100	7.300	7.600	6.600	6.295	6.195	6.097	6.000	6.000	6.000	6.000
33XX	11.800	9.700	10.500	10.900	11.800	12.200	11.000	9.600	9.600	9.700	9.800	9.900	10.000	10.000
34	15.000	17.100	16.200	18.000	19.000	19.500	17.500	17.000	17.000	17.100	17.200	17.600	18.100	18.600
35	11.200	12.100	13.200	10.500	11.700	12.100	11.000	10.500	10.700	10.900	11.000	11.600	12.100	12.600
36	98.350	89.600	106.200	116.200	128.500	128.900	110.000	100.000	90.000	81.087	79.000	74.400	70.200	65.700
37	6.400	10.700	10.800	14.600	14.900	14.700	14.000	13.500	13.500	13.600	13.600	14.000	14.300	14.700
38	4.600	4.500	4.800	5.500	5.900	5.600	5.000	4.600	4.279	4.239	4.200	4.000	3.800	3.600
39	16.027	13.400	14.500	15.200	15.300	14.700	11.459	10.643	10.258	9.723	9.654	8.370	8.691	8.945
2421	4.982	4.200	3.900	3.600	3.100	3.000	2.336	2.182	2.099	1.932	1.870	1.441	1.430	1.422
2436	25.991	20.700	22.000	22.800	22.700	21.900	20.024	19.648	19.278	18.916	18.560	17.205	15.938	14.753
24XX	2.974	2.100	2.050	2.100	2.500	2.500	2.446	2.394	2.342	2.292	2.242	2.011	1.804	1.618
26:1	8.818	9.000	8.400	8.700	9.300	9.300	9.174	9.050	8.926	8.810	8.689	8.142	7.637	7.175
2621	1.637	1.200	1.200	1.200	1.600	1.600	1.574	1.547	1.522	1.497	1.472	1.353	1.245	1.144
2631	4.171	4.400	4.950	5.100	4.900	5.000	4.780	4.732	4.684	4.637	4.591	4.326	4.306	4.272
26XX	0.513	0.500	0.500	0.500	0.400	0.500	0.497	0.493	0.490	0.486	0.483	0.489	0.492	0.460
2812	5.300	7.700	7.700	8.700	8.500	8.900	3.740	3.680	3.607	3.560	3.500	3.000	3.000	3.000
2819	2.887	3.100	3.300	3.300	3.300	3.500	3.068	3.037	3.007	2.977	2.947	2.856	2.767	2.680
28XX	7.700	5.800	4.400	5.600	5.900	5.900	3.200	2.920	2.880	2.840	2.800	2.800	2.800	2.800
3334	308.750	295.400	318.600	342.100	361.600	364.200	316.697	299.919	287.680	277.093	273.658	265.093	260.310	255.169
SUBTOT	308.750	295.400	318.600	342.100	361.600	364.200	316.697	299.919	287.680	277.093	273.658	265.093	260.310	255.169

NON-MANUFACTURING EMPLOYMENT (1000'S)												
LOW SCENARIO - WASHINGTON												
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2/22/91
40-49	91.400	93.600	98.500	101.900	107.900	112.000	111.000	109.000	108.000	108.500	109.000	110.000
50-51	100.500	105.700	111.400	116.400	124.600	132.100	130.500	130.500	131.000	132.500	134.000	138.000
52, 53+	141.000	146.900	161.200	168.800	179.100	189.000	186.000	179.000	180.500	183.000	184.500	194.000
54	38.200	49.200	57.400	59.900	62.300	65.400	64.500	65.000	65.300	65.600	65.800	68.000
58	101.600	118.900	128.200	132.500	135.000	141.600	142.600	143.017	144.468	145.062	146.501	174.148
60-67	91.800	99.600	107.500	109.400	112.300	116.300	113.000	113.000	113.500	115.000	117.000	124.000
70	17.800	20.100	21.500	22.900	24.700	26.100	26.000	26.000	26.100	26.200	26.300	28.300
72	16.000	19.900	20.800	19.700	20.400	21.500	22.269	22.392	22.517	22.641	22.767	24.400
73	52.900	61.000	78.000	70.000	76.500	83.700	84.800	86.400	88.000	89.500	91.000	109.000
76	5.500	5.600	5.900	6.900	8.000	8.400	8.000	8.000	8.100	8.200	8.300	8.600
80	95.800	117.400	129.300	134.600	140.800	151.200	152.500	156.000	160.000	163.000	166.000	189.148
81	9.200	12.400	14.400	15.000	15.600	16.500	16.700	16.800	16.900	17.000	17.100	20.100
83	15.600	22.600	25.000	27.200	29.700	31.400	32.000	32.400	32.700	33.000	33.300	37.300
89	19.500	21.100	23.100	37.500	40.700	43.000	43.600	44.200	45.500	47.000	48.500	54.500
75, 78+	66.800	83.500	89.000	95.400	101.100	106.700	107.500	108.500	109.500	111.000	112.000	117.000
82	8.900	12.000	13.100	14.700	15.900	16.700	16.600	16.600	16.700	16.700	16.800	17.400
941	145.500	143.600	151.100	156.000	160.600	166.300	166.500	167.000	167.500	168.000	168.500	176.100
90-99	117.400	129.100	135.500	141.300	146.800	152.100	152.000	152.000	152.300	152.700	153.000	158.000
Const	92.600	80.600	88.900	96.600	106.600	115.300	100.000	95.000	96.000	98.000	99.000	105.000
Agric	119.300	115.100	114.400	113.300	112.300	110.163	109.591	109.022	108.456	107.892	107.332	103.070
Mining	3.200	2.700	3.000	3.300	3.600	4.000	3.500	3.000	2.700	2.700	2.700	2.700
Fd Gvt	67.900	70.100	70.600	71.400	72.000	74.500	70.000	68.000	68.500	69.000	69.500	71.000
SUBTOT	1418.400	1530.700	1647.800	1714.700	1796.500	1883.963	1859.168	1850.831	1864.241	1882.195	1898.900	2029.766
TOTAL	1727.150	1826.100	1966.400	2056.800	2158.100	2248.163	2175.865	2150.750	2151.921	2159.287	2172.558	2294.859
												2416.488
												2534.077

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															LOW SCENARIO - WASHINGTON										2/22/91						
																	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
HOUSING																															
SF	1193.211	1266.263	1296.121	1318.354	1348.020	1367.485	1378.665	1383.832	1387.676	1387.830	1390.434	1400.914	1411.039	1414.871																	
MF	250.130	298.560	324.707	346.921	374.775	394.782	408.436	417.508	425.655	431.031	438.424	474.979	513.815	550.173																	
MO	97.169	126.178	140.172	151.726	166.490	176.657	183.078	186.763	189.797	191.125	193.480	203.236	211.910	218.037																	
TOTAL	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1970.179	1988.104	2003.128	2009.986	2022.339	2079.129	2136.764	2183.081																	
POPUL	4132.160	4406.000	4538.000	4619.000	4761.000	4866.700	4945.148	4990.141	5027.852	5045.064	5076.070	5239.404	5406.012	5545.026																	
HHLDS	1540.510	1691.000	1761.000	1817.000	1889.286	1938.924	1970.179	1988.104	2003.128	2009.986	2022.339	2079.129	2136.764	2183.081																	
PCI	10725.00	10924.00	11258.00	11383.00	11774.00	11798.00	12031.80	12152.10	12273.60	12396.30	12520.30	13159.00	13830.20	14535.70																	

2/22/91

LOW SCENARIO - OREGON

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	24.300	23.800	24.000	23.700	23.600	24.900	23.000	22.800	22.600	22.400	22.200	21.000	20.000	19.000
22	2.800	1.600	1.800	1.800	1.800	2.100	1.279	1.259	1.239	1.219	1.200	1.100	1.000	1.000
23	3.200	2.400	2.500	2.600	2.700	2.900	1.980	1.959	1.939	1.920	1.900	1.800	1.700	1.600
25	2.600	2.700	2.500	2.900	3.000	3.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
27	10.000	11.500	12.800	13.200	13.500	14.100	13.400	13.000	13.100	13.200	13.300	13.600	13.800	14.000
29	0.600	0.400	0.500	0.500	0.500	0.500	0.378	0.357	0.337	0.318	0.300	0.200	0.200	0.200
30	2.400	3.200	3.800	4.600	4.900	5.000	4.800	4.600	4.600	4.700	4.700	4.800	4.900	5.000
31	0.300	0.400	0.500	0.500	0.500	0.500	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
32	4.500	3.100	3.600	4.000	4.200	4.900	3.800	3.200	2.800	2.800	2.800	2.800	2.700	2.600
33XX	9.600	8.600	9.300	9.300	10.100	10.700	9.300	8.500	8.000	7.559	7.500	7.200	7.000	7.000
34	12.700	11.000	10.200	11.200	12.300	12.400	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
35	17.700	15.500	15.800	16.800	17.600	18.000	16.000	15.500	15.500	15.500	15.500	16.000	16.500	17.000
36	9.800	13.900	13.600	14.100	15.600	17.200	15.500	15.000	15.000	15.000	15.000	15.500	15.800	16.000
37	10.300	9.200	10.800	11.600	11.400	12.200	9.898	9.797	9.697	9.598	9.500	9.000	8.500	8.500
38	19.300	14.600	12.100	13.200	12.500	11.600	10.000	10.000	10.100	10.200	10.300	10.900	11.500	12.000
39	2.200	2.400	3.200	3.800	4.900	3.800	3.000	2.600	2.400	2.400	2.400	2.300	2.200	2.100
2421	23.800	20.500	22.000	21.400	20.800	19.000	14.891	13.812	13.286	12.546	12.444	10.696	11.115	11.401
2436	20.100	15.500	16.800	16.100	16.300	14.900	12.365	11.613	11.164	10.232	9.892	7.265	7.030	6.854
24XX	25.600	27.600	29.200	31.300	29.900	27.300	27.085	26.576	26.077	25.587	25.106	23.273	21.558	19.956
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	5.100	4.150	4.000	3.900	4.100	4.100	4.044	3.991	3.935	3.884	3.832	3.589	3.367	3.163
2631	2.000	2.100	2.000	1.900	2.000	2.000	1.967	1.934	1.901	1.869	1.839	1.690	1.554	1.430
26XX	3.300	2.840	3.200	2.800	3.000	3.000	2.675	2.662	2.648	2.634	2.621	2.526	2.434	2.346
2812	0.250	0.200	0.200	0.200	0.200	0.200	0.199	0.197	0.196	0.195	0.193	0.191	0.188	0.184
2819	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28XX	2.050	1.900	1.900	1.900	2.000	2.300	1.756	1.741	1.721	1.704	1.687	1.635	1.584	1.534
3334	1.400	0.600	0.700	0.900	0.900	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
SUBTOT	215.100	199.300	206.300	214.200	218.300	217.200	190.216	183.998	181.141	178.365	177.114	169.963	167.531	165.768

NON-MANUFACTURING EMPLOYMENT (1000'S)		LOW SCENARIO - OREGON														2/22/91
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010		
40-49	60.500	57.300	58.500	60.500	62.800	65.100	63.000	61.000	61.200	61.400	61.600	63.500	65.000	66.400		
50-51	67.400	65.800	68.200	72.900	78.200	80.800	77.000	75.000	75.500	76.000	76.500	82.500	88.600	95.000		
52, 53+	96.200	92.900	98.700	104.200	109.700	112.000	108.000	105.000	106.000	107.000	108.000	114.000	120.100	126.200		
54	24.600	29.500	33.800	36.400	39.400	42.000	41.000	41.000	41.100	41.200	41.300	41.900	42.500	43.000		
58	67.400	70.400	76.000	78.900	82.300	85.000	84.000	84.500	85.500	87.500	90.000	102.500	114.000	125.000		
60-67	70.000	66.800	72.100	73.300	75.300	75.800	73.000	72.430	72.918	73.609	74.500	79.000	83.300	87.202		
70	14.800	14.600	15.600	17.100	18.400	19.700	18.800	18.600	18.700	18.800	18.900	20.000	21.000	22.000		
72	9.800	10.400	10.800	10.400	10.900	11.600	10.900	10.845	10.905	10.965	11.026	11.497	11.893	12.193		
73	24.900	35.000	45.500	43.000	46.700	48.100	48.400	49.000	50.000	51.200	52.800	63.000	73.000	83.000		
76	3.000	3.500	4.100	4.400	4.600	4.700	4.200	4.117	4.140	4.163	4.186	4.365	4.515	4.629		
80	62.100	69.400	74.400	77.600	82.100	87.200	90.000	94.000	98.000	100.000	102.000	114.000	125.000	136.100		
81	5.600	7.300	8.100	8.500	8.700	9.000	9.049	9.218	9.391	9.568	9.800	11.600	13.300	15.000		
83	11.400	14.000	16.900	23.300	24.400	25.200	24.800	24.600	24.800	25.100	25.400	28.300	31.200	34.000		
89	11.100	10.300	11.300	17.200	19.000	20.500	20.800	21.100	21.400	21.700	22.000	24.500	26.900	29.000		
75, 78+	42.200	43.500	47.400	47.900	50.800	53.500	52.700	52.500	53.000	53.500	54.000	57.400	60.700	64.000		
82	7.100	8.300	10.300	13.800	14.300	14.600	14.300	14.300	14.400	14.400	14.400	14.600	14.800	15.000		
941	94.200	94.600	97.400	99.300	101.200	104.100	103.500	104.000	104.500	105.500	106.500	111.700	116.900	122.000		
90-99	78.200	73.500	77.700	80.200	81.700	84.300	84.000	83.500	84.000	84.500	86.300	89.900	94.500	99.000		
Const	46.500	33.100	35.300	39.900	45.200	47.900	34.000	33.396	34.102	34.824	35.561	39.400	43.200	47.000		
Agric	96.300	98.800	99.700	100.300	101.000	100.580	99.781	98.988	98.201	97.421	96.647	93.708	90.121	86.728		
Mining	2.300	1.500	1.400	1.300	1.400	1.400	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200		
Fd Gvt	30.800	29.600	30.600	31.700	32.200	34.200	31.000	30.000	29.000	29.000	29.000	30.000	31.000	32.000		
SUBTOT	926.400	930.100	993.800	1042.100	1090.300	1127.280	1093.430	1088.294	1097.957	1108.550	1121.620	1198.570	1272.729	1345.652		
TOTAL	1141.500	1129.400	1200.100	1256.300	1308.600	1344.480	1283.646	1272.292	1279.099	1286.915	1298.734	1368.533	1440.260	1511.420		

LOW SCENARIO - OREGON															2/22/91
HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
HOUSING															
SF	766.113	797.066	812.147	825.103	840.326	852.139	855.703	858.599	860.609	863.106	868.900	879.145	890.561	900.054	
MF	143.583	154.439	162.893	171.662	179.226	187.320	191.145	194.662	197.759	201.152	206.310	222.922	241.118	259.190	
MO	81.898	92.495	98.960	105.235	110.407	115.947	117.901	119.509	120.677	121.992	124.655	129.181	133.571	137.756	
TOTAL	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1164.748	1172.770	1179.045	1186.249	1199.865	1231.249	1265.250	1297.000	
POPUL	2633.160	2675.800	2690.000	2741.000	2791.000	2842.300	2865.281	2885.015	2900.450	2918.174	2951.668	3041.185	3137.821	3229.531	
HHLDS	991.593	1044.000	1074.000	1102.000	1129.959	1155.406	1164.748	1172.770	1179.045	1186.249	1199.865	1231.249	1265.250	1297.000	
PCI	9897.80	9845.90	10162.10	10402.20	10731.30	10804.40	10906.10	11037.00	11169.40	11303.50	11439.10	12142.10	12888.30	13680.40	

MANUFACTURING EMPLOYMENT (1000'S)		LOW SCENARIO - IDAHO										2/22/91			
		1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
INDUSTRY															
20	17.000	16.600	16.100	17.100	16.900	17.000	16.000	15.000	14.715	14.557	14.400	13.600	12.800	12.200	
22	0.100	0.050	0.100	0.100	0.100	0.100	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	
23	0.300	0.250	0.300	0.300	0.300	0.300	0.150	0.100	0.066	0.057	0.050	0.050	0.050	0.050	
25	0.250	0.600	0.600	0.700	0.700	0.600	0.500	0.400	0.337	0.318	0.300	0.300	0.300	0.300	
27	3.100	4.200	4.300	4.500	4.600	4.800	4.400	4.400	4.500	4.600	4.600	4.800	5.000	5.100	
29	0.100	0.025	0.050	0.050	0.050	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
30	1.000	0.850	1.100	0.800	0.900	0.800	0.700	0.500	0.400	0.300	0.300	0.300	0.300	0.300	
31	0.000	0.100	0.150	0.150	0.150	0.100	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	
32	1.300	0.900	0.800	0.900	0.900	1.000	0.700	0.600	0.600	0.600	0.600	0.600	0.600	0.600	
33XX	1.200	0.100	0.200	0.100	0.100	0.100	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	
34	2.100	1.900	2.000	2.000	2.300	2.400	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	
35	5.000	5.800	5.200	5.500	6.200	7.000	6.500	6.300	6.200	6.100	6.000	6.000	6.000	6.000	
36	1.500	2.800	3.300	4.000	4.900	5.600	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	
37	0.700	0.950	1.100	1.600	1.500	1.500	1.200	1.000	0.900	0.800	0.800	0.700	0.600	0.500	
38	0.150	0.300	0.300	0.400	0.400	0.400	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	
39	0.400	0.325	0.300	0.400	0.400	0.400	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	
2421	8.100	6.400	6.600	6.700	7.000	7.200	5.334	5.343	5.436	5.462	5.603	5.662	5.942	5.938	
2436	0.500	0.400	0.400	0.400	0.400	0.400	0.250	0.236	0.238	0.241	0.250	0.261	0.263	0.269	
24XX	6.775	6.700	6.400	6.800	7.400	7.600	6.282	6.164	6.048	5.934	5.823	5.398	5.000	4.628	
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2621	0.225	0.250	0.250	0.300	0.300	0.300	0.296	0.292	0.288	0.284	0.280	0.262	0.246	0.231	
2631	0.850	0.950	0.950	1.000	1.100	1.200	1.180	1.161	1.141	1.122	1.104	1.014	0.933	0.858	
26XX	0.425	0.575	0.600	0.600	0.600	0.600	0.524	0.527	0.530	0.532	0.535	0.469	0.468	0.435	
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2819	1.067	1.000	0.900	0.900	0.900	0.900	0.889	0.879	0.868	0.858	0.848	0.814	0.781	0.749	
28XX	2.433	2.600	2.400	2.600	2.600	2.700	2.641	2.621	2.602	2.582	2.563	2.468	2.377	2.289	
3334	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
SUBTOT	54.475	54.625	54.200	57.900	60.700	63.050	55.045	53.022	52.369	51.848	51.455	50.149	49.111	47.998	

2/22/91

LOW SCENARIO - IDAHO

NON-MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
40-49	20.100	19.200	17.900	18.600	19.100	19.500	19.000	19.000	19.100	19.200	19.200	19.500	19.800	20.000
50-51	22.300	20.800	20.500	20.600	22.700	22.700	22.500	22.000	22.200	22.400	22.700	24.800	26.900	29.000
52,53+	29.900	31.300	31.500	32.400	35.100	36.800	35.800	35.400	35.600	35.900	36.200	37.500	38.800	40.000
54	9.400	10.700	11.100	11.400	12.100	12.700	12.500	12.300	12.400	12.500	12.600	13.100	13.500	13.900
58	19.000	21.600	21.600	22.700	24.400	26.100	24.800	25.000	25.300	25.700	26.100	30.100	34.100	38.000
60-67	23.400	23.600	19.200	19.200	19.300	19.500	19.000	19.000	19.200	19.400	19.700	21.500	23.300	25.000
70	5.100	5.200	5.800	6.000	6.500	6.800	6.500	6.500	6.600	6.700	6.800	7.400	8.300	8.500
72	3.000	3.800	3.600	3.100	3.200	3.300	3.624	3.651	3.679	3.706	3.734	3.933	4.109	4.255
73	11.000	12.100	12.800	8.000	8.800	9.200	9.000	9.200	9.400	9.600	9.900	12.600	15.300	18.000
76	1.000	1.100	1.000	1.100	1.200	1.200	1.107	1.116	1.124	1.132	1.141	1.202	1.255	1.300
80	15.500	17.900	19.100	20.000	20.700	21.800	22.000	22.300	22.500	22.800	23.100	26.800	30.400	34.000
81	2.100	2.400	2.500	2.700	2.900	3.000	2.700	2.706	2.762	2.819	2.878	3.235	3.607	3.965
83	3.400	4.000	4.100	4.500	4.800	5.000	5.000	5.000	5.100	5.200	5.300	5.900	6.500	7.000
89	4.800	3.900	3.900	10.300	10.700	11.000	11.100	11.300	11.500	11.700	12.000	13.800	15.500	17.000
75,78+	10.300	10.800	11.000	12.100	13.100	13.900	13.900	14.100	14.200	14.300	14.400	15.000	15.500	16.000
82	3.800	3.900	4.100	4.300	4.400	4.500	4.400	4.350	4.370	4.400	4.400	4.500	4.700	4.800
941	31.100	32.300	33.400	34.900	35.300	37.700	38.000	38.300	38.600	38.800	39.000	40.000	41.000	42.000
90-99	26.400	26.100	27.700	28.600	29.900	31.700	31.700	31.700	31.800	31.900	32.000	33.000	34.000	35.000
Const	17.400	15.100	13.600	14.200	16.000	18.000	16.000	15.000	15.200	15.400	15.600	16.800	18.000	19.000
Agric	69.100	65.400	64.800	64.155	63.500	62.245	61.684	61.128	60.577	60.031	59.490	57.303	54.884	52.756
Mining	4.700	3.800	2.600	3.300	3.600	3.800	2.800	2.500	2.500	2.500	2.500	2.500	2.500	2.500
Fd Gvt	13.000	11.800	12.200	12.500	12.900	13.300	12.000	11.800	11.900	12.000	12.000	12.200	12.400	12.500
SUBTOT	345.800	346.800	344.000	354.655	370.200	383.745	375.115	373.351	375.612	378.088	380.743	402.673	424.055	444.496
TOTAL	400.275	401.425	398.200	412.555	430.900	446.795	430.160	426.373	427.981	429.936	432.198	452.822	473.166	492.494

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															LOW SCENARIO - IDAHO					2/22/91									
															1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
HOUSING																													
SF	262.386	280.726	282.132	285.125	286.174	286.958	286.819	287.624	288.131	288.329	288.680	294.616	300.797	306.094															
MF	25.070	29.289	30.147	31.463	32.176	32.816	33.180	33.843	34.422	34.915	35.463	39.615	44.040	48.379															
MO	36.714	43.986	44.720	46.412	47.104	47.634	47.666	48.154	48.462	48.584	48.757	51.396	53.853	56.140															
TOTAL	324.170	354.000	357.000	363.000	365.455	367.409	367.665	369.621	371.015	371.827	372.900	385.626	398.690	410.613															
POPUL	944.000	1004.000	1000.500	1004.400	1005.000	1006.700	1007.401	1012.762	1016.581	1018.606	1021.745	1060.473	1100.385	1137.399															
HHLDS	324.170	354.000	357.000	363.000	365.455	367.409	367.665	369.621	371.015	371.827	372.900	385.626	398.690	410.613															
PCI	8611.20	8400.50	8573.30	8785.80	9226.40	9457.00	9334.30	9427.70	9521.90	9617.20	9713.30	10208.80	10729.60	11276.90															

LOW SCENARIO - WESTERN MONTANA 2/22/91

MANUFACTURING EMPLOYMENT (1000'S)

INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010
20	0.700	0.465	0.525	0.550	0.475	0.500	0.445	0.440	0.435	0.430	0.425	0.400	0.400	0.400
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.025	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.075	0.075	0.075
25	0.000	0.140	0.150	0.150	0.150	0.150	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
27	0.750	0.700	0.725	0.750	0.825	0.875	0.800	0.800	0.825	0.850	0.850	0.900	0.900	0.900
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.025	0.025	0.010	0.010	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	0.000	0.025	0.030	0.010	0.010	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	0.400	0.325	0.280	0.290	0.300	0.300	0.239	0.229	0.219	0.209	0.200	0.200	0.200	0.200
33XX	1.000	0.150	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
34	0.150	0.250	0.275	0.250	0.225	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
35	0.050	0.225	0.325	0.350	0.375	0.400	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
36	0.050	0.075	0.075	0.140	0.125	0.125	0.108	0.118	0.128	0.138	0.150	0.175	0.204	0.225
37	0.100	0.075	0.050	0.100	0.100	0.100	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
38	0.100	0.125	0.120	0.130	0.140	0.150	0.159	0.168	0.178	0.189	0.200	0.225	0.253	0.275
39	0.150	0.175	0.300	0.650	0.700	0.750	0.700	0.650	0.600	0.600	0.600	0.600	0.600	0.600
2421	4.500	4.000	4.150	3.900	3.900	4.000	2.990	2.993	3.047	3.061	3.141	3.172	3.332	3.328
2436	0.000	0.800	0.800	0.800	0.950	0.825	0.543	0.512	0.517	0.524	0.543	0.567	0.572	0.585
24XX	2.700	2.100	2.500	2.500	2.650	2.650	2.437	2.391	2.346	2.302	2.259	2.094	1.940	1.796
2611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2621	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2631	0.550	0.750	0.750	0.750	0.750	0.750	0.737	0.725	0.713	0.701	0.690	0.634	0.583	0.536
26XX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2819	0.200	0.190	0.180	0.180	0.180	0.180	0.178	0.176	0.174	0.172	0.170	0.163	0.156	0.150
28XX	0.100	0.050	0.050	0.100	0.100	0.100	0.099	0.098	0.097	0.096	0.095	0.092	0.089	0.086
3334	1.250	0.850	0.750	0.800	0.800	0.800	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450
SUBTOT	13.776	11.545	12.160	12.470	12.865	13.085	10.685	10.550	10.529	10.522	10.572	10.498	10.504	10.356

LOW SCENARIO - WESTERN MONTANA														2/22/91	
NON-MANUFACTURING EMPLOYMENT (1000'S)															
INDUSTRY	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010	
40-49	7.500	6.400	6.650	6.700	6.900	7.000	7.010	7.002	7.000	7.000	7.000	7.000	7.000	7.000	7.000
50-51	3.800	3.400	3.275	3.375	3.500	3.600	3.378	3.418	3.458	3.498	3.539	3.805	4.059	4.290	4.290
52,53+	8.000	8.200	8.650	8.700	8.775	8.850	8.629	8.586	8.644	8.702	8.761	9.190	9.563	9.864	9.864
54	2.900	3.000	2.825	3.100	3.500	3.800	3.609	3.426	3.444	3.462	3.480	3.611	3.825	4.017	4.017
58	7.500	7.500	7.475	7.500	8.400	8.600	8.400	8.200	8.250	8.300	8.400	9.715	10.900	12.113	12.113
60-67	3.700	3.400	3.650	3.650	3.850	3.950	3.439	3.469	3.499	3.530	3.561	3.800	4.200	4.500	4.500
70	2.500	2.700	2.900	2.850	2.700	2.800	2.800	2.800	2.850	2.907	2.932	2.306	3.700	4.001	4.001
72	0.800	0.900	0.875	0.900	0.775	0.750	0.750	0.775	0.800	0.825	0.850	0.983	1.027	1.064	1.064
73	1.000	1.700	2.175	2.200	1.650	1.750	1.750	1.800	1.850	1.900	1.950	2.400	2.850	3.347	3.347
76	0.300	0.300	0.350	0.350	0.425	0.450	0.302	0.304	0.307	0.309	0.311	0.328	0.342	0.355	0.355
80	6.400	7.650	8.300	8.400	8.700	8.800	8.492	8.617	8.744	8.873	9.004	9.900	10.800	11.800	11.800
81	0.500	0.600	0.700	0.700	0.725	0.800	0.636	0.649	0.663	0.677	0.691	0.776	0.866	0.956	0.956
83	1.400	1.200	1.525	1.500	2.100	2.300	2.000	1.800	1.900	2.000	2.100	2.419	2.729	3.032	3.032
89	1.000	0.700	0.800	0.800	0.750	0.800	0.716	0.725	0.733	0.742	0.751	0.807	0.861	0.910	0.910
75,78+	3.300	3.325	3.450	3.500	3.500	3.500	3.338	3.367	3.396	3.426	3.456	3.661	3.848	4.008	4.008
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
941	8.900	9.775	9.500	9.400	9.600	9.800	9.600	9.500	9.579	9.670	9.762	10.088	10.343	10.509	10.509
90-99	8.300	7.400	7.400	7.400	8.000	8.200	8.000	8.000	8.100	8.200	8.300	8.600	8.800	9.000	9.000
Const	4.800	3.800	2.800	3.050	3.250	3.400	2.600	2.650	2.700	2.750	2.800	3.128	3.498	3.644	3.644
Agric	7.500	7.300	7.300	7.300	7.300	7.300	7.155	7.098	7.042	6.986	6.931	6.619	6.457	6.291	6.291
Mining	3.100	1.875	2.075	2.175	2.300	2.600	2.200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Fd Gvt	5.600	4.850	4.900	4.950	5.100	5.200	4.800	4.700	4.600	4.500	4.500	4.500	4.500	4.500	4.500
SUBTOT	88.800	85.975	87.575	88.500	91.800	94.250	89.604	88.886	89.559	90.257	91.079	96.636	102.168	107.201	107.201
TOTAL	102.575	97.520	99.735	100.970	104.665	107.335	100.289	99.436	100.088	100.779	101.651	107.134	112.672	117.557	117.557

HOUSING, POPULATION, HOUSEHOLDS, AND INCOME															LOW SCENARIO - WESTERN MONTANA					2/22/91	
	1980	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000	2005	2010							
HOUSING																					
SF	82.313	84.905	85.088	85.166	85.108	85.105	85.029	84.883	84.892	84.923	84.890	86.068	87.220	88.277							
MF	8.950	10.092	10.489	10.732	10.924	11.144	11.336	11.501	11.739	11.991	12.218	14.007	15.871	17.770							
MO	15.138	17.403	17.922	18.312	18.459	18.638	18.751	18.800	18.956	19.117	19.219	20.605	21.859	23.176							
TOTAL	106.400	112.400	113.500	114.211	114.491	114.886	115.116	115.184	115.586	116.030	116.327	120.680	124.950	129.223							
POPUL	294.500	303.900	303.500	303.800	303.400	303.300	303.907	304.086	305.148	306.319	307.103	319.803	332.367	343.734							
HHLDS	106.400	112.400	113.500	114.211	114.491	114.886	115.116	115.184	115.586	116.030	116.327	120.680	124.950	129.223							
PCI	7793.00	7983.00	8477.00	8595.70	8716.10	8838.10	9474.30	9474.30	9474.30	9474.30	9474.30	10156.30	10887.50	11671.20							

CHAPTER 6

FORECAST OF ELECTRICITY USE IN THE PACIFIC NORTHWEST

Introduction

Forecasts of demand for electricity are the foundation of electricity planning. This chapter describes long-term forecasts of electricity needs in the Pacific Northwest region. The forecasts were prepared jointly by the Northwest Power Planning Council and the Bonneville Power Administration.

Demand forecasts play three important roles in the region's power planning process. The first is the traditional role; they are the basis for deciding how much electricity the region will need. The second role is to explore and define the uncertainty surrounding future electrical resource needs. Finally, the demand forecasts are an essential component of conservation assessment. Conservation is identified as the priority resource in the Northwest Power Act. Demand forecasts have a twofold role in conservation planning. First, they determine the conservation potential associated with various levels of demand. Second, they aid in determining the reduction in demand that can be attributed to programs to acquire conservation resources. The role of demand forecasts in resource planning is discussed in more detail in the final section of this chapter.

The use of these demand forecasts in regional planning differs significantly from the traditional role of demand forecasts. The traditional use could be characterized as deterministic. That is, a "best-guess" demand forecast determined the amount of new electricity generation needed. Before the early 1970s, it was generally assumed that demand for electricity would continue to grow at close to historical rates. That growth had been rapid and relatively steady. It was assumed that economies of scale in power generation could be relied on to keep prices for electricity from increasing as new generating plants were added. Planners saw little reason for demand growth to slow down. In fact, it was widely assumed that there would be little or no response to price changes if they did occur.

The dramatic reduction in electricity demand growth that occurred in the rest of the country as electricity prices

increased in the early 1970s caught most planners by surprise. The initial response seems to have been to develop much more sophisticated forecasting tools. The forecasting models adopted by the Council and Bonneville represent the results of those efforts. However, it has also been recognized that even with the best available tools, forecasts remain highly uncertain. Forecast ranges have been developed to deal with this uncertainty in planning.

The forecast of demand for electricity encompasses a range of five forecasts: a low, medium-low, medium, medium-high and high forecast. The high-demand forecast is designed to ensure that power supplies never constrain the region's economic growth potential. The high forecast portrays a future in which regional growth achieves record high levels, relative to national growth, combined with less competitive prices for alternative fuels. The likelihood that such rapid growth would occur for a 20-year period is considered very small. The forecast range is bounded on the low side by a forecast that is pessimistic about the regional economy, roughly in proportion to the optimism of the high case.

Inside the bounds of the low and high forecasts is a smaller, most probable range of demands bounded by the medium-low and medium-high forecasts. The medium-low, medium and medium-high forecasts will carry greater weight in the planning of resources than will the high and low extremes. Nevertheless, the possibilities posed by the high-growth forecast must be addressed by appropriate resource options. Similarly, conditions that are implied by the low-demand forecast will be considered within a flexible planning strategy designed to minimize regional electricity costs and risks.

The forecasts of electricity demand are determined by three primary factors: economic growth and its composition, prices of alternative fuels, and the price of electricity. The economic and alternative fuel price assumptions that drive these demand forecasts are described in Chapter 5, "Economic Forecasts for the Pacific Northwest." Forecasts of electricity prices are based on the amount of electricity demand and the cost of generating the electricity needed

to meet that demand. At the same time, electricity demand is affected by the price of electricity. Thus, the forecasts must take into account the interaction between electricity prices, as determined by resource choices and their costs, and electricity demand. The interrelationships involved in determining the demand forecasts are illustrated in Figure 6-1. A demand forecasting system captures these relationships in considerable detail.

The Council is required by the Northwest Power Act to produce 20-year forecasts of the demand for electricity in the Pacific Northwest. Bonneville uses long-term forecasts of demand as a basis for determining future federal system loads. Although Bonneville is responsible for meeting federal system loads rather than regional loads, regional load growth is one of the major determinants of federal system loads. Federal system load forecasts combine portions of the regional load forecast and load requirements that retail utilities decide to place on Bonneville.

Bonneville also needs near-term forecasts for system operations, rate setting and financial planning. To maintain consistency between near-term forecasts and the long-term forecasts used in the resource planning process, Bonneville typically replaces the near-term loads in the medium forecast with more detailed customer group forecasts that better reflect near-term economic conditions. These near-term forecasts are prepared by Bonneville and regional utilities for the Pacific Northwest Utilities Conference Committee. Only the medium case long-term

forecast is merged with near-term customer group specific forecasts. This merging applies only to loads through 1995.

Besides merging medium case forecasts, Bonneville also transforms the forecasts into monthly peak and energy loads, accounts for transmission and distribution losses and compiles calendar, fiscal and operating year load (sales plus losses) forecasts to meet various needs. The discussion and tables of sector sales that follow cover unmerged long-term forecasts; however, tables showing loads forecasts by customer group are attached as Appendix 6-C. They are in a format traditionally presented in Bonneville forecasts.

The demand forecast ranges are constructed by combining economic assumptions, fuel price assumptions and some modeling assumptions. This combination of assumptions is designed to explore a wide range of possible demands without combining assumptions unrealistically. That is, mutually inconsistent assumptions are not combined just to obtain extreme forecasts. In the high forecast, for example, the high economic assumptions are combined with high fuel price assumptions. In addition, for the high forecast, it was assumed large industrial consumers have relatively low price response. Electricity prices, which have a significant effect on demand, are determined for each scenario by an electricity pricing model based on the amount and cost of resources needed to meet demand. Generally, electricity prices are higher with higher demand growth.

Forecast System

Figure 6-1
Structure of
the Demand
Forecast System

Overview

In 1989, firm sales of electricity to the final consumer in the Pacific Northwest totaled 17,305 average megawatts, when adjusted to reflect normal temperatures. That is 152 billion kilowatt-hours. The high forecast shows this demand could grow to 28,836 average megawatts by 2010, nearly two thirds higher than current electricity requirements. In more graphic terms, the high requires the addition of electricity equivalent to that consumed by nearly 11 cities the size of Seattle by 2010. Under the set of assumptions leading to the low forecast, demand decreases to 15,787 average megawatts, about 9 percent lower than current requirements. This large uncertainty about future needs for electricity resources raises an important challenge for energy planning. The region needs to deal with this uncertainty in a manner that will neither prevent the region from attaining rapid economic growth, nor impose large and unnecessary costs should slower growth occur. Figure 6-2 illustrates the forecast range in the context of historical sales of electricity.

Table 6-1 shows that the rate of growth of demand could be as high as 2.5 percent per year, if the high case were to materialize, or as low as -0.4 if the low case were to occur. A more likely outcome, however, is between the medium-low growth rate of 0.6 percent and the medium-high rate of 1.7 percent. The medium forecast is for a 1.2 percent annual growth rate in demand for electricity.

More detailed tables summarizing the five forecasts appear in Appendix 6-A.

Forecast growth rates are higher if direct service industries—industries that buy directly from Bonneville—are excluded. For all but the low case, demand excluding direct service industries demand grows 0.3 percent faster than the total firm demand shown in Table 6-1. For example, the high case growth rate of 2.5 percent per year becomes 2.8 percent if direct service industries are excluded. By excluding direct service industries, the low case growth rate moves from -0.4 percent to 0.1 percent.

It is also important to realize that growth is not forecast to occur at a constant rate each year of the forecast. For example, year-to-year growth in the high case varies from over 4 percent to less than 2 percent, with the most rapid growth occurring in the early 1990s.

The forecasts reflect the robust regional economy over the last four years. As a result, the near-term forecasts are higher than forecasts that were done in 1989 by Bonneville and the Council. This is particularly true for the lower end of the forecast range. The long-term forecasts are also slightly higher. Most of the increases in 2010 are less than 5 percent. Running counter to this pattern are the slight decreases in the high forecast from the forecasts included in Bonneville's 1989 Pacific Northwest Loads and Resources study (white book) and from the Council's 1989 supplement forecast. Table 6-B-1 in Appendix 6-B compares these recent forecasts to those in this plan.

Electricity Sales

Figure 6-2
Sales of Electricity—
Historical and
Forecast

Table 6-1
Firm Sales of Electricity (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	17,305	20,826	23,305	28,836	2.5
Medium-High	17,305	19,336	20,935	24,583	1.7
Medium	17,305	18,513	19,587	22,075	1.2
Medium-Low	17,305	16,930	17,566	19,485	0.6
Low	17,305	15,607	15,520	15,787	-0.4

The forecasts for all but the high case have been raised slightly from those included in the draft plan as a result of numerous changes in assumptions. These increases were generally less than 3 percent. The high forecast was not changed significantly. Table 6-B-2 in Appendix 6-B shows the changes to the forecast between the draft and final plan.

History can provide a useful guide for describing a forecast if the comparison is done carefully. However, year-to-year growth rates are influenced strongly by cycles in economic activity and weather conditions. For this reason, comparing a few years of demand growth with a 20-year forecast is inappropriate. Comparing longer periods or comparing weather-adjusted and cycle-adjusted growth can be useful.

Figure 6-3 compares the projected growth rates of demand to regional growth rates since 1950. Growth of electricity consumption in the Pacific Northwest averaged about 7 percent per year during the 1950s and 1960s. However, even during this time there were years of negative growth. In the 1970s, the region's electricity demand growth fell to a 4 percent rate.

The 1980s are difficult to characterize because of their volatility. However, when two years that are both economic cycle peaks are chosen to compute a growth rate (1979 and 1989), the average demand growth rate is about 1.2 percent per year. Although demand went up and down from 1980 to 1986, demand in 1986 was nearly the same as 1980. Since 1986, demand has been growing strongly, averaging about 3.5 percent per year. The years 1987, 1988 and

Demand Growth

Figure 6-3
Historical and
Forecast
1989-2010 Growth

1989 saw an economic boom in the Northwest. This economic prosperity was spread evenly across all sectors of the economy, but was led by dramatic expansion of the Boeing Company. Even the energy-intensive, resource-based industries, such as paper, chemicals, wood products and metals, experienced strong growth. The Northwest economy has benefitted from the earlier decline in the value of the dollar relative to other currencies, making its products more competitive in foreign markets.

All of these factors have contributed to strong growth in demand for electricity. However, a recovery from a recession is not something to be compared to a 20-year trend forecast. The 1979 to 1989 growth rate of 1.2 percent per year is probably a better comparison. The most likely range of the forecast centers around 1 percent, and it falls below the growth rates of the 1950s, 1960s and 1970s.

What are the reasons for expected demand growth being lower than growth rates experienced before 1980? Several factors are listed below.

- The rate of economic growth (employment, population, households and production) is expected to be significantly slower. This is true for the nation as a whole, as well as the region, and is due to basic demographic trends. For example, national forecasts of employment growth over the next 20 years are about half the rate experienced between 1960 and 1980.
- Electricity prices have increased dramatically since the late 1970s, thus decreasing the demand for electricity. This will continue to slow growth during the forecast as buildings and equipment are replaced using more energy-efficient practices. Some of these practices are now mandated by code. For example, buildings being built today use about 30 percent less electricity than the average building in the existing stock. By 2010, nearly half of the building stock will have been built since 1984.
- Oil and natural gas prices have decreased significantly since 1986. These changes, combined with higher electricity prices, make natural gas more attractive as a heating fuel.
- The source of much of the region's electricity demand growth during the earlier decades was in energy-intensive industries, including paper, wood products, aluminum, chemicals and food products. These five industries account for over 90 percent of industrial electricity use. In the future, these are not forecast to grow rapidly, even in the high case. This has a significant effect on expected growth in electricity demand.
- A continuing shift to commercial activities, away from manufacturing, reduces the growth of electricity use. For example, the commercial share of total employment is expected to increase from 73 percent in 1980 to about 82 percent in 2010, but the commercial sector

uses only 1 average megawatt of electricity per 1,000 employees compared to 12 average megawatts in the manufacturing sector.

A further caution should be added about comparing historical growth rates to the forecast. Growth rates can vary significantly year to year or with different long-term intervals. However, more importantly for planning, growth rates at different points may have very different resource planning implications. For example, in the high case forecast, which grows at 2.5 percent per year, about 550 average megawatts of new load would be added annually. But in the 1950s and 1960s, with growth at 7 percent per year, only 406 average megawatts per year were added. Thus, a forecast growth rate that is just a little more than one-third of an historical growth rate, implies a need for 35 percent more electricity resources.

This chapter is concerned primarily with forecasts of electricity sales to final consumers. Further, the forecasts throughout this chapter are for average annual energy rather than peak electricity requirements at any particular time. The demand forecast concept presented is a "price effects" forecast. Such a forecast indicates what demand would be if consumers responded to prices and if no new conservation programs were implemented. Other types of forecasts used in the planning process are described in a later section.

The amount of electricity generation required to meet forecast use is called "electricity load." Electricity load is larger than sales to final consumers because of transmission and distribution losses incurred in delivering the electricity from the generator to the consumer. This loss typically amounts to about 8 percent of the generated electricity.

Because electricity loads are needed to determine resource requirements, electricity demand forecasts are converted to loads for resource planning. A brief description of the load forecast follows, but the rest of the chapter focuses on the need for power from the consumer's point of view. This is because the need for power must be analyzed from that view in order to obtain reliable results and understand the role of conservation in power planning.

Regional firm electricity loads, including transmission and distribution losses, are forecast to grow from 18,720 average megawatts in 1989 to between 17,160 and 31,332 average megawatts by 2010. A more probable range is from 21,146 to 26,681 average megawatts, the 2010 forecasts for the medium-low and medium-high cases. The medium forecast is 23,945 average megawatts, which implies an average annual rate of growth of 1.2 percent. The load forecasts are summarized in Table 6-2.

Table 6-2
Electricity Load Forecasts (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	18,720	22,569	25,272	31,332	2.5
Medium-High	18,720	20,946	22,685	26,681	1.7
Medium	18,720	20,057	21,222	23,945	1.2
Medium-Low	18,720	18,362	19,047	21,146	0.6
Low	18,720	16,944	16,846	17,160	-0.4

Forecast Detail

Summaries of forecast results tend to obscure important detail. A major dimension of the demand forecasting system is the separate treatment of demand by customers of public utilities and customers of investor-owned utilities. A second major dimension is the separate forecasting of residential, commercial, industrial, and irrigation uses of electricity. Further, most components of demand, such as residential use of electricity in investor-owned utility service areas, are analyzed for specific end-uses as well as other dimensions within the sector forecasting models. The detailed forecast results are described in this section. The forecasts for investor-owned and publicly owned utilities are described first, followed by results for individual consuming sectors.

Utility Type Forecasts

Separate forecasts are done for investor-owned utilities, public utilities and Bonneville direct customers. The economic assumptions driving the forecasts are divided into investor-owned and public utility service areas as described in Chapter 5, "Economic Forecasts for the Pacific Northwest." These economic assumptions, combined with differences in electricity rates and existing conditions, lead to differences in the forecasts for the two customer groups.

Table 6-3 shows the 1989 composition of firm electricity sales and the five forecasts for 2010. In 1989, total regional firm sales of electricity, adjusted for normal temperatures, were 17,305 average megawatts. Investor-owned utilities marketed 8,047 average megawatts or 47 percent of the total. Public utilities marketed 38 percent, and the Bonneville Power Administration directly marketed 16 percent.

Bonneville's direct sales decrease as a share of future regional electricity demand in all five of the forecast cases. Direct service industries accounted for most of Bonneville's direct sales in 1989, but are forecast to decrease in all forecast scenarios. Public utility sales are projected to grow slightly more slowly than investor-owned utility sales

in the higher forecasts and slightly faster in the lower forecasts.

In addition to providing electricity directly to some customers, Bonneville is the source for much of the electricity that is sold by public utilities. Although several public utilities generate electricity to serve part of their loads, most public utilities rely entirely on Bonneville. Therefore, the Bonneville administrator's major regional obligations consist of, 1) direct service industrial customers and various federal agencies that are served directly by Bonneville; 2) all loads of publicly owned utilities that have no significant electricity generating resources (non-generating publics); and 3) a part of the loads of publicly owned utilities that do have electricity resources (generating publics). In Figure 6-4, Bonneville-supplied electricity is illustrated by the shaded area. Bonneville was the source for about 40 percent of the firm electricity sales in the region in 1989.

Forecasting the growth of Bonneville's obligations to provide electricity is complicated by uncertainties well beyond the basic uncertainty embodied in forecasts of regional electricity demand. The Northwest Power Act and contracts between Bonneville and the investor-owned utilities allow for the possibility that investor-owned utilities could place loads on Bonneville providing they give seven years' notice. Further, it is not clear to what extent publicly owned utilities will continue to rely on Bonneville to meet their load growth. These uncertainties result in a wide range of possible Bonneville requirements in the future.

Sector Forecasts

Figure 6-5 shows the composition by sector of 1989 electricity sales in the region. The industrial sector accounts for the largest share of electricity sales, followed by the residential sector, and then the commercial sector. The industrial, residential and commercial sectors together account for 95 percent of the region's electricity demand. Irrigation and other miscellaneous uses account for the remainder. Forecasts for each of the demand sectors are discussed in some detail in the sections that follow.

Table 6-3
Firm Sales Forecast by Utility Type (Average Megawatts)

	Total Sales	Investor-Owned Utility Sales	Public Utility Sales	Bonneville Direct Sales
Actual 1989	17,305	8,047	6,542	2,716
Forecast 2010				
▪ High	28,836	14,908	11,314	2,614
▪ Medium-High	24,583	12,437	9,633	2,514
▪ Medium	22,075	11,032	8,693	2,350
▪ Medium-Low	19,485	9,700	7,990	1,795
▪ Low	15,787	8,085	6,838	864
Growth Rates 1989-2010				
▪ High	2.5	3.0	2.6	-0.2
▪ Medium-High	1.7	2.1	1.9	-0.4
▪ Medium	1.2	1.5	1.4	-0.7
▪ Medium-Low	0.6	0.9	1.0	-2.0
▪ Low	-0.4	0.0	0.2	-5.3

Sales by Utility Type

Figure 6-4
1989 Regional Firm
Sales by Utility
Type (Bonneville's
Current Obligation
Shaded)

Electricity Use by Sector

Figure 6-5
1989 Firm Sales
Shares

Residential Demand

The residential sector accounted for 34 percent of regional firm sales of electricity in 1989. Residential sector demand is influenced by many social and economic factors, including fuel prices, per capita income, and the choices of efficiency for energy-consuming equipment available to consumers (available technology). The most important factor, however, is the number of households.

The structure of the residential sector demand model reflects this importance by using the individual household as the basic modeling unit. The model projects future demand for electricity, given future growth in households by housing type; by projecting the amount of electricity-using equipment the average household owns; choices of fuel for space heating, water heating; and cooking; the level of energy efficiency chosen; and the energy-using behavior of the household. These choices are influenced in the model by energy prices, equipment costs, average incomes and available technology.

The use of electricity is simulated for each of eight use classifications. Figure 6-6 shows estimated historical shares of these uses in 1989. Space heating and water heating are the two most important end use categories, accounting for about half of all residential electricity use. The miscellaneous category also includes some back-up space heating in houses that are heated primarily by wood.

Note that Figure 6-6 shows end-use shares averaged over all houses, whether they use electricity for a given end use or not. Houses that use electricity for space and water heating will tend to use a larger share for those end uses than is shown in Figure 6-6.

The projections of residential demand for electricity cover a wide range. This range results mostly from variations in projections of the number of households, per capita income and fuel prices in the economic and demographic growth assumptions. Projected demand also varies because of different assumptions regarding use of wood for space heating.

In the absence of new conservation programs, projected residential electricity use in the year 2010 ranges from 9,667 average megawatts in the high case to 5,981 average megawatts in the low case. As shown in Table 6-4, the average annual rate of growth, based on the 1989 weather-adjusted actual of 5,780 average megawatts, varies from 2.5 percent for the high case to 0.2 percent for the low case.

The residential energy demand model is best described as a hybrid of engineering and econometric approaches. It is based on the fundamental idea that residential energy is used by equipment such as furnaces, refrigerators and water heaters to provide amenities to the occupants of residences. Residential energy use, as simulated by the model, is a function of the following factors.

Residential Electricity Uses

Figure 6-6
1989 Residential
Use by
Application

Table 6-4
Residential Sector Electricity Demand (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	5,789	6,958	7,786	9,667	2.5
Medium-High	5,789	6,523	7,044	8,246	1.7
Medium	5,789	6,346	6,742	7,567	1.3
Medium-Low	5,789	6,129	6,427	7,172	1.0
Low	5,789	5,853	5,833	5,981	0.2

- Total number of residences and the number of new residences constructed.** The projections for future years are taken from the economic and demographic projections.
- Number of energy-using appliances in the average residence.** Each year's appliance penetrations, or purchases of appliances per household, are simulated based on econometric analysis of historic sales patterns. Penetrations are influenced by equipment and energy costs and by per capita incomes.
- Efficiencies of these appliances.** Efficiency choice by consumers is simulated based on engineering analysis of costs of appliances of varying efficiencies and on econometric analysis of observed efficiency choices in the past. Efficiency choices are influenced by energy prices, the cost of more efficient appliances, and the inclination of consumers to invest in conservation (represented by their implicit discount rates). Efficiency choices can also be constrained (e.g., thermal integrity choices will be no worse than some specified level), which provides the means of representing such

conservation programs as building codes and appliance efficiency standards.

4. **Fuels used by these appliances.** While some appliances such as air conditioners use electricity exclusively, others such as water heaters can use any of several fuels. Fuel choice is simulated based on the efficiency choices and econometric analysis of past fuel choice behavior. Fuel choices are influenced by relative fuel prices, equipment prices, and relative efficiencies of the appliances using the various fuels.
5. **Intensity of use of these appliances.** Intensity of use is varied by such means as thermostat settings and reduced use of hot water for washing clothes. Variation in intensity of use is based on econometric analysis of observed short-run response to fuel prices. Intensity of use is determined in the model by fuel costs, appliance efficiencies and per capita incomes.

Table 6-5 provides a summary of historical and projected values of some of the components that determine total demand for electricity in both public and investor-owned utility (IOU) areas.

The thermal integrity of single-family houses (shown in Table 6-5) improves significantly from 1979 levels. The greater thermal integrity of new houses raises the average thermal integrity in 2010; the higher growth scenarios have a higher proportion of new houses, so the average thermal integrity of the total stock is higher.

Thermal integrity improvements reflect residential weatherization programs throughout the 1980s, more stringent building codes that took effect in Washington and Oregon in 1986, and recent progress toward region-wide adoption of the Council's model conservation standards. These standards have now been adopted in Washington and Oregon, and a building code that obtains 50 to 60 percent of the savings of the model conservation standards has been adopted in Idaho.

In the Draft 1991 Power Plan, the forecast did not assume this recent progress toward the model conservation standards. Taking these developments into account for the final plan reduced projected energy use from what it would be otherwise; in the case of the medium high scenario, the reduction is more than 200 average megawatts in 2010. The Council's estimate of conservation supply still available was reduced accordingly.

The efficiency of refrigerators has improved significantly since the early 1970s and is expected to improve further. In 1972, the average new refrigerator (17 cubic feet, automatic defrost, top-mounted freezer compartment) was estimated to use about 1,600 kilowatt-hours per year. By the early 1980s a comparable new refrigerator was estimated to use about 1,100 kilowatt-hours. The 1990 federal efficiency standard for this average refrigerator is about 900 kilowatt-hours, and the 1993 federal efficiency standard is about 700 kilowatt-hours.

In a change from the Draft 1991 Power Plan, this forecast includes the effects of the 1993 federal standards

since these savings are now secured. This change reduces energy use projections from what they would be otherwise; in the medium high scenario the reduction is about 140 average megawatts in 2010. Conservation potential still available has been reduced by corresponding amounts.

As time passes and older, less efficient refrigerators wear out and are replaced, the models that meet the 1990 and 1993 federal standards will make up a bigger share of the population of refrigerators. The average efficiency of refrigerators will therefore improve so that, by the end of the forecast period, it will approach the 1993 efficiency standard. This is an example of the long-term adjustment processes that can be expected in response to changes in energy prices and policy decisions that have already occurred.

Projected improvements in refrigerator efficiencies are shown in Table 6-5. As in the case of thermal integrity, the higher growth scenarios have a higher share of newer, more efficient units, so these scenarios have more efficient stocks of refrigerators.

Fuel choice projections have mixed effects on energy use per household. As shown in Table 6-5, the shares of households with electric water heating are projected to decrease in all forecasts. Electric space heating shares are projected to be higher in higher growth forecasts and lower in lower growth forecasts. Space and water heating saturations are influenced by electricity prices, per capita incomes, and the share of recently constructed houses in the stock. In addition, they are influenced heavily by the relationship of electricity prices to those of competing fuels such as natural gas and oil. As will be described in the section on electricity prices, the higher growth scenarios have higher electricity prices, but *relatively* lower prices of electricity compared to competing fuels. This pattern helps explain the higher saturation of electrical space heating in the higher growth scenarios.

Housing type also influences energy use per household. For all the forecasts, a reduction is projected in the total share of homes that are single-family houses, while an increase in the shares of multifamily units and manufactured homes is projected. Table 6-6 shows the 1980 historical shares of the three building types, along with the projected 2010 shares for each of the forecasts. This trend tends to decrease average use per household, since multifamily units and manufactured homes are smaller and require less energy to heat and cool.

Electricity use per household is the net result of changes in efficiency, housing type, housing size, utilization levels, fuel choice and interaction between end uses (e.g., lower appliance use can increase space heating requirements). The changes in some of these individual components are substantial, but there is a tendency for them to offset one another in their effects on use per household. For example, efficiencies generally improve, tending to reduce use per household, while the sizes of multifamily units and manufactured homes are projected to increase, thereby increasing the per household energy

Table 6-5
Residential Sector Summary Indicators

		Estimated 1989	Forecast 2010				
			High	Medium-High	Medium	Medium-Low	Low
Households (millions)	Public	1,430	2,598	2,205	2,072	1,953	1,648
	IOU ^a	2,069	3,676	3,139	2,959	2,803	2,374
Electricity Prices (1990 cents/kWh)	Public	4.0	4.7	4.2	4.0	3.5	3.3
	IOU	5.2	5.9	5.4	5.6	4.7	4.5
Natural Gas Prices (1990 dollars/million Btu)	Both	5.53	10.24	8.65	7.40	6.30	5.02
Efficiency Measures							
▪ Thermal Integrity (All electrically heated single-family, efficiency relative to regional 1979 stock)	Public	1.26	1.73	1.63	1.57	1.54	1.43
	IOU	1.22	1.75	1.65	1.62	1.57	1.45
▪ Refrigerators (Stock in single-family houses, efficiency relative to regional 1979 stock)	Public	1.15	1.96	1.98	2.00	2.01	2.02
	IOU	1.14	1.95	1.97	1.99	2.01	2.02
Saturation							
▪ Electric Space Heat (% of homes with electric heat)	Public	58	65	62	60	56	56
	IOU	41	48	46	44	43	42
▪ Electric Hot Water (% of homes with electric hot water)	Public	87	81	83	83	83	82
	IOU	80	75	75	75	75	74
Kilowatt-Hours per Household (All homes)		14,493	13,497	13,517	13,176	13,210	13,027
Space Heat kWh per Household (Electrically heated homes)		8,495	7,552	7,909	7,734	7,895	7,875
Non-space-heat kWh per Household (All homes)		10,420	9,341	9,357	9,263	9,394	9,267
Space Heat Sales (MWa)		1,627	2,977	2,538	2,247	2,072	1,726
Total Sales (MWa)		5,789	9,667	8,246	7,567	7,172	5,981
^a Investor-owned utilities.							

Table 6-6
Share of Housing Stock by Building Type 1980-2010 (%)

	1980	2010				
		High	Medium-High	Medium	Medium-Low	Low
Single-Family Dwellings	77.8	77.1	72.4	70.5	69.1	67.4
Multifamily Dwellings	14.4	15.2	17.2	18.5	19.4	21.8
Manufactured Housing	7.8	7.7	10.4	11.0	11.5	10.8

Single-Family Forecast Indicators

Figure 6-7
Factors Contributing to Change in Electric Space Heating in Public Rate Pool—Medium-High Scenario

requirements for space conditioning. These patterns are illustrated in Figures 6-7 and 6-8. Figure 6-7 shows the impact of the various determinants of electric space heating in single-family houses in the public rate pool. Figure 6-8 shows the same impacts for manufactured homes in the investor-owned utility rate pool.

Figure 6-7 shows a decrease in per household use due to improvement in thermal integrity. This is partially balanced by increases in electricity's share of space heating, utilization levels, and the space heating load net of waste heat from appliances. The net change in electric space heating in single-family houses in the public rate pool between 1989 and 2010 in the medium-high scenario is a decrease of 12.8 percent per household.

Figure 6-8 shows an improvement in thermal integrity, that is more than offset by a combination of increases in electricity's share of space heating, utilization levels, house size, and space heating load net of waste heat from appliances. The net change in electric space heating for manufactured homes in the private rate pool is an increase of 13.6 percent per household.

When all the influences just described are combined over all house types, end uses and rate pools, the net effect is the observed pattern of relatively small changes in per household use between scenarios. This means that the variation in total residential demand across the range is due largely to variation in the projected number of households.

Manufactured Home Forecast Indicators

Figure 6-8
Factors Contributing to Change in Electric Space Heating in IOU Rate Pool—Medium-High Scenario

The projection of electrical equipment use is based on demand for electricity before taking into account the Council's proposed conservation programs. The effects of these programs cause sales of electricity to grow at slower rates. In addition, the use of electricity per household would decline because of the increased thermal efficiency of buildings and improved appliance efficiencies. The effects of these efficiency increases would be somewhat diminished, however, by the greater use of energy services due to cost savings from improved efficiency in space and water heating. These effects are reflected in the "sales" forecasts that are the basis of the electricity prices used for the "price effects" forecasts.

Commercial Demand

Although currently the smallest of the major consuming sectors, the commercial sector is the fastest growing, averaging 3.4 percent growth per year since 1980. This rate of growth is more than twice that of total demand by all sectors. The commercial sector has steadily increased its share of regional sales from 16 percent in 1970 to 22 percent in 1989.

Shares of historical commercial sector demand for electricity for various applications are shown in Figure 6-9. Space heating and lighting make up the largest shares of commercial electricity use. If space heating, ventilation and air conditioning are combined, as they commonly are, into an HVAC category, HVAC and lighting account for

more than 80 percent of electricity use in the commercial sector.

Commercial sector electricity use is forecast separately for 10 different building types. The consumption shares of these building types are shown in Figure 6-10. Offices account for more than one-fourth of electricity use by the sector. Retail buildings are the next largest category, followed by miscellaneous buildings and groceries. More than two-thirds of the sector's electricity use is attributed to these four building types.

Commercial sector electricity demand, like that of the residential sector, is influenced by many factors, such as fuel prices and available technology. In particular, one fundamentally important factor used as a basis for energy use projections is the total floor space of the buildings in the commercial sector. The commercial sector demand model projects the amount of commercial floor space and then predicts fuel choice, efficiency choice, and the use of the energy-consuming equipment necessary to service this floor space. These choices are based on investment factors, fuel prices and available technology. Energy-use projections are made separately for different building types, applications and fuel types.

Commercial Electricity Uses

Figure 6-9
1989 Commercial
Sector Use by
Application

Commercial Use by Building Type

Figure 6-10
1989 Commercial
Sector Use by
Building Type

Since the 1986 Power Plan, development of the Council's commercial sector energy demand model has concentrated on incorporating recent data on floor space and energy use. Even before 1986, forecasters of commercial sector energy use in many parts of the United States were discovering that they tended to underforecast energy use in the early 1980s. A number of explanations were proposed, including unexpected growth in use of computers and other office machinery, a cyclical boom in construction of office building which exceeded the current requirements for floor space, and unexpected resistance to adoption of more efficient space conditioning and lighting equipment. Since 1986, data has become available which, while it does not eliminate all concern about the problem, does shed some light on its causes.

First, an estimate of the stock of commercial floor space was developed by Baker, Reiter and Associates under contract to the Bonneville Power Administration. This estimate was the result of a widespread sample of commercial buildings in the region and must be regarded as a significant improvement over the estimate previously used in the forecasting model. The estimated floor space of many building types changed substantially.

The estimation effort also resulted in estimates of 1980-1986 construction in the region. The estimated construction is consistent with a boom in office construction that saw estimated office space grow faster than employment of office workers. The differential growth of office space and office workers is also consistent with higher-than-normal vacancy rates (around 20 percent) in the metropolitan centers of the region. The assumption for the Council's forecast is that vacancy rates will gradually decline to around 10 percent, and then office floor space will grow in proportion to employment.

While office floor space appears to have grown faster than office employment, other building types seem to have grown more slowly than relevant employment. Health care buildings are one example. In these cases, the forecast assumes that the 1986 relationship of employment to floor space represents the long-term relationship, and that floor space will grow in proportion to employment growth after 1986.

The re-estimated floor space in the commercial sector made it necessary to re-estimate electricity use per square foot in the model's base year (1979). New energy use data from the End-use Load and Conservation Assessment Program, the Commercial Audit Program and the Seattle City Light Commercial Data Base also contributed to the estimates.

The new energy use data also allowed the examination of the relationship of energy use in buildings built in the early 1980s to that of buildings built earlier. The data indicate that total electricity use in new offices and retail stores is not much different than use in older ones. Further, this relationship seems to hold even when use for heating, ventilation and air conditioning (HVAC) in new buildings is compared to HVAC use in older ones, and

when lighting use is compared between new and older buildings.

These results could be interpreted to imply that the energy-efficiency of HVAC and lighting equipment has not improved since 1979. However, there is considerable anecdotal evidence that efficiencies have improved. This evidence suggests that new buildings and equipment are more energy-efficient, but are being used to provide a higher level of service or amenity to the occupants of the buildings. This higher amenity can take a number of forms (more hours of operation, greater control of temperature or humidity, more attractive display lighting, etc.), but the final effect is that energy use per square foot apparently has not declined with improved energy efficiency of buildings or equipment.

Information about changing amenity levels in commercial buildings is mainly anecdotal—new schools tend to be air conditioned, new groceries tend to have delicatessens, and the like. Amenity levels may not increase in all new buildings, but they may increase in some existing buildings as well. The assumption in the commercial forecast is that for five building types (offices, retail, schools, colleges and miscellaneous), buildings built after 1980 provide increased amenities. These increased amenities, together with improved efficiencies, make HVAC and lighting electricity use about the same as the 1979 stock of these buildings types. It is also assumed that the pre-1980 stock of these same building types will provide gradually increasing levels of amenities until they reach the level provided by new buildings.

These assumptions had the effect of raising the forecast and brought the projected electricity use from 1979 to 1989 into much closer agreement with actual commercial sales during that period. This historical agreement is not conclusive proof that the assumptions are accurate, or that the assumptions lead to accurate long run forecasts. Historical agreement could have been obtained with a different combination of assumptions, leading to different long run forecasts. Given that these assumptions are based on the available data, the performance of the model in matching historical experience is some confirmation that the assumptions are reasonable.

Finally, the high scenario assumptions include modifications that bring fuel choices in the investor-owned utilities closer to fuel choice in the public utilities. The intent is to include in the high scenario the possibility that fuel choice is strongly influenced by factors not included in the forecasting model's simulation, and that the net effect of these factors is that electricity is preferred as a heating fuel even when electricity's apparent life-cycle costs are not particularly attractive.

The resulting projections of commercial demand for electricity vary widely. In the low growth forecast, commercial demand for electricity decreases from 3,761 megawatts in 1989 to 4,236 megawatts by 2010. In the high growth forecast, it reaches 7,549 megawatts. As shown in

Table 6-7, the average rate of growth of demand ranges from 0.6 to 3.4 percent per year.

Table 6-8 shows some of the components underlying these totals. Floor space increases in all forecasts, as a result of increased employment in the commercial sector, and is the major driver of growth in demand for electricity. Use of electricity per square foot of floor space of all buildings increases in the higher-growth forecasts and decreases in lower-growth forecasts. The change in use per square foot from 1989 to 2010 is modest for all forecasts, ranging from an increase of 7 percent in the high-growth forecast to a decrease of 10 percent in the low-growth forecast.

Use of electricity per square foot of office floor space, however, is projected to move in different directions depending on utility type. It decreases in the investor-owned utilities for two scenarios, and increases slightly in the other scenario. In the public utilities, it increases for all scenarios. These changes are modest in either direction. The largest projected increase is about 9 percent, and the largest projected decrease is about 6 percent.

Saturation of electric space heating is projected to increase most in the higher growth scenarios and to decrease in the lower scenarios. This pattern holds for offices as well as for commercial buildings generally.

The pattern of projected electric space heat saturations is due partly to the pattern of projected electricity prices. Table 6-8 shows that investor-owned utilities' rate pool prices increase in all growth scenarios, but public rate pool prices decrease or stay constant in the lower-growth scenarios. In addition, projected 2010 prices for investor-owned utilities are at least 65 percent higher than those for the public utilities.

Projected prices of competing fuels also influence space heat saturations. Figure 6-14, in the section on prices, demonstrates that while projected residential electricity prices are lowest in the low scenario, natural gas prices are projected to decline even more, so that electricity prices *relative* to natural gas prices are highest in the low scenario. Fuel prices projected for the commercial sector follow a similar pattern and lead to higher electric

space heat saturations in the higher growth scenarios and lower electric space heat saturations in the lower-growth scenarios.

The mixed pattern of projected energy use is due in part to projected electricity prices and in part to conflicting trends in efficiency and amenity levels. As described earlier, new buildings are assumed to provide a higher level of service or amenity to their occupants, which tends to use more electricity. At the same time, new buildings and equipment are projected to be more energy-efficient in providing any specified level of amenity. The net result of these conflicting trends is the observed pattern of small increases and decreases in overall electricity use per square foot.

These projections do not take into account the conservation programs included in the power plan, but are based on existing building codes and market response to increased energy prices. The programs in the plan have been identified as cost-effective resources to meet this demand forecast. The conservation programs will reduce overall demand for electricity, reduce demand per square foot, and improve equipment efficiency.

In general, recent research and trends in commercial electricity use have left a number of unanswered questions. The assumptions made for this forecast seem to be reasonable, but further adjustments will undoubtedly be made as there is more information. Given its increasing share of regional electricity use, the commercial sector will be the subject of continuing research and analysis.

Industrial Demand

The industrial sector is the largest of the four consuming sectors. In 1989, the industrial sector consumed 6,935 average megawatts of firm power, accounting for 40 percent of total firm demand in the region. In addition to the firm power, the industrial sector consumes varying amounts of interruptible power depending on economic and hydroelectric conditions. In 1989, industry consumed 490 average megawatts of interruptible, or nonfirm electricity.

Table 6-7
Commercial Sector Electricity Demand (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	3,761	4,948	5,721	7,549	3.4
Medium-High	3,761	4,494	4,993	6,295	2.5
Medium	3,761	4,346	4,676	5,610	1.9
Medium-Low	3,761	4,081	4,210	4,969	1.3
Low	3,761	3,912	3,906	4,236	0.6

*Table 6-8
Commercial Sector Summary Indicators*

		Estimated 1989	Forecast 2010				
			High	Medium- High	Medium	Medium- Low	Low
Floor Space (million sq. ft.)	Public	705.3	1,239.6	1,030.8	942.4	892.0	825.7
	IOU ^a	1,331.5	2,586.9	2,190.7	1,991.6	1,876.9	1,733.7
Electricity Prices (1990 cents/kWh)	Public	3.4	4.2	3.7	3.4	3.0	2.7
	IOU	5.3	7.1	6.1	5.9	5.4	5.5
Natural Gas Prices (1990 dollars/ million Btu)	Both	4.80	9.52	7.89	6.64	5.50	4.20
Sales—Kilowatt-hour per Square Foot Floor Space							
▪ Offices							
• Space Heat (offices heated by electricity)	Public	6.4	6.0	6.3	6.5	6.7	6.6
	IOU	6.3	5.4	6.1	6.1	4.8	4.4
• Lighting	Public	8.3	7.8	8.0	8.2	8.3	8.5
	IOU	8.3	8.0	8.0	8.1	8.2	8.2
• Total	Public	25.1	25.4	26.5	27.0	27.3	26.7
	IOU	24.0	24.1	24.9	24.9	23.1	22.5
▪ All Commercial Buildings							
• Space Heat (buildings heated by electricity)		8.9	6.9	8.0	8.5	9.0	10.0
• Lighting		5.3	5.2	5.3	5.3	5.4	5.4
• Total		16.2	17.3	17.1	16.7	15.7	14.5
Saturation of Electric Space Heat (%)							
▪ Offices	Public	73	96	93	88	78	62
	IOU	67	95	85	74	53	42
▪ All Commercial Buildings	Public	60	89	83	76	66	50
	IOU	44	80	58	47	29	13
Total Sales (MWa)							
▪ Space Heat		1,029	2,487	1,950	1,608	1,166	732
▪ Lighting		1,242	2,286	1,934	1,771	1,696	1,572
▪ Total		3,761	7,549	6,295	5,610	4,969	4,236
^a Investor-owned utilities.							

Unlike the residential and commercial sectors where the general uses of electricity are similar in different houses or buildings, the industrial uses of electricity are extremely diverse. It is very difficult to generalize about the end uses of energy or the amounts of energy used in a

“typical” industrial plant. For example, the primary metals industry uses about 80 times as much electricity per dollar of output as the apparel industry.

The industrial use of electricity in the Northwest is highly concentrated in a few subsectors. Five industries—

food, chemicals, paper, lumber and metals—account for nearly 90 percent of industrial use of electricity. Figure 6-11 illustrates the composition of total industrial demand for electricity based on the forecast for 1989. Metals production alone accounted for nearly half of total industrial electricity use.

Over 90 percent of electricity use in metals is by Bonneville's direct service industry customers, primarily the region's aluminum smelters. These aluminum smelters also dominate all direct service industry sales, accounting for about 90 percent of that total. Bonneville's direct service industrial customers accounted for 40 percent of total industrial demand for electricity in 1989, or about 17 percent of total regional sales to all sectors. One-fourth of the direct service industry demand is considered nonfirm demand, or interruptible demand. If Bonneville were to have a shortage of energy, for example, due to poor water conditions, it could withhold service for one-fourth of the direct service industry demand. Only the firm portion of direct service industry demands are included in the the Council's forecasts of energy requirements. However, the interruptible portion of direct service industry demand is considered in system operation and electricity pricing analyses.

Forecasts of industrial demand for electricity are based on production forecasts for the various industrial sectors, the amount of energy used per unit of output, and the effects of electricity and other fuel prices on their use

of energy. Table 6-9 shows industrial sector firm demand forecasts for selected years for all five forecasts. In the high forecast, consumption of electricity by the industrial sector grows to 10,611 average megawatts by 2010—an average annual growth rate of 2.1 percent per year. In the low forecast, industrial demand decreases at a rate of 1.7 percent per year due to significant reductions in direct service industry sales offsetting modest growth in other industries. The more likely range of industrial demand growth is from -0.2 to 1.3 percent per year with the medium case growth at 0.7 percent per year.

Methods of forecasting the industrial demand for electricity vary substantially among different industrial subsectors. In general, the forecasting methods are most detailed for the activities that consume the greatest amounts of electricity. It is necessary to forecast industrial activity and demand for electricity individually for up to 40 industry components in order to obtain reliable forecasts of total industry demands.

The composition of the industrial forecasting system is shown in Table 6-10. The components are defined using the Standard Industrial Classification (SIC) code. Table 6-10 shows the share of total industrial consumption of electricity estimated to have been consumed by each subsector in 1981. The concentration of demand for electricity that is illustrated in Figure 6-11 is also apparent in Table 6-10.

Industrial Electricity Use

Figure 6-11
Composition of
Industry Demand

Table 6-9
Industrial Sector Firm Sales (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	6,935	8,020	8,852	10,611	2.1
Medium-High	6,935	7,474	8,047	9,143	1.3
Medium	6,935	6,997	7,370	8,082	0.7
Medium-Low	6,935	5,944	6,161	6,601	-0.2
Low	6,935	5,112	5,072	4,885	-1.7

There are four different forecasting methods used for the industrial sector. The methods are referred to as, 1) key industry model, 2) econometric model, 3) simple relationships, and 4) eclectic. The method applied to each industry component is abbreviated in Table 6-10. Most of the forecasting methods are driven primarily by forecasts of industrial production. In addition, each of those methods modifies the relationship between production and electricity use to reflect the effects of changing energy prices and other factors.

The three largest non-direct service industries are forecast using the key industry models. The key industry models are highly detailed approaches to forecasting demand for electricity. The three key industries are lumber and wood products, pulp and paper, and chemicals. First, the industry is divided into the most energy-intensive activities. For those activities, the uses of electricity are divided into several types, such as motors for specific processes, electrolysis or lighting. The fraction of electricity use attributable to each of these end uses is estimated for an average plant. In the case of the chemical production of phosphorus and chlorine, the model is specified separately for each of the relatively few plants in the region.

The forecast requires a specification of how the types of end uses may change their shares over time. In addition, the degree to which electricity for each type of end use could be conserved in response to price changes must be specified. The degree of price response was varied across forecast scenarios, being largest in the low forecast and smallest in the high forecast. Given these specifications, the demand for electricity per unit of production will change from its base year value as production and electricity prices change.

The key industry models require a great deal of data and judgment. This information goes beyond readily available sources of data. For this reason, specification of the key industry models relied heavily on the judgment and advice of industry representatives and trade organizations.

The industrial forecasting system includes a variety of econometric forecasting equations for the remaining non-key and non-direct service industry demands for electric-

ity. Econometric models consist of equations estimated from historical data. The equations attempt to measure the effect of industry production and energy prices on the demands for different types of energy, including electricity.

Alternative econometric estimates are available in the demand forecasting system for most industry components. In Table 6-10, the alternative equation used is specified in parentheses next to the forecasting method. Equations obtained from the Oregon Department of Energy are noted as ODOE. Equations obtained from Bonneville are labeled AEA for the consulting firm that estimated the equations, Applied Economic Associates.¹

Because historical data is generally of poor quality at the industrial subsector level, it is often difficult to obtain plausible relationships for econometric equations. Where econometric results appeared implausible, simple relationships between output and electricity use were used as a basis for the forecasts. The sectors whose forecasting methods are listed as "simple" are those for which econometric results were unsatisfactory.

In these simple forecasts, demand for electricity is assumed to grow at the same rate as production, but is modified by an assumed trend in electricity use per unit of production. There is substantial agreement, in econometric models and other research on industrial energy demand, that in the absence of other influences, energy demand will grow with production. There is much less agreement about the degree to which price changes influence demand. To reflect this uncertainty, assumptions about changes in demand per unit of production were varied across forecast scenarios. Electricity use per unit of production was assumed constant in the high forecast for industry components that were forecast using the simple method. In the medium-high forecast, the electric intensity was assumed to decrease by 0.5 percent per year; in the medium-low forecast, by 1.5 percent per year; and in the

1. Applied Economic Associates, Inc. *Update and Re-estimation of the Northwest Energy Policy Project Energy Demand Forecasting Model*. Report to Bonneville Power Administration, December 1981.

Table 6-10
Industrial Forecasting Methods

SIC Code	Title	1981 Percent of Manufacturing Electricity	Forecasting Method
Manufacturing			
20	Food and Kindred Products	4.1	Simple
22	Textiles	.1	Econometric Model (AEA)
23	Apparel	.1	Simple
24	Lumber and Wood Products	6.8	Summed
2421	▪ Sawmills and Planing Mills	2.8	Key Industry Model
2436	▪ Softwood Veneer and Plywood	1.5	Key Industry Model
24XX	▪ Rest of SIC 24	2.5	Simple
25	Furniture	.1	Simple
26	Pulp and Paper	21.0	Summed
2611	▪ Pulp Mills	1.6	Key Industry Model
2621	▪ Paper Mills	12.1	Key Industry Model
2621	▪ Paper Mills—Direct Service Industries	.2	Eclectic
	▪ Crown Zellerbach		
2631	▪ Paperboard Mills	4.4	Key Industry Model
26XX	▪ Rest of SIC 26	2.7	Simple
27	Printing and Publishing	.5	Econometric Model (ODOE)
28	Chemicals	11.0	Summed
2812	▪ Chlorine and Alkalies	1.9	Key Industry Model
2812	▪ Chlorine and Alkalies—Direct Service Industries	1.1	Eclectic
	▪ Georgia Pacific		
	▪ Pennwalt		
2819	▪ Elemental Phosphorus	5.0	Key Industry Model
2819	▪ Elemental Phosphorus—Direct Service Industries	.8	Eclectic
	▪ Pacific Carbide		
	▪ DOE Richland		(Included in Federal Agencies)
28XX	Rest of SIC 28	2.2	Econometric Model (ODOE)
29	Petroleum Refining	1.4	Simple
30	Rubber and Plastics	.5	Econometric Model (AEA)
31	Leather and Leather Goods	0.0	Included in Residual
32	Stone, Clay, Glass and Concrete	1.2	Summed
3291	▪ Abrasive Products—Direct Service Industries	.3	Eclectic
	▪ Carborundum		

*Table 6-10 (cont.)
Industrial Forecasting Methods*

SIC Code	Title	1981 Percent of Manufacturing Electricity	Forecasting Method
Manufacturing (cont.)			
32XX	▪ Rest of SIC 32	.9	Econometric Model (ODOE)
33	Primary Metals	49.0	Summed
3334	▪ Aluminum—Direct Service Industries	43.2	Eclectic
3313	▪ Electrometallurgical—Direct Service Industries	1.3	Eclectic
	▪ Hanna		
	▪ Gilmore		
3339	▪ Non-ferrous n.e.c.—Direct Service Industries	.1	Eclectic
	▪ OREMET		
33XX	▪ Rest of SIC 33	4.4	Econometric Model (ODOE)
34	Fabricated Metals	.8	Simple
35	Machinery Except Electrical	.8	Simple
36	Electrical Machinery	.4	Econometric Model (ODOE)
37	Transportation Equipment	1.9	Simple
38	Professional Instruments	.4	Simple
39	Miscellaneous Manufacturing	.1	Simple
XX	Residual Categories	.4	Simple
Mining			Grows with Employment

low forecast, by 2.0 percent per year. The medium case assumes a reduction of electricity use per unit output of 1.0 percent per year. These assumptions are similar to the range of results from econometric equations that were more acceptable theoretically and behaviorally.

Forecasting methods for the direct service industrial customers of Bonneville are described as eclectic, because they are the results of several types of forecast methods and studies. For example, aluminum industry electricity use was forecast using industry forecasting models, results of various aluminum studies, and external consultants, supplemented by judgment and specific knowledge gained through years of dealing with the industry. The forecasts are done primarily on the basis of the relationship between aluminum prices and production costs. The aluminum price projections are based on forecasts from independent consultants who follow the aluminum industry. Production costs for each smelter are Bonneville estimates. Different model approaches are used in the aluminum load forecasting process for the long term and the short term. In the long-term model, if a plant cannot recover its total production costs over several years, given

the long-term aluminum price forecast, then it is assumed to permanently shut down. In the near-term model, if a plant cannot recover its variable costs given the prevailing aluminum prices, then it will temporarily close some production capacity, only to re-open it when the aluminum prices recover enough to exceed the variable production costs. The results are then evaluated with staff judgment to produce the aluminum electricity demand forecast.

Electricity use by non-aluminum direct service industries was forecast by an analysis of each plant and its future markets. Use is determined by general macroeconomic conditions reflected in industry-specific production indices, and the region's relative price of electricity. Variables reflecting national trends were taken from Data Resources Inc. In the case of a few plants, the analysis was supplemented with an assessment of prices and production costs. Projected use is adjusted for these plants based on rough estimates of profits and losses.

The forecast growth rates of industrial demand for electricity are considerably smaller than the projected rates of growth in total industrial production. Production by Northwest manufacturing industries is expected to grow

by 4.7 percent per year in the high forecast; 3.7 and 2.1 percent per year in the medium-high and medium-low forecasts, respectively; and by 1.2 percent per year in the low forecast. The medium forecast is 3.0 percent per year.

The relative growth rates of electricity demand and output imply an overall reduction in the electricity intensity of the Northwest industrial sector. The ratios of electricity use to production decline over the forecast period in all five forecasts. The rate of decline in the most probable range is about 2.3 percent per year. Although these rates of decrease are significant, they are lower than recent regional history. Between 1977 and 1986, regional industrial electricity intensity is estimated to have declined by about 3.8 percent per year. Such decreases in energy intensity are not unprecedented. At the national level, for example, total energy use per unit of production in the industrial sector has been estimated to have decreased by 4.5 percent per year between 1970 and 1986.

There are several factors operating to reduce industrial rates of electricity growth relative to production growth. The most important is a change in the mix of industry. Many of the large users of electricity are not expected to grow as fast as industry does on average. This is most notable in the case of the direct service industries, a very large portion of the industrial demand that is contractually limited to current levels and could decline due to economic forces.

During the 1980s, direct service industrial demands for electricity exhibited enormous volatility, primarily reflecting swings in aluminum industry market conditions. This volatility is expected to continue, with the uncertainty for the regional industry compounded by the potential outcomes of major issues. Such issues include the impact of resource strategies taken by the region on availability of power to aluminum smelters, terms and conditions of future direct service industry power sales contracts, the nature and extent of direct service industry contract assignments, and the level of industrial power rates. In general, future direct service industry demand for electricity will be a function of the perceptions of industrial producers about the attractiveness of the region as a place to invest and operate, as well as their ability to maintain competitiveness in product markets.

During the past two years, the competitive position of the region's aluminum smelters has improved. The excess aluminum smelting capacity worldwide in the early 1980s has been reduced through permanent plant closures and delays in announced new capacity in developing countries. Northwest aluminum companies have invested in improved efficiency and benefitted from Bonneville's variable electricity rate structure. In addition, reduced transportation costs to the Pacific rim, combined with a decreased value of the dollar against other world currencies, have made the Northwest smelters more competitive in those markets. Nevertheless, even though regional smelters have reduced their costs considerably, and have benefitted from recent market strength, continued opera-

tion of the aluminum smelters will depend, to a great extent, on the outcome of the issues discussed above.

The uncertainty of future direct service industry power sales is reflected in the five forecast scenarios for purposes of defining the full range of electrical resource needs. Figure 6-12 shows the percent of aluminum plant capacity that is assumed to be operating in the region by the end of the forecast period for each of the five forecasts. Capacity is defined as the amount of electricity, in terms of average megawatts, that regional aluminum smelters are expected to consume after efficiency improvements made under Bonneville's Conservation/Modernization program. In the high scenario, it is assumed that the aluminum direct service industries will operate at 100 percent of capacity. Operating rates for the medium-high, medium, and medium-low scenarios are assumed to be 97 percent, 90 percent, and 67 percent, respectively. In the low scenario, the aluminum industry is forecast to operate at about 50 percent of capacity until the year 2001. At that time it is assumed that new contract terms and poor economic conditions could result in a decrease in operating rates to 25 percent of capacity.

The forecast of industrial electricity use is further dampened by the fact that some of the large non-direct service industrial users, such as lumber and wood products, food processing and pulp and paper, are not projected to grow as fast as less energy-intensive industries. As shown in Table 6-11, output growth for the key non-direct service industries combined is expected to be 1.4 percent per year in the medium forecast, compared to 3.0 percent per year for all industrial production. Thus, the two components of the industrial sector that accounted for nearly 90 percent of the sector's electricity demand historically will show relatively weak growth over the next 20 years.

The third major reason for lower electricity growth relative to production is the effect of the large change in the relative price of electricity in the region over the last several years. The effects of price on industrial demand cannot be separated into components as they can for the residential and commercial sectors. But conceptually they include efficiency improvements, fuel switching and product mix changes within individual industrial sectors. The forecasting models embody these changes as general price response.

Irrigation Demand

In 1989, 640 average megawatts of electricity were used for irrigation, less than 4 percent of total regional firm electricity sales. For several decades, Pacific Northwest irrigation sales climbed rapidly and steadily. However, after 1977 they became more erratic, leveled off, and then began to decrease slowly. The average annual rate of growth of on-farm and Bureau of Reclamation irrigation electricity use from 1970 to 1977 was a robust 10 percent. From 1977 to 1989 there was no net growth, reflecting

Aluminum Industry Assumptions

Figure 6-12
Projected Aluminum Operating Rates

Table 6-11
Composition of Industry Growth, 1989-2010: Medium Forecast

	Historical Share of Consumption (%)	Production Growth Rate (% per year)	Demand Growth Rate (% per year)
Direct Service Industries	44	N/A	-0.8
Key Non-Direct Service Industries	43	1.4	0.9
Minor Industries	14	3.9	3.3
Total	100	3.0	0.7

increased electricity and water conservation and a slowing down in the development of new irrigated land.

There are currently about 8.2 million acres of irrigated land in the region. Nearly half of the region's irrigated acres are in Idaho. Oregon and Washington each have a little over one-fifth of the total irrigated acres. Most electricity use in irrigation is associated with sprinkler irrigation. Currently, about 55 percent of the irrigated land in the region is irrigated with sprinkler systems. The distribution of irrigation by state is different for electricity used than for irrigated acres. Washington and Idaho accounted for over 80 percent of irrigation electricity use in 1987 but only 67 percent of sprinkled acres. This difference is due to the high electricity intensity of Washington's irrigated agriculture.

Table 6-12 shows the forecasts of use of electricity for irrigation. The forecast range is quite flat. The high and medium-high forecasts show moderate growth in electricity used for irrigation from its 1989 level. The other cases each show declining amounts of electricity being used for irrigation compared to 1989. All of the growth rates are made lower by the fact that 1989 irrigation electricity sales were high due to dry weather. The irrigation forecast excludes about 100 megawatts of Bureau of Reclamation pumping loads at Grand Coulee and Roza dams. The forecasts shown in Table 6-12 include U.S. Bureau of Reclamation irrigation sales.

The forecasts reflect the expectation that major additions to Northwest irrigated agriculture are unlikely and that additions that do occur are likely to be offset by in-

creased efficiency in the use of electricity and water. Two factors will limit irrigation growth: the depletion of aquifers in some areas, and the lack of additional good land to bring under irrigation.

Increases in the high forecast cases are partly a result of assumed conversions from flood to sprinkled irrigation in areas of Idaho. While sprinkled irrigation requires more electricity, it also uses water more efficiently. The listing of some stocks of salmon as endangered species could further encourage such water conserving practices, which already appear to be attractive for economic and other reasons.

The forecast of irrigation electricity use is based on a range of assumed rates of growth in irrigation sales for five-year increments. The resulting demands are then adjusted for the effects of price changes based on specified price elasticities. The long-term price elasticity was assumed to be -0.4 . This price elasticity was jointly specified by the Council and Bonneville. The prices are from the Council's electricity pricing model for all but the medium forecast. The medium prices are from Bonneville's Supply Pricing Model.

Retail Electricity Prices

The forecasts of electricity prices in the Pacific Northwest show relatively stable prices over the next several years. However, the exact price outlook varies substantially in the different forecasts.

Electricity prices are an important determinant of electricity demand. It is also true that electricity demand growth has an important effect on future electricity prices. These mutual dependencies are accounted for in the demand and price forecasts.

Figure 6-13 shows real average retail rates in 1990 dollars for the five forecasts. As can be seen from Figure 6-13, the price outlook varies substantially in the different forecasts, showing substantial increases in the high forecast and declining in real terms in the low forecast. This pattern results because nearly all new resources are more costly than the existing resource base, and the more new

resources that need to be added, the greater the cost increase. In the middle range of the forecasts, electricity prices are expected to be generally stable, or increase only moderately, relative to the prices of other goods and services.

It is apparent that the medium forecast prices have a different pattern over time than the other four cases. This is due to the fact that a different pricing model was used for the medium forecast. Bonneville's Supply Pricing Model (SPM) was used for the medium forecast, in order to facilitate use of the medium forecast in other Bonneville processes. In the near term, medium prices dip below the other cases. This is probably due to the fact that Bonneville's SPM is designed to deal with the near term in more detail, and has incorporated updated utility costs using more recent 1990 investor-owned utility and Bonneville cost information. The medium forecast of prices remains below the other forecasts until about 2004, but by 2010 is between the medium-high and high forecasts. The Council and Bonneville staff will continue to explore the differences. However, the difference in prices is not large and has an insignificant effect on forecast demand in the medium case. In addition, since the medium forecast plays no special role in the Council's planning, the differences will not have any significant effect on the plan's resource analysis.

Table 6-13 shows 1989 estimated average electricity prices, forecasts for 2010, and average annual rates of change for three different kinds of rates. The rates include average retail rates paid by all consumers combined, average retail rates paid by customers of public utilities, and average retail rates paid by customers of investor-owned utilities.

Average retail prices in the region are predicted to increase faster than inflation between 1989 and 2010 in the high and medium-high forecasts. In the low and medium-low forecasts, real prices decline. Investor-owned utility prices are projected to increase faster, or decrease less, than the prices for publicly owned utilities. This is because investor-owned utilities need to add new resources sooner than public utilities.

Table 6-12
Irrigation Sector (Average Megawatts)

	Actual 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	640	702	741	791	1.0
Medium-High	640	646	647	680	0.3
Medium	640	626	594	599	-0.3
Medium-Low	640	577	563	525	-0.9
Low	640	532	504	467	-1.5

Electricity Prices

Figure 6-13
Average Retail
Electric Rates

Table 6-13
Electricity Price Forecasts (1990 Cents per Kilowatt-Hour)

	Average Retail All Consumers	Average Retail Public Utilities	Average Retail Investor-Owned Utilities
Estimated 1989 (1990 cents per kWh)	4.1	3.4	4.6
Forecast 2010 (1990 cents per kWh)			
▪ High	5.0	4.1	6.0
▪ Medium-High	4.3	3.6	5.3
▪ Medium	4.1	3.3	5.1
▪ Medium-Low	3.7	2.9	4.6
▪ Low	3.6	2.7	4.6
Growth Rates (1989-2010) (% per year)			
▪ High	1.0	0.9	1.3
▪ Medium-High	0.2	0.3	0.7
▪ Medium	0.0	-0.1	0.5
▪ Medium-Low	-0.5	-0.8	0.0
▪ Low	-0.6	-1.1	0.0

All but the medium case demand forecasts use retail electricity price forecasts produced by an electricity pricing model that is part of the Council's demand forecasting system. The model develops forecasts of retail prices by sector for investor-owned and public utilities. The prices are forecast through a detailed consideration of power system costs, secondary power sales, forecast assumptions, and the provisions of the Pacific Northwest Electric Power Planning and Conservation Act (the Act). Bonneville, as discussed above, has a similar electricity pricing model which was used for the medium case demand forecasts.

The Council's electricity pricing model contains capacity and cost information on both generating and conservation resources. Cost and capacity of the federal base hydroelectric resources are included as a total. However, most other resources are treated on an individual basis. Capability of each resource is specified for critical water conditions and for peak capacity. Capital cost and operating costs are specified for each generation resource. For conservation resources, only those costs that are to be paid through electric rates are included. The effects of conservation programs are generally predicted directly in the various demand models, although in some cases the savings are included as a resource within the pricing model and subtracted from demand there.

The costs of generation and conservation are added up and allocated to the various owners (Bonneville and investor-owned and public utilities). The costs of resources used to provide power to customers of Bonneville, public utilities and investor-owned utilities are combined to reflect contractual agreements among utilities and the exchange and other provisions of the Act. The model develops forecasts of wholesale power costs for three Bonneville rate pools—priority firm, direct service industries and new resources. Similarly, costs are developed for investor-owned and public utilities. Retail markups are added to these costs to obtain estimates of retail rates for each consuming sector of each type of utility.

As demand grows, resources are added to meet demand, and the new resource costs are melded with existing resource costs. The pricing model balances resources and demand based on critical water capacities. However, the effects of different water conditions on secondary energy and electric rates are simulated by the pricing model. The operation of the hydroelectric system on a monthly basis over 40 historical water years is the basis of this simulation. When there is surplus hydroelectric power in any month for a specific water year, the model allocates that secondary power to various uses according to a set of priorities specified in the model assumptions. These uses in the assumed order of priority are, 1) serve the top quartile of direct service industry demand, 2) shut down combustion turbines, 3) sell outside the region, and 4) shut down other thermal generation.

For purposes of the pricing model, firm surpluses are added to secondary power and allocated using the same priorities. If the region is in a deficit situation, instead of surplus, the model will import power at a pre-specified

price until additional resources are added to meet demand.

The revenues from sales of secondary power and firm surplus power, or the costs of importing to cover deficits, are averaged over months and water years to obtain estimates of expected prices of power given uncertain water conditions.

These price forecast results depend on several important assumptions. It was assumed that the resource portfolio in the draft power plan would be followed as resources are added to meet growing demand. Therefore, the resource portfolio assumed for these forecasts is similar, but not identical, to the one presented in this plan. The differences are not expected to affect the demand forecast significantly.

Another important assumption is that no dramatically revised repayment requirement will be imposed for the federal debt on the region's hydroelectric system. Some of the more extreme versions of the revised repayment costs would have a significant effect on electricity prices.

It is assumed that investor-owned utilities do not place significant amounts of load on Bonneville, resources are not built before regional need, and that a constant real price is received for secondary and firm surplus power sales except during times of excess water conditions (spill).

Electricity price forecasts were described above, and fuel price forecasts were described in Chapter 5. However, for most of the demand sectors, the relative price of electricity compared to oil or natural gas is important. It is the relative price that most affects consumers' choice of fuel type. Figure 6-14 shows forecast prices of electricity relative to natural gas for residential customers. Natural gas prices have been divided by 0.8 to adjust for differences in the end-use efficiency of gas and electricity. Thus, the relative prices shown in Figure 6-14 are more appropriate comparisons of the cost of heating than of the cost of buying fuel. Although electricity rates are highest in the high forecast, it is in the high forecast that relative electricity rates are lowest. This stimulates the demand for electricity in the high forecast. The relative fuel price pattern results because the range of uncertainty in future fuel prices is much wider than the range of uncertainty in the electricity prices.

When the ratio in Figure 6-14 is above 1.0, it means electricity is relatively more expensive than natural gas. During most of the 1970s, electricity in the Pacific Northwest was inexpensive relative to natural gas, its main competitor. However, recent large increases in electricity rates, combined with decreases in natural gas prices, have increased the competitiveness of natural gas. This result is only a general tendency, because the relative prices of electricity vary significantly for different utility areas. Further, the attractiveness of electricity or natural gas also can depend on consumer tastes and the relative cost of equipment used to convert energy to a useful service, such as heat. The general conclusion to be drawn from Figure 6-14 is that natural gas and electricity prices could remain competitive within a fairly broad range. However, natural

Natural Gas Price Comparison

Figure 6-14
Relative Residential Energy Prices
(Ratio of Electricity to Natural Gas)

gas prices have clearly become more attractive relative to electricity in the early 1980s, and could continue to gain advantage through 1990, particularly in the low and medium-low scenarios.

Demand Forecasts in Resource Planning

The demand forecasts are not simply a preliminary step to resource planning. Instead, the forecasts interact with resource planning in a number of ways, and, as a result, are an integral part of resource planning. Some important dimensions of the use of forecasts in resource planning are described in this section. First, the conceptual roles of forecasts in the planning process are described. Then, some of the practical applications of forecasts to resource planning are also described.

Demand Forecast Roles

The integral planning role of demand forecasts has three major components. First, forecasts of demand define the extent and nature of demand uncertainty that planners must face. Second, the level of demand is not independent of resource choices, but will respond to the costs of resource choices to meet future demands. Finally, sophisticated demand models are needed to assess the potential impacts of choosing conservation programs as alternatives to building new generating resources. These roles are described below.

Defining the Range of Uncertainty

Future demand for electricity has been one of the primary uncertainties addressed in developing a risk-minimizing power plan for the region. The demand forecast range measures this uncertainty. The range of demand forecasts is based primarily on variations in the key assumptions. The forecast range has been described above in terms of five forecasts. However, for resource planning, a probability distribution is assumed to describe the likelihood that any given level of future electricity demand will occur within the range.

Bonneville and the Council currently assume different probability distributions about the forecast range. For planning purposes, the Council has adopted a trapezoidal distribution. The implications of the trapezoidal distribution are, 1) that demands outside the high and low forecasts are judged to be of sufficiently low probability that they are not formally considered in resource planning, and 2) that demands between the medium-high and medium-low forecasts are most likely and are considered equally probable. The probability of future demand being between the medium-low and the medium-high forecasts is about 50 percent. The probability of being between the medium-high and high or between the medium-low and low is about 25 percent.

Bonneville assumes a normal probability distribution around the medium forecast. The implications of this assumption are, 1) the medium forecast is described as the

most probable future demand, and 2) future demands can fall outside of the low and high forecasts. Bonneville assumes that there is a 50-percent probability that demand will fall between the medium-low and medium-high cases, that the probabilities of being between the medium-low and low or between the medium-high and high are each 20 percent, and that the probabilities of being either below the low or above the high case are each 5 percent.

Resource portfolio analysis is based on the entire probability distribution of future loads. This is a major change from the Council's first power plan in 1983 and is made possible by an enhanced decision model. The decision model analyzes hundreds of possible load paths that are distributed according to the assumed probability distribution defined over the range of demand forecasts. It is not expected that the specific form of probability distribution used in this analysis would have a significant effect on the results.

Effects of Resource Choices on Price

As discussed in the previous section, there is an electricity pricing model in the demand forecasting system. The pricing model develops forecasts of retail prices for each sector for investor-owned and public utilities. These rates are forecast through a detailed consideration of power system costs, secondary power sales, and the provisions of the Act. This model translates resource decisions into retail prices. The price model ensures that the implications of future resource decisions, including conservation programs, are consistently reflected in future prices and demands.

Conservation Analysis

In addition to defining uncertainty, the demand forecasting models play an important role in defining and evaluating conservation opportunities. This is particularly true for the residential and commercial sectors where the demand models are most detailed and conservation opportunities are best defined.

There are two major roles for the demand models in conservation analysis. The first is to help define the size of the potential conservation resource. The second is to predict the effectiveness of programs designed to achieve some portion of the potential conservation available.

Estimates of the number of energy-using buildings and equipment in the region, including their fuel type and efficiency characteristics, are needed to help determine how much additional efficiency can be achieved to offset the need for new electricity generation. The economic forecasts and the building energy demand models provide the detailed building forecasts necessary to analyze potential conservation. The demand models evaluate the effects of differing regional growth rates on new building construction and the effects of alternative energy prices on fuel choice in those buildings, thus resulting in different

amounts of conservation potential for different forecast scenarios.

The effects of conservation programs can be quite complicated, and the demand models are designed to help assess those effects. For example, an energy-efficient building code can affect all three components of a building owner's energy choice: efficiency, fuel type and intensity of use. While the direct impact is on efficiency choice, there are also likely to be unintended effects on fuel choice and intensity of use. For example, a more stringent code for residential electrical efficiency will tend to increase the construction cost of electrically heated homes. This relative increase in the initial cost, if borne by homebuyers, may cause some increase in the number of homes heated by natural gas or oil, even though the operating cost of the electrically heated homes would be reduced.

When cost-effective conservation actions are taken, the cost of providing an end-use service, such as space heating, will decrease. With the decrease in cost, the consumer's intensity of use may increase. Another important complication is that appliances give off waste heat that affects the heating and cooling requirements in buildings. Since more efficient appliances give off less waste heat, more heating and less cooling will be needed than with less efficient appliances. These secondary effects are evaluated in the detailed building models to give a more accurate assessment of the actual effects of conservation programs on demand for electricity.

Forecast Concepts

Treating conservation as a resource creates interactions among demand forecasts and resource choices that complicate analysis. For example, conservation actions that planners think are available resource choices may also be taken by consumers in response to increasing electricity prices. Double counting of this conservation must be avoided in planning. In order to avoid such problems, some innovative analytical methods have been developed.

For example, three different demand forecast concepts are used in resource planning. Most presentations and publications, including this chapter, describe "price effects" forecasts. Price-effects forecasts show what the demand for electricity would be if customers were to respond to price, but no new conservation programs were implemented. Price-effects forecasts reflect current state building codes as of 1991 and federal appliance efficiency standards, but do not assume further adoption of the Council's model conservation standards.

An important factor affecting price-effects forecasts is what resource mix is assumed in developing the electricity price that is provided to the demand models. The electricity prices that determine the price-effects forecast are based on a second concept of demand—a "sales" forecast. A "sales" forecast is a forecast of the demand for electricity after the effects of the model conservation standards

and other conservation programs have been taken into account. This is the amount of electricity that would actually be sold by utilities if conservation programs were implemented and savings realized.

The third demand concept, the "frozen-efficiency" forecast, attempts to eliminate double counting of conservation actions that are taken by consumers in response to price, but which could also be achieved through the proposed conservation programs. Frozen-efficiency forecasts, as the name implies, hold the technical efficiency of energy use constant at current levels for uses where conservation programs are proposed. This eliminates the part of consumer price response that could potentially be double counted as conservation program savings.

The three forecasts for the high scenario are illustrated in Figure 6-15. Table 6-14 shows the growth rates for the three forecast concepts for each of the forecast scenarios. The price-effects growth rates are the same as those shown in Table 6-1 and Figure 6-3. The frozen-efficiency growth rates are slightly higher because part of the demand decreases due to price response have been eliminated. The differences between price-effects and frozen-efficiency forecasts are relatively small because prices are not forecast to increase much in most forecast scenarios. Demand growth is significantly lower for the sales forecasts than for the other two forecasts, reflecting potential conservation savings from the Council's programs. The differences between the frozen-efficiency and sales forecasts are smallest in the low case because only new build-

ing standards savings are acquired and relatively few new buildings are constructed.

The difference between the highest forecast (the frozen-efficiency forecast) and the lowest (the sales forecast) is the total effect on electricity demand of conservation resources. The price-effects forecast divides that total effect into two parts, that which would result from price response and the incremental effect of conservation programs. The difference between the frozen-efficiency and price-effects forecasts represents the price response portion. The difference between the price-effects and the sales forecasts represents the incremental program impacts. The results of the forecast indicate that very little of the cost-effective conservation would be achieved, under current regional electricity pricing practices, without a strong conservation program effort.

Electrical Loads for Resource Planning

Demand forecasts serve as the basis for resource portfolio analysis. This section describes what forecast concepts are used and how they are modified for resource planning analysis.

Forecast Concepts

Figure 6-15
Comparison of
High Forecast
Concepts

For resource portfolio analysis, the decision analysis model (ISAAC) uses frozen-efficiency forecasts of demand in order to avoid counting conservation potential twice.² However, several adjustments are made to these forecasts before they are used for resource planning.

First, demand forecasts are converted to load forecasts by adding transmission and distribution losses. The demand forecasts are for consumption of electricity at the point of use, while loads are the amount of electricity that needs to be generated. More electricity has to be generated than is actually consumed by utility customers, because some electricity is used or lost in the transmission and distribution of power. The demand forecasts are converted to loads based on historical average losses. These losses are about 8 percent.

Second, resource analysis is done on an operating year basis. Since the demand forecasts are done on a calendar year basis, the demands must be converted from a year that begins in January to a year that begins the previous September. (Note that the operating years described in Appendix 6-C are from July 1 through June 30.) This is done by calculating a weighted average of the previous and current calendar years. The previous year receives a one-third weight, and the current year a two-thirds weight. In addition, for resource planning, the forecasts were set to actual values for operating year 1989.

In the demand-forecast range, the forecasts of direct service industry demand for electricity are shown as a

range of demand levels associated with specific forecast scenarios. The direct service industry loads are treated differently, however, for resource planning. The decision analysis model (ISAAC) embodies an aluminum forecasting submodel. This model forecasts levels of aluminum demand that depend on a randomly selected level of aluminum prices, as well as electricity prices and other costs of production. Aluminum prices are not assumed to be correlated to general economic conditions. As a result, levels of aluminum demand, instead of being associated with particular demand scenarios as they are in the demand forecast ranges described here, are independent of demand scenarios. The aluminum model was calibrated to result in the same range of aluminum loads as those in the demand forecasts, but they are not associated with particular demand conditions. This better reflects the various counterbalancing influences that are likely to affect the aluminum industry under specific scenarios.

Federal agency and non-aluminum direct service industry loads are entered into the decision model separately from other loads, and do not vary by scenario. The operating year, frozen-efficiency, non-direct service industry and non-federal agency loads that are provided to the decision model are shown for selected years in Table 6-15.

2. ISAAC is an acronym for Integrated System for Analysis of Acquisitions. For a description of the ISAAC model, see Volume II, Chapter 15.

Table 6-14
Growth Rates for Different Forecast Concepts (Average Annual Rate of Change, 1989-2010)

	Sales	Price Effects	Frozen Efficiency
High	2.1	2.5	2.6
Medium-High	1.4	1.7	1.8
Medium	0.8	1.2	1.2
Medium-Low	0.2	0.6	0.6
Low	-0.8	-0.4	-0.4

Table 6-15
Decision Model Loads (Average Megawatts by Operating Year)

	Estimated 1989	1995	Forecasts 2000	2010	Growth Rate (% per year) 1989-2010
High	15,700	19,806	22,738	29,017	3.0
Medium-High	15,700	18,324	20,190	24,356	2.1
Medium-Low	15,700	16,551	17,284	19,364	1.0
Low	15,700	15,626	15,693	16,268	0.2

APPENDIX 6-A

FORECAST SUMMARY TABLES

1. Price Effects Forecasts
2. Sales Forecasts
3. Frozen-Efficiency Forecasts

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1LP - 1991 FINAL PLAN 1 LOW - PRICE

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	2010
TOTAL:	(ACTUAL) (ACTUAL)					1989-1995 1995-2010 1989-2010	
COMMERCIAL	3603.	3761.	3964.	3912.	3906.	4033.	4236.
RESIDENTIAL	5586.	5789.	5839.	5853.	5833.	5883.	5981.
INDUSTRIAL FIRM (1)	6646.	6935.	6591.	5112.	5072.	4787.	4885.
DSI FIRM	2435.	2531.	2284.	1129.	1002.	651.	651.
NON-DSI FIRM	4211.	4404.	4307.	3983.	4070.	4136.	4234.
IRRIGATION (2)	649.	640.	547.	532.	504.	471.	467.
OTHER (3)	182.	180.	194.	199.	206.	212.	218.
TOTAL FIRM SALES	16666.	17305.	17135.	15607.	15520.	15386.	15787.
TOTAL NON-DSI SALES	14231.	14774.	14850.	14478.	14519.	14735.	15136.
PUBLIC CUSTOMER POOL:							
COMMERCIAL	1488.	1549.	1667.	1698.	1724.	1784.	1885.
RESIDENTIAL	2485.	2596.	2631.	2632.	2614.	2633.	2671.
INDUSTRIAL FIRM (1)	4449.	4639.	4343.	3068.	2989.	2681.	2725.
DSI FIRM	2435.	2531.	2284.	1129.	1002.	651.	651.
NON-DSI FIRM	2014.	2108.	2058.	1939.	1988.	2030.	2074.
IRRIGATION (2)	327.	324.	271.	264.	253.	239.	239.
OTHER (3)	153.	150.	165.	168.	174.	179.	183.
TOTAL FIRM SALES	8902.	9258.	9078.	7830.	7755.	7516.	7702.
TOTAL NON-DSI SALES	6467.	6727.	6792.	6701.	6753.	6865.	7051.
PRIVATE CUSTOMER POOL:							
COMMERCIAL	2115.	2212.	2298.	2214.	2182.	2249.	2351.
RESIDENTIAL	3101.	3193.	3208.	3221.	3218.	3250.	3309.
INDUSTRIAL FIRM (1)	2197.	2296.	2249.	2044.	2083.	2106.	2160.
IRRIGATION	322.	316.	276.	268.	251.	231.	228.
OTHER (3)	29.	30.	29.	31.	32.	34.	35.
TOTAL FIRM SALES	7764.	8047.	8058.	7777.	7766.	7870.	8085.

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

91F1MLP - 1991 FINAL 1 MEDIUM LOW - PRICE

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM

SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F2MP - 1991 FINAL PLAN 2 MEDIUM - PRICE W/ BPA'S SPM

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2010
TOTAL:	(ACTUAL)	(ACTUAL)	(ACTUAL)			
COMMERCIAL	3603.	3761.	3976.	4346.	4676.	5128.
RESIDENTIAL	5586.	5789.	5860.	6348.	6742.	7180.
INDUSTRIAL FIRM (1)	6646.	6935.	6905.	6997.	7370.	7567.
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2137.
NON-DSI FIRM	4211.	4404.	4459.	4845.	5234.	5945.
IRRIGATION (2)	649.	640.	617.	628.	594.	599.
OTHER (3)	182.	180.	194.	199.	206.	218.
TOTAL FIRM SALES	16666.	17305.	17552.	18513.	19587.	22075.
TOTAL NON-DSI SALES	14231.	14774.	15106.	16361.	17451.	19938.

----- DEMAND GROWTH RATES -----
1989-1995 1995-2010 1989-2010

2.44 1.72 1.92
1.54 1.18 1.28
0.15 0.97 0.73
-2.67 -0.05 -0.80
1.44 1.37 1.44
-0.37 -0.30 -0.32
1.64 0.64 0.92
1.13 1.18 1.17
1.72 1.33 1.44

PUBLIC CUSTOMER POOL:

COMMERCIAL	1488.	1549.	1664.	1860.	1997.	2148.	2313.	3.10	1.46	1.93
RESIDENTIAL	2485.	2596.	2638.	2841.	2999.	3179.	3344.	1.51	1.09	1.21
INDUSTRIAL FIRM (1)	4449.	4639.	4591.	4455.	4596.	4735.	4902.	-0.67	0.64	0.26
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2136.	2137.	-2.67	-0.05	-0.80
NON-DSI FIRM	2014.	2108.	2145.	2303.	2460.	2600.	2765.	1.49	1.23	1.30
IRRIGATION (2)	327.	324.	304.	309.	296.	291.	301.	-0.80	-0.17	-0.35
OTHER (3)	153.	150.	165.	168.	174.	179.	183.	1.91	0.57	0.95
TOTAL FIRM SALES	8902.	9258.	9362.	9633.	10062.	10532.	11043.	0.66	0.91	0.84
TOTAL NON-DSI SALES	6467.	6727.	6916.	7481.	7926.	8396.	8906.	1.79	1.17	1.35

PRIVATE CUSTOMER POOL:

COMMERCIAL	2115.	2212.	2312.	2486.	2678.	2980.	3297.	1.96	1.90	1.92
RESIDENTIAL	3101.	3193.	3222.	3505.	3742.	4001.	4223.	1.57	1.25	1.34
INDUSTRIAL FIRM (1)	2197.	2296.	2314.	2542.	2774.	2949.	3180.	1.71	1.50	1.56
IRRIGATION	322.	316.	313.	317.	298.	290.	297.	0.05	-0.43	-0.29
OTHER (3)	29.	30.	29.	31.	32.	34.	35.	0.28	1.00	0.79
TOTAL FIRM SALES	7764.	8047.	8190.	8881.	9525.	10254.	11032.	1.66	1.46	1.51

- (1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM

SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91FIMHP - 1991 FINAL PLAN 1 MEDIUM HIGH - PRICE

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	2010
TOTAL:	(ACTUAL)	(ACTUAL)					
COMMERCIAL	3603.	3761.	3964.	4494.	4993.	5583.	6295.
RESIDENTIAL	5586.	5789.	5854.	6523.	7044.	7667.	8246.
INDUSTRIAL FIRM (1)	6646.	6935.	7036.	7474.	8047.	8526.	9143.
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	2301.
NON-DSI FIRM	4211.	4404.	4533.	5139.	5709.	6226.	6842.
IRRIGATION (2)	649.	640.	650.	646.	647.	656.	680.
OTHER (3)	182.	180.	194.	199.	206.	212.	218.
TOTAL FIRM SALES	16666.	17305.	17697.	19336.	20935.	22644.	24583.
TOTAL NON-DSI SALES	14231.	14774.	15194.	17001.	18598.	20344.	22282.

1989-1995 1995-2010 1989-2010

3.01 2.27 2.48
2.01 1.58 1.70
1.26 1.35 1.32
-1.33 -0.10 -0.45
2.60 1.93 2.12
0.16 0.34 0.29
1.64 0.64 0.92
1.87 1.61 1.69
2.37 1.82 1.98

PUBLIC CUSTOMER POOL:

COMMERCIAL	1488.	1549.	1665.	1918.	2127.	2312.	2541.
RESIDENTIAL	2485.	2596.	2640.	2918.	3131.	3397.	3646.
INDUSTRIAL FIRM (1)	4449.	4639.	4690.	4780.	5023.	5207.	5461.
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	2301.
NON-DSI FIRM	2014.	2108.	2187.	2445.	2685.	2907.	3160.
IRRIGATION (2)	327.	324.	316.	313.	311.	314.	316.
OTHER (3)	153.	150.	165.	168.	174.	179.	183.
TOTAL FIRM SALES	8902.	9258.	9476.	10097.	10766.	11408.	12146.
TOTAL NON-DSI SALES	6467.	6727.	6973.	7762.	8428.	9108.	9840.

3.62 1.89 2.38
1.97 1.50 1.63
0.50 0.89 0.78
-1.33 -0.10 -0.45
2.50 1.73 1.95
-0.59 0.06 -0.12
1.91 0.57 0.95
1.46 1.24 1.30
2.41 1.60 1.83

PRIVATE CUSTOMER POOL:

COMMERCIAL	2115.	2212.	2299.	2577.	2866.	3271.	3754.
RESIDENTIAL	3101.	3193.	3214.	3605.	3913.	4270.	4600.
INDUSTRIAL FIRM (1)	2197.	2296.	2346.	2694.	3023.	3319.	3682.
IRRIGATION	322.	316.	334.	333.	336.	342.	364.
OTHER (3)	29.	30.	29.	31.	32.	34.	35.
TOTAL FIRM SALES	7764.	8047.	8221.	9239.	10169.	11237.	12437.

2.58 2.54 2.55
2.04 1.64 1.75
2.70 2.11 2.27
0.90 0.59 0.68
0.28 1.00 0.79
2.33 2.00 2.08

- (1) INCLUDES COLOCCUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1HP - 1991 PLAN FINAL 1 HIGH - PRICE

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	1989-1995 1995-2010 1989-2010
TOTAL:	(ACTUAL)	(ACTUAL)					
COMMERCIAL	3603.	3761.	3994.	4948.	5721.	6569.	4.68 2.86 3.37
RESIDENTIAL	5586.	5789.	5851.	6958.	7786.	8759.	3.11 2.22 2.47
INDUSTRIAL FIRM (1)	6646.	6935.	7148.	8020.	8852.	9593.	2.45 1.88 2.05
DSI FIRM	2435.	2531.	2538.	2476.	2475.	2401.	-0.36 -0.26 -0.25
NON-DSI FIRM	4211.	4404.	4611.	5544.	6376.	7191.	3.91 2.65 3.01
IRRIGATION (2)	649.	640.	686.	702.	741.	780.	1.55 0.80 1.02
OTHER (3)	182.	180.	194.	199.	206.	212.	1.64 0.64 0.92
TOTAL FIRM SALES	16666.	17305.	17872.	20826.	23305.	25914.	3.13 2.19 2.46
TOTAL NON-DSI SALES	14231.	14774.	15335.	18350.	20829.	23513.	3.68 2.46 2.81
PUBLIC CUSTOMER POOL:							
COMMERCIAL	1488.	1549.	1665.	2097.	2395.	2676.	5.18 2.45 3.22
RESIDENTIAL	2485.	2596.	2639.	3100.	3444.	3857.	3.00 2.12 2.37
INDUSTRIAL FIRM (1)	4449.	4639.	4771.	5089.	5439.	5722.	1.56 1.26 1.35
DSI FIRM	2435.	2531.	2538.	2476.	2476.	2401.	-0.36 -0.26 -0.25
NON-DSI FIRM	2014.	2108.	2233.	2613.	2963.	3320.	3.65 2.43 2.77
IRRIGATION (2)	327.	324.	332.	335.	339.	342.	0.55 0.13 0.25
OTHER (3)	153.	150.	165.	168.	174.	179.	1.91 0.57 0.95
TOTAL FIRM SALES	8902.	9258.	9571.	10789.	11791.	12776.	2.58 1.72 1.96
TOTAL NON-DSI SALES	6467.	6727.	7033.	8313.	9315.	10375.	3.59 2.20 2.60
PRIVATE CUSTOMER POOL:							
COMMERCIAL	2115.	2212.	2329.	2850.	3326.	3893.	4.32 3.14 3.48
RESIDENTIAL	3101.	3193.	3212.	3858.	4342.	4902.	3.21 2.29 2.55
INDUSTRIAL FIRM (1)	2197.	2296.	2378.	2931.	3413.	3871.	4.15 2.85 3.22
IRRIGATION	322.	316.	354.	367.	402.	438.	2.53 1.36 1.69
OTHER (3)	29.	30.	29.	31.	32.	34.	0.28 1.00 0.79
TOTAL FIRM SALES	7764.	8047.	8301.	10037.	11514.	13138.	3.75 2.67 2.98

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1L - 1991 FINAL PLAN 1 LOW - SALES

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES					
	1988	1989	1990	1995	2000	2005	2010	1989-1995	1995-2010	1989-2010
TOTAL:	(ACTUAL) (ACTUAL)									
COMMERCIAL	3603.	3761.	3964.	3798.	3582.	3616.	3716.	0.17	-0.15	-0.06
RESIDENTIAL	5586.	5789.	5838.	5739.	5478.	5376.	5391.	-0.14	-0.42	-0.34
INDUSTRIAL FIRM (1)	6646.	6935.	6591.	5096.	5030.	4744.	4843.	-5.01	-0.34	-1.70
DSI FIRM	2435.	2531.	2284.	1129.	1002.	651.	651.	-12.59	-3.60	-6.26
NON-DSI FIRM	4211.	4404.	4307.	3967.	4028.	4093.	4192.	-1.73	0.37	-0.23
IRRIGATION (2)	649.	640.	547.	517.	462.	429.	425.	-3.51	-1.29	-1.92
OTHER (3)	182.	180.	194.	199.	206.	212.	218.	1.64	0.64	0.92
TOTAL FIRM SALES	16666.	17305.	17134.	15349.	14758.	14378.	14593.	-1.98	-0.34	-0.81
TOTAL NON-DSI SALES	14231.	14774.	14849.	14220.	13756.	13727.	13942.	-0.64	-0.13	-0.28
PUBLIC CUSTOMER POOL:										
COMMERCIAL	1488.	1549.	1667.	1649.	1578.	1594.	1642.	1.05	-0.03	0.28
RESIDENTIAL	2485.	2596.	2631.	2586.	2464.	2408.	2406.	-0.06	-0.48	-0.36
INDUSTRIAL FIRM (1)	4449.	4639.	4343.	3063.	2976.	2668.	2711.	-6.69	-0.81	-2.52
DSI FIRM	2435.	2531.	2284.	1129.	1002.	551.	651.	-12.59	-3.60	-6.26
NON-DSI FIRM	2014.	2108.	2058.	1934.	1974.	2017.	2060.	-1.43	0.42	-0.11
IRRIGATION (2)	327.	324.	271.	264.	250.	236.	236.	-3.38	-0.74	-1.50
OTHER (3)	153.	150.	165.	168.	174.	179.	183.	1.91	0.57	0.95
TOTAL FIRM SALES	8902.	9258.	9076.	7730.	7442.	7085.	7179.	-2.96	-0.49	-1.20
TOTAL NON-DSI SALES	6467.	6727.	6791.	6601.	6441.	6434.	6528.	-0.31	-0.07	-0.14
PRIVATE CUSTOMER POOL:										
COMMERCIAL	2115.	2212.	2298.	2149.	2003.	2022.	2074.	-0.49	-0.24	-0.31
RESIDENTIAL	3101.	3193.	3207.	3154.	3014.	2968.	2985.	-0.21	-0.37	-0.32
INDUSTRIAL FIRM (1)	2197.	2296.	2249.	2033.	2054.	2077.	2132.	-2.01	0.32	-0.35
IRRIGATION	322.	316.	276.	253.	212.	193.	189.	-3.64	-1.92	-2.41
OTHER (3)	29.	30.	29.	31.	32.	34.	35.	0.28	1.00	0.79
TOTAL FIRM SALES	7764.	8047.	8058.	7619.	7315.	7293.	7415.	-0.91	-0.18	-0.39

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1ML - 1991 FINAL 1 MEDIUM LOW - SALES

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005
TOTAL:	(ACTUAL)	(ACTUAL)				
COMMERCIAL	3603.	3761.	3964.	3956.	3884.	4024.
RESIDENTIAL	5586.	5789.	5648.	6004.	6034.	6224.
INDUSTRIAL FIRM (1)	6646.	6935.	6757.	5917.	6091.	6244.
DSI FIRM	2435.	2531.	2368.	1580.	1582.	1582.
NON-DSI FIRM	4211.	4404.	4389.	4338.	4509.	4662.
IRRIGATION (2)	649.	640.	579.	562.	521.	487.
OTHER (3)	182.	180.	194.	199.	206.	212.
TOTAL FIRM SALES	18666.	17305.	17342.	16637.	16735.	17192.
TOTAL NON-DSI SALES	14231.	14774.	14975.	15058.	15154.	15610.
PUBLIC CUSTOMER POOL:						
COMMERCIAL	1488.	1549.	1666.	1726.	1730.	1793.
RESIDENTIAL	2485.	2596.	2636.	2700.	2701.	2767.
INDUSTRIAL FIRM (1)	4449.	4639.	4482.	3700.	3791.	3873.
DSI FIRM	2435.	2531.	2368.	1580.	1582.	1582.
NON-DSI FIRM	2014.	2108.	2114.	2121.	2209.	2291.
IRRIGATION (2)	327.	324.	286.	283.	275.	260.
OTHER (3)	153.	150.	165.	168.	174.	179.
TOTAL FIRM SALES	8902.	9258.	9235.	8578.	8670.	8875.
TOTAL NON-DSI SALES	6467.	6727.	6867.	6998.	7088.	7294.
PRIVATE CUSTOMER POOL:						
COMMERCIAL	2115.	2212.	2298.	2229.	2154.	2231.
RESIDENTIAL	3101.	3193.	3211.	3304.	3333.	3458.
INDUSTRIAL FIRM (1)	2197.	2296.	2275.	2217.	2300.	2371.
IRRIGATION	322.	316.	294.	279.	246.	223.
OTHER (3)	29.	30.	29.	31.	32.	34.
TOTAL FIRM SALES	7764.	8047.	8107.	8060.	8065.	8316.
DEMAND GROWTH RATES 1989-1995						
COMMERCIAL	0.85	0.66	0.66	0.66	0.66	0.66
RESIDENTIAL	0.61	0.51	0.51	0.51	0.51	0.51
INDUSTRIAL FIRM (1)	-2.61	0.64	0.64	0.64	0.64	0.64
DSI FIRM	-7.56	0.01	0.01	0.01	0.01	0.01
NON-DSI FIRM	-0.25	0.85	0.85	0.85	0.85	0.85
IRRIGATION (2)	-2.15	-1.10	-1.10	-1.10	-1.10	-1.10
OTHER (3)	1.64	0.92	0.92	0.92	0.92	0.92
TOTAL FIRM SALES	-0.65	0.54	0.54	0.54	0.54	0.54
TOTAL NON-DSI SALES	0.32	0.60	0.60	0.60	0.60	0.60
DEMAND GROWTH RATES 1989-2010						
COMMERCIAL	1.82	0.70	0.70	0.70	0.70	0.70
RESIDENTIAL	0.66	0.40	0.40	0.40	0.40	0.40
INDUSTRIAL FIRM (1)	-3.70	0.51	0.51	0.51	0.51	0.51
DSI FIRM	-7.56	0.01	0.01	0.01	0.01	0.01
NON-DSI FIRM	0.10	0.85	0.85	0.85	0.85	0.85
IRRIGATION (2)	-2.25	-0.57	-0.57	-0.57	-0.57	-0.57
OTHER (3)	1.91	0.57	0.57	0.57	0.57	0.57
TOTAL FIRM SALES	-1.26	0.48	0.48	0.48	0.48	0.48
TOTAL NON-DSI SALES	0.66	0.58	0.58	0.58	0.58	0.58
DEMAND GROWTH RATES 1989-2010						
COMMERCIAL	0.13	0.64	0.64	0.64	0.64	0.64
RESIDENTIAL	0.57	0.60	0.60	0.60	0.60	0.60
INDUSTRIAL FIRM (1)	-0.58	0.85	0.85	0.85	0.85	0.85
IRRIGATION	-2.05	-1.69	-1.69	-1.69	-1.69	-1.69
OTHER (3)	0.28	1.00	1.00	1.00	1.00	1.00
TOTAL FIRM SALES	0.03	0.61	0.61	0.61	0.61	0.61

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES
91F2M - 1991 FINAL PLAN 2 MEDIUM - SALES W/ BPA'S SPM

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	2010
TOTAL:	(ACTUAL)	(ACTUAL)	(ACTUAL)				
COMMERCIAL	3603.	3761.	3976.	4209.	4323.	4533.	4906.
RESIDENTIAL	5586.	5789.	5859.	6215.	6340.	6553.	6830.
INDUSTRIAL FIRM (1)	6646.	6935.	6905.	6952.	7250.	7490.	7885.
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2136.	2137.
NON-DSI FIRM	4211.	4404.	4459.	4800.	5114.	5354.	5748.
IRRIGATION (2)	649.	640.	617.	611.	552.	525.	527.
OTHER (3)	182.	180.	194.	199.	206.	212.	218.
TOTAL FIRM SALES	16666.	17305.	17551.	18186.	18671.	19314.	20365.
TOTAL NON-DSI SALES	14231.	14774.	15105.	16034.	16535.	17178.	18229.
PUBLIC CUSTOMER POOL:							
COMMERCIAL	1488.	1549.	1664.	1804.	1855.	1896.	2015.
RESIDENTIAL	2485.	2596.	2638.	2789.	2831.	2885.	2997.
INDUSTRIAL FIRM (1)	4449.	4639.	4591.	4433.	4540.	4640.	4804.
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2136.	2137.
NON-DSI FIRM	2014.	2108.	2145.	2281.	2404.	2504.	2667.
IRRIGATION (2)	327.	324.	304.	308.	292.	282.	276.
OTHER (3)	153.	150.	165.	168.	174.	179.	183.
TOTAL FIRM SALES	8902.	9258.	9362.	9502.	9891.	9881.	10274.
TOTAL NON-DSI SALES	6467.	6727.	6916.	7350.	7556.	7745.	8137.
PRIVATE CUSTOMER POOL:							
COMMERCIAL	2115.	2212.	2312.	2405.	2469.	2637.	2891.
RESIDENTIAL	3101.	3193.	3221.	3426.	3509.	3668.	3833.
INDUSTRIAL FIRM (1)	2197.	2296.	2314.	2519.	2710.	2850.	3081.
IRRIGATION	322.	316.	313.	303.	259.	244.	251.
OTHER (3)	29.	30.	29.	31.	32.	34.	35.
TOTAL FIRM SALES	7764.	8047.	8189.	8683.	8979.	9433.	10092.
DEMAND GROWTH RATES 1989-1995 1995-2010 1989-2010							
COMMERCIAL	1.89	1.03	1.27				
RESIDENTIAL	1.19	0.63	0.79				
INDUSTRIAL FIRM (1)	0.04	0.84	0.61				
DSI FIRM	-2.67	-0.05	-0.80				
NON-DSI FIRM	1.45	1.21	1.28				
IRRIGATION (2)	-0.78	-0.98	-0.93				
OTHER (3)	1.64	0.64	0.92				
TOTAL FIRM SALES	0.83	0.76	0.78				
TOTAL NON-DSI SALES	1.37	0.86	1.01				
PUBLIC CUSTOMER POOL:							
COMMERCIAL	2.57	0.74	1.26				
RESIDENTIAL	1.20	0.48	0.69				
INDUSTRIAL FIRM (1)	-0.75	0.54	0.17				
DSI FIRM	-2.67	-0.05	-0.80				
NON-DSI FIRM	1.33	1.05	1.13				
IRRIGATION (2)	-0.84	-0.74	-0.77				
OTHER (3)	1.91	0.57	0.95				
TOTAL FIRM SALES	0.44	0.52	0.50				
TOTAL NON-DSI SALES	1.49	0.68	0.91				
PRIVATE CUSTOMER POOL:							
COMMERCIAL	1.41	1.23	1.28				
RESIDENTIAL	1.18	0.75	0.87				
INDUSTRIAL FIRM (1)	1.55	1.35	1.41				
IRRIGATION	-0.72	-1.24	-1.09				
OTHER (3)	0.28	1.00	0.79				
TOTAL FIRM SALES	1.28	1.01	1.08				

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

31FIMH - 1991 FINAL PLAN 1 MEDIUM HIGH - SALES

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES					
	1988	1989	1990	1995	2000	2005	2010	1989-1995	1995-2010	1989-2010
TOTAL:	(ACTUAL)	(ACTUAL)	(ACTUAL)							
COMMERCIAL	3603.	3761.	3964.	4357.	4654.	5026.	5560.	2.48	1.64	1.88
RESIDENTIAL	5586.	5789.	5853.	6383.	6620.	7000.	7448.	1.64	1.03	1.21
INDUSTRIAL FIRM (1)	6646.	6935.	7036.	7465.	8024.	8490.	9101.	1.24	1.33	1.30
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	2301.	-1.33	-0.10	-0.45
NON-DSI FIRM	4211.	4404.	4533.	5130.	5686.	6190.	6800.	2.57	1.90	2.09
IRRIGATION (2)	649.	640.	650.	631.	605.	600.	608.	-0.24	-0.25	-0.24
OTHER (3)	182.	180.	194.	199.	206.	212.	218.	1.64	0.64	0.92
TOTAL FIRM SALES	16666.	17305.	17697.	19035.	20108.	21329.	22935.	1.60	1.25	1.35
TOTAL NON-DSI SALES	14231.	14774.	15194.	16699.	17770.	19029.	20635.	2.06	1.42	1.60

PUBLIC CUSTOMER POOL:

COMMERCIAL	1488.	1549.	1665.	1863.	1991.	2092.	2235.	3.12	1.22	1.76
RESIDENTIAL	2485.	2596.	2690.	2860.	2950.	3082.	3268.	1.63	0.89	1.10
INDUSTRIAL FIRM (1)	4449.	4639.	4690.	4776.	5012.	5191.	5440.	0.49	0.87	0.76
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	2301.	-1.33	-0.10	-0.45
NON-DSI FIRM	2014.	2108.	2187.	2441.	2675.	2891.	3139.	2.47	1.69	1.91
IRRIGATION (2)	327.	324.	316.	312.	308.	304.	290.	-0.63	-0.48	-0.52
OTHER (3)	153.	150.	165.	168.	174.	179.	183.	1.91	0.57	0.95
TOTAL FIRM SALES	8902.	9258.	9476.	9979.	10436.	10848.	11416.	1.26	0.90	1.00
TOTAL NON-DSI SALES	6467.	6727.	6973.	7644.	8098.	8548.	9115.	2.15	1.18	1.46

PRIVATE CUSTOMER POOL:

COMMERCIAL	2115.	2212.	2299.	2494.	2662.	2934.	3325.	2.02	1.94	1.96
RESIDENTIAL	3101.	3193.	3213.	3522.	3670.	3918.	4179.	1.65	1.15	1.29
INDUSTRIAL FIRM (1)	2197.	2298.	2346.	2689.	3011.	3299.	3661.	2.67	2.08	2.25
IRRIGATION	322.	316.	334.	319.	297.	296.	318.	0.16	-0.02	0.03
OTHER (3)	29.	30.	29.	31.	32.	34.	35.	0.28	1.00	0.79
TOTAL FIRM SALES	7764.	8047.	8221.	9055.	9672.	10481.	11520.	1.99	1.62	1.72

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1H - 1991 PLAN FINAL 1 HIGH - SALES

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2010
TOTAL:	(ACTUAL)	(ACTUAL)				
COMMERCIAL	3603.	3761.	3994.	4774.	5330.	6713.
RESIDENTIAL	5586.	5789.	5850.	6809.	7343.	8807.
INDUSTRIAL FIRM (1)	6846.	6935.	7148.	7994.	8783.	10452.
DSI FIRM	2435.	2531.	2538.	2476.	2476.	2401.
NON-DSI FIRM	4211.	4404.	4811.	5518.	6307.	8050.
IRRIGATION (2)	649.	640.	686.	687.	718.	714.
OTHER (3)	182.	180.	194.	199.	206.	218.
TOTAL FIRM SALES	16666.	17305.	17871.	20462.	22360.	26904.
TOTAL NON-DSI SALES	14231.	14774.	15334.	17986.	19884.	24503.
PUBLIC CUSTOMER POOL:						
COMMERCIAL	1488.	1549.	1665.	2026.	2236.	2667.
RESIDENTIAL	2485.	2596.	2638.	3038.	3253.	3838.
INDUSTRIAL FIRM (1)	4449.	4639.	4771.	5078.	5409.	6072.
DSI FIRM	2435.	2531.	2538.	2476.	2476.	2401.
NON-DSI FIRM	2014.	2108.	2233.	2601.	2933.	3671.
IRRIGATION (2)	327.	324.	332.	334.	336.	311.
OTHER (3)	153.	150.	165.	168.	174.	183.
TOTAL FIRM SALES	8902.	9258.	9571.	10643.	11407.	13070.
TOTAL NON-DSI SALES	6467.	6727.	7033.	8167.	8931.	10669.
PRIVATE CUSTOMER POOL:						
COMMERCIAL	2115.	2212.	2329.	2748.	3094.	4046.
RESIDENTIAL	3101.	3193.	3212.	3771.	4090.	4969.
INDUSTRIAL FIRM (1)	2197.	2296.	2378.	2916.	3374.	4380.
IRRIGATION	322.	316.	354.	353.	363.	403.
OTHER (3)	29.	30.	29.	31.	32.	35.
TOTAL FIRM SALES	7764.	8047.	8301.	9819.	10952.	13834.

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1LF - 1991 FINAL PLAN 1 LOW - FROZEN EFF.

	DEMAND IN AVERAGE MEGAWATTS				DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2010
TOTAL:	(ACTUAL)	(ACTUAL)				
COMMERCIAL	3603.	3761.	3964.	3957.	3967.	4227.
RESIDENTIAL	5586.	5789.	5839.	5853.	5892.	6004.
INDUSTRIAL FIRM (1)	6646.	6935.	6591.	5112.	4787.	4885.
DSI FIRM	2435.	2531.	2284.	1129.	651.	651.
NON-DSI FIRM	4211.	4404.	4307.	3983.	4136.	4234.
IRRIGATION (2)	649.	640.	547.	532.	471.	467.
OTHER (3)	182.	180.	194.	199.	212.	218.
TOTAL FIRM SALES	16666.	17305.	17135.	15653.	15416.	15801.
TOTAL NON-DSI SALES	14231.	14774.	14850.	14524.	14765.	15150.
PUBLIC CUSTOMER POOL:						
COMMERCIAL	1488.	1549.	1667.	1702.	1722.	1837.
RESIDENTIAL	2485.	2596.	2631.	2632.	2615.	2677.
INDUSTRIAL FIRM (1)	4449.	4639.	4343.	3066.	2989.	2725.
DSI FIRM	2435.	2531.	2284.	1129.	651.	651.
NON-DSI FIRM	2014.	2108.	2058.	1939.	1988.	2074.
IRRIGATION (2)	327.	324.	271.	264.	239.	239.
OTHER (3)	153.	150.	165.	168.	174.	183.
TOTAL FIRM SALES	8902.	9258.	9076.	7835.	7753.	7660.
TOTAL NON-DSI SALES	6467.	6727.	6792.	6706.	6752.	7009.
PRIVATE CUSTOMER POOL:						
COMMERCIAL	2115.	2212.	2298.	2255.	2245.	2391.
RESIDENTIAL	3101.	3193.	3208.	3221.	3220.	3326.
INDUSTRIAL FIRM (1)	2197.	2296.	2249.	2044.	2083.	2160.
IRRIGATION	322.	316.	276.	268.	251.	228.
OTHER (3)	29.	30.	29.	31.	32.	35.
TOTAL FIRM SALES	7784.	8047.	8058.	7818.	7924.	8141.

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

91F1MLF - 1991 FINAL 1 MEDIUM LOW - FROZEN EFF.

- (1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
- (2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
- (3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM

SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F2MF - 1991 FINAL PLAN 2 MEDIUM - FROZEN EFF. W/ BPA'S SPM

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES		
	1988	1989	1990	1995	2000	2005	1989-1995	1995-2010
TOTAL:	(ACTUAL)	(ACTUAL)						
COMMERCIAL	3603.	3761.	3976.	4396.	4761.	5190.	2.63	1.79
RESIDENTIAL	5586.	5789.	5860.	6348.	6753.	7214.	1.55	1.24
INDUSTRIAL FIRM (1)	6646.	6935.	6905.	6997.	7370.	7684.	0.15	0.97
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2136.	-2.67	-0.05
NON-DSI FIRM	4211.	4404.	4459.	4845.	5234.	5548.	1.60	1.37
IRRIGATION (2)	649.	640.	617.	626.	594.	581.	-0.37	-0.32
OTHER (3)	182.	180.	194.	199.	206.	212.	1.64	0.64
TOTAL FIRM SALES	16666.	17305.	17552.	18566.	19684.	20882.	1.18	1.22
TOTAL NON-DSI SALES	14231.	14774.	15106.	16414.	17548.	18746.	1.77	1.37
PUBLIC CUSTOMER POOL:								
COMMERCIAL	1488.	1549.	1664.	1874.	2026.	2166.	3.23	1.51
RESIDENTIAL	2485.	2596.	2638.	2842.	3005.	3195.	1.52	1.14
INDUSTRIAL FIRM (1)	4449.	4639.	4591.	4455.	4596.	4735.	-0.67	0.64
DSI FIRM	2435.	2531.	2446.	2152.	2136.	2136.	-2.67	-0.05
NON-DSI FIRM	2014.	2108.	2145.	2303.	2460.	2600.	1.49	1.23
IRRIGATION (2)	327.	324.	304.	309.	296.	291.	-0.80	-0.17
OTHER (3)	153.	150.	165.	168.	174.	179.	1.91	0.57
TOTAL FIRM SALES	8902.	9258.	9362.	9648.	10096.	10567.	0.69	0.94
TOTAL NON-DSI SALES	6467.	6727.	6916.	7496.	7960.	8431.	1.82	1.20
PRIVATE CUSTOMER POOL:								
COMMERCIAL	2115.	2212.	2312.	2522.	2735.	3023.	2.21	2.00
RESIDENTIAL	3101.	3193.	3222.	3506.	3748.	4019.	1.57	1.32
INDUSTRIAL FIRM (1)	2197.	2296.	2314.	2542.	2774.	2949.	1.71	1.50
IRRIGATION	322.	316.	313.	317.	298.	290.	0.05	-0.43
OTHER (3)	29.	30.	29.	31.	32.	34.	0.28	1.00
TOTAL FIRM SALES	7764.	8047.	8190.	8918.	9588.	10315.	1.73	1.52

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
 (2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
 (3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1MHF - 1991 FINAL PLAN 1 MEDIUM HIGH - FROZEN EFF.

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	1989-1995 1995-2010 1989-2010
TOTAL:	(ACTUAL)	(ACTUAL)					
COMMERCIAL	3603.	3761.	3964.	4595.	5182.	5789.	3.39 2.46 2.72
RESIDENTIAL	5586.	5789.	5854.	6530.	7060.	7703.	2.03 1.61 1.73
INDUSTRIAL FIRM (1)	6646.	6935.	7036.	7474.	8047.	8526.	1.26 1.35 1.32
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	-1.33 -0.10 -0.45
NON-DSI FIRM	4211.	4404.	4533.	5139.	5709.	6226.	2.60 1.93 2.12
IRRIGATION (2)	649.	640.	650.	646.	647.	656.	0.16 0.34 0.29
OTHER (3)	182.	180.	194.	199.	206.	212.	1.64 0.64 0.92
TOTAL FIRM SALES	16666.	17305.	17697.	19444.	21142.	22886.	1.96 1.68 1.76
TOTAL NON-DSI SALES	14231.	14774.	15194.	17108.	18804.	20586.	2.48 1.89 2.06
PUBLIC CUSTOMER POOL:							
COMMERCIAL	1488.	1549.	1665.	1951.	2191.	2376.	3.92 2.02 2.56
RESIDENTIAL	2485.	2596.	2640.	2921.	3139.	3413.	1.98 1.53 1.66
INDUSTRIAL FIRM (1)	4449.	4639.	4690.	4780.	5023.	5207.	0.50 0.89 0.78
DSI FIRM	2435.	2531.	2503.	2336.	2338.	2300.	-1.33 -0.10 -0.45
NON-DSI FIRM	2014.	2108.	2187.	2445.	2885.	2907.	2.50 1.73 1.95
IRRIGATION (2)	327.	324.	316.	313.	311.	314.	-0.12 0.06 0.57
OTHER (3)	153.	150.	165.	168.	174.	179.	1.91 0.57 1.28
TOTAL FIRM SALES	8902.	9258.	9476.	10133.	10837.	11488.	1.52 1.35 1.35
TOTAL NON-DSI SALES	6467.	6727.	6973.	7798.	8500.	9188.	2.49 1.64 1.88
PRIVATE CUSTOMER POOL:							
COMMERCIAL	2115.	2212.	2299.	2644.	2991.	3413.	3.02 2.77 2.84
RESIDENTIAL	3101.	3193.	3214.	3609.	3922.	4290.	2.06 1.68 1.79
INDUSTRIAL FIRM (1)	2197.	2296.	2346.	2694.	3023.	3319.	2.70 2.11 2.27
IRRIGATION	322.	316.	334.	333.	336.	342.	0.90 0.59 0.68
OTHER (3)	29.	30.	29.	31.	32.	34.	0.28 1.00 0.79
TOTAL FIRM SALES	7764.	8047.	8221.	9311.	10304.	11398.	2.46 2.09 2.20

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

PACIFIC NORTHWEST ELECTRICITY LOAD FORECASTING SYSTEM
SUMMARY OF REGIONAL DEMAND AND GROWTH RATES

91F1HF - 1991 PLAN FINAL 1 HIGH - FROZEN

	DEMAND IN AVERAGE MEGAWATTS					DEMAND GROWTH RATES	
	1988	1989	1990	1995	2000	2005	1989-1995 1995-2010 1989-2010
TOTAL:	(ACTUAL)	(ACTUAL)					
COMMERCIAL	3603.	3761.	3994.	5120.	6050.	6917.	5.28 3.03 3.66
RESIDENTIAL	5586.	5789.	5851.	6982.	7835.	8841.	3.17 2.26 2.52
INDUSTRIAL FIRM (1)	6646.	6935.	7148.	8020.	8852.	9593.	2.45 1.88 2.05
DSI FIRM	2435.	2531.	2538.	2476.	2401.	2401.	-0.36 -0.20 -0.25
NON-DSI FIRM	4211.	4404.	4611.	5544.	6376.	7191.	3.91 2.65 3.01
IRRIGATION (2)	649.	840.	686.	741.	780.	791.	1.55 0.80 1.02
OTHER (3)	182.	180.	194.	199.	206.	212.	1.64 0.64 0.92
TOTAL FIRM SALES	16666.	17305.	17872.	21022.	23683.	26343.	3.30 2.26 2.55
TOTAL NON-DSI SALES	14231.	14774.	15335.	18546.	21207.	23942.	3.86 2.53 2.91
PUBLIC CUSTOMER POOL:							
COMMERCIAL	1488.	1549.	1685.	2143.	2493.	2797.	5.56 2.69 3.50
RESIDENTIAL	2485.	2596.	2639.	3110.	3467.	3894.	3.06 2.15 2.41
INDUSTRIAL FIRM (1)	4449.	4639.	4771.	5089.	5439.	5722.	1.58 1.26 1.35
DSI FIRM	2435.	2531.	2538.	2476.	2476.	2401.	-0.36 -0.20 -0.25
NON-DSI FIRM	2014.	2108.	2233.	2613.	2963.	3320.	3.65 2.43 2.77
IRRIGATION (2)	327.	324.	332.	335.	339.	342.	0.55 0.13 0.25
OTHER (3)	153.	150.	165.	168.	174.	179.	1.91 0.57 0.95
TOTAL FIRM SALES	8902.	9258.	9571.	10844.	11912.	12933.	2.67 1.79 2.04
TOTAL NON-DSI SALES	6467.	6727.	7033.	8368.	9436.	10532.	3.71 2.28 2.69
PRIVATE CUSTOMER POOL:							
COMMERCIAL	2115.	2212.	2329.	2978.	3556.	4120.	5.08 3.26 3.78
RESIDENTIAL	3101.	3193.	3212.	3872.	4368.	4947.	3.27 2.35 2.61
INDUSTRIAL FIRM (1)	2197.	2296.	2378.	2931.	3413.	3871.	4.15 2.85 3.22
IRRIGATION	322.	316.	354.	367.	402.	438.	2.53 1.36 1.69
OTHER (3)	29.	30.	29.	31.	32.	34.	0.28 1.00 0.79
TOTAL FIRM SALES	7764.	8047.	8301.	10178.	11771.	13410.	3.99 2.73 3.09

(1) INCLUDES COLOCKUM, MINING, AND NON-BPA INTERRUPTIBLE
(2) INCLUDES USBR, EXCLUDES GRAND COULEE AND ROZA PUMPING
(3) FEDERAL AGENCIES AND STREET LIGHTING

APPENDIX 6-B

FORECAST CHANGES FROM 1989

Table 6-B-1
*Demand Forecast Changes from Previous Forecasts (91F1*P, 91F2MP)*

Year/Scenario	1989 Supplement ^a	1989 White Book ^b	1991 Power Plan	Change from 1989 Supplement	Change from 1989 White Book
1995					
▪ Low	14,322	14,738	15,607	+ 1,284	+ 855
▪ Medium-Low	15,998	16,393	16,930	+ 932	+ 523
▪ Medium	17,162	17,588	18,276	+ 1,115	+ 674
▪ Medium-High	18,333	18,728	19,335	+ 1,003	+ 594
▪ High	20,439	20,885	20,826	+ 387	- 73
2000					
▪ Low	14,114	14,501	15,520	+ 1,406	+ 1,008
▪ Medium-Low	16,721	16,847	17,566	+ 845	+ 708
▪ Medium	18,372	18,559	19,345	+ 973	+ 774
▪ Medium-High	19,933	20,263	20,935	+ 1,002	+ 661
▪ High	22,976	23,386	23,305	+ 329	- 92
2005					
▪ Low	14,913	14,669	15,386	+ 473	+ 717
▪ Medium-Low	17,897	17,641	18,395	+ 498	+ 754
▪ Medium	19,852	19,775	20,599	+ 747	+ 824
▪ Medium-High	21,915	21,956	22,644	+ 729	+ 688
▪ High	25,979	26,290	25,914	- 65	- 376
2010					
▪ Low	15,442	14,963	15,787	+ 346	+ 817
▪ Medium-Low	19,124	19,000	19,485	+ 361	+ 487
▪ Medium	21,344	21,146	21,129	- 215	+ 977
▪ Medium-High	24,026	23,942	24,583	+ 557	+ 635
▪ High	29,223	29,537	28,836	- 387	- 707
^a Northwest Power Planning Council. 1989 Supplement to the 1986 Northwest Conservation and Electric Power Plan, Volume II, Appendix 2-A. Spring 1989. ^b Forecast of Electricity Use in the Pacific Northwest, Appendix A. August 1989.					

*Table 6-B-2
Demand Forecast Changes from Draft Plan (91F1*P, 91F2MP)*

Year/Scenario	1991 Draft Plan	1991 Power Plan	Change from Draft Plan
1995			
▪ Low	15,136	15,607	+ 471
▪ Medium-Low	16,668	16,930	+ 262
▪ Medium	18,224	18,276	+ 52
▪ Medium-High	19,258	19,335	+ 78
▪ High	20,888	20,826	-62
2000			
▪ Low	15,147	15,570	+ 373
▪ Medium-Low	17,375	17,566	+ 191
▪ Medium	19,178	19,345	+ 167
▪ Medium-High	20,863	20,935	+ 72
▪ High	23,280	23,305	+ 25
2005			
▪ Low	14,992	15,386	+ 394
▪ Medium-Low	18,114	18,395	+ 281
▪ Medium	20,339	20,599	+ 260
▪ Medium-High	22,437	22,644	+ 207
▪ High	25,855	25,914	+ 59
2010			
▪ Low	15,317	15,787	+ 470
▪ Medium-Low	19,130	19,485	+ 355
▪ Medium	21,419	22,129	+ 710
▪ Medium-High	24,316	24,583	+ 267
▪ High	28,859	28,836	-23

APPENDIX 6-C

DETAILED FORECAST TABLES

1. Calendar Year Forecasts
2. Operating Year Forecasts
3. Fiscal Year Forecasts

1991 FINAL COUNCIL PLAN -- LOW CASE -- (91FILP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & HONGEN PUBLIC UTILS												
1 SALES	2968.2	2964.8	2960.4	2956.4	2960.8	2969.3	2982.2	2984.3	2984.9	2982.9	2986.3	2993.0
2 DISTRIBUTION LOSSES	124.7	124.5	124.3	124.2	124.4	124.7	125.3	125.3	125.4	125.3	125.4	125.7
3 SYSTEM LOAD	3092.9	3089.3	3084.7	3080.6	3085.2	3094.0	3107.5	3109.7	3110.2	3108.1	3111.7	3118.7
4 DSI ALUM FIRM LOAD	1876.5	1700.6	1485.0	1256.6	1027.0	1027.0	1027.0	1027.0	1027.0	899.7	624.9	549.0
5 DSI NON-ALUM FIRM LOAD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	1976.5	1800.6	1585.0	1356.6	1127.0	1127.0	1127.0	1127.0	1127.0	999.7	724.9	649.0
8 TOT DSI FIRM TRANS LOSSES	51.5	47.0	41.4	35.4	29.4	29.4	29.4	29.4	29.4	26.1	19.0	16.9
9 BPA FEDERAL AGENCIES	144.6	143.1	141.6	142.7	143.8	144.8	145.7	146.5	147.4	148.3	149.1	149.9
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	138.2	133.5	127.8	121.7	115.9	116.1	116.5	116.5	116.6	113.3	106.3	104.4
12 ADDTL FEDERAL TRAN LOSSES	60.1	61.6	59.6	56.8	56.8	52.8	49.5	49.5	48.0	47.8	47.7	47.8
13 TOTAL FEDERAL FIRM LOAD	5479.5	5295.5	5065.8	4825.7	4595.9	4602.0	4613.6	4616.8	4616.8	4484.8	4207.4	4137.6
GENERATING PUBLIC UTILITIES												
14 SALES	3367.5	3363.7	3358.7	3354.2	3359.2	3368.7	3383.4	3385.9	3386.5	3384.2	3388.0	3395.6
15 TRANSMIS & DISTRIB LOSSES	215.5	215.3	215.0	214.7	215.0	215.6	216.5	216.7	216.7	216.6	216.8	217.3
16 SYSTEM LOAD	3583.1	3579.0	3573.6	3568.8	3574.1	3584.3	3600.0	3602.5	3603.2	3600.7	3604.9	3612.9
17 PUB RESIDENTIAL EXCHG--RPSA	313.2	314.4	311.0	305.4	304.1	304.7	304.1	302.5	302.6	303.0	304.0	304.5
18 PUB RESIDENTIAL EXCHG--ETCA	10.3	10.2	10.0	9.8	9.7	9.6	9.6	9.4	9.4	9.4	9.4	9.3
19 TOTAL PUBLIC SALES	6335.7	6328.5	6319.1	6310.6	6320.0	6338.0	6365.6	6370.2	6371.3	6367.0	6374.3	6388.6
INVESTOR-OWNED UTILITIES												
20 SALES	7893.1	7842.2	7811.4	7778.8	7777.4	7767.4	7763.9	7766.0	7769.4	7765.8	7770.2	7784.6
21 TRANSMIS & DISTRIB LOSSES	828.8	823.4	820.2	816.8	816.6	815.6	815.2	815.4	815.8	815.4	815.9	817.4
22 SYSTEM LOAD	8721.9	8665.7	8631.6	8595.5	8594.0	8582.9	8579.1	8581.4	8585.2	8581.2	8586.1	8602.0
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	16597.3	16361.8	16104.3	15836.0	15615.5	15624.5	15649.7	15657.2	15662.7	15528.3	15266.2	15219.8
26 TOTAL REGIONAL FIRM LOAD	17964.5	17720.1	17451.1	17170.1	16944.1	16949.3	16972.7	16980.7	16985.2	16846.6	16578.3	16532.5
27 DSI ALUM TQ LOAD	625.7	566.9	495.0	419.1	342.0	342.0	342.0	342.0	342.0	300.0	208.3	183.0
28 DSI NON-ALUM TQ LOAD	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	658.7	599.9	528.0	452.1	375.0	375.0	375.0	375.0	375.0	333.0	241.3	216.0
31 TOT DSI T Q TRANS LOSSES	17.2	15.6	13.8	11.8	9.8	9.8	9.8	9.8	9.8	8.7	6.3	5.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	18640.4	18335.7	17992.9	17634.0	17328.9	17334.0	17357.5	17365.5	17370.0	17188.4	16825.9	16754.1

1991 FINAL COUNCIL PLAN -- LOW CASE -- (91FILP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2003	2004	2005	2006	2007	2008	2009	2010
SMALL & NONGEN PUBLIC UTILS								
1 SALES	2998.8	3015.2	3033.7	3051.2	3065.5	3081.7	3098.5	3119.3
2 DISTRIBUTION LOSSES	126.0	126.6	127.4	128.1	128.7	129.4	130.1	131.0
3 SYSTEM LOAD	3124.8	3141.8	3161.1	3179.3	3194.2	3211.1	3228.6	3250.3
4 DSI ALUM FIRM LOAD	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0
5 DSI NON-ALUM FIRM LOAD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	649.0	649.0	649.0	649.0	649.0	649.0	649.0	649.0
8 TOT DSI FIRM TRANS LOSSES	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
9 BPA FEDERAL AGENCIES	150.5	151.1	151.8	152.5	153.0	153.7	154.2	154.8
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	104.6	105.1	105.6	106.1	106.5	107.0	107.5	108.0
12 ADDTL FEDERAL TRAN LOSSES	46.7	47.0	48.2	49.8	50.3	49.6	49.8	50.4
13 TOTAL FEDERAL FIRM LOAD	4143.4	4161.8	4183.6	4204.7	4221.1	4238.4	4257.1	4280.7
GENERATING PUBLIC UTILITIES								
14 SALES	3402.3	3420.8	3441.8	3461.7	3477.9	3496.3	3515.3	3539.0
15 TRANSMIS & DISTRIB LOSSES	217.7	218.9	220.3	221.5	222.6	223.8	225.0	226.5
16 SYSTEM LOAD	3620.0	3639.7	3662.1	3683.2	3700.5	3720.0	3740.3	3765.5
17 PUB RESIDENTL EXCHG--RPSA	304.9	306.3	307.8	309.5	310.5	311.7	313.0	315.3
18 PUB RESIDENTL EXCHG--ETCA	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
19 TOTAL PUBLIC SALES	6401.1	6436.0	6475.4	6512.9	6543.4	6578.0	6613.8	6658.3
INVESTOR-OWNED UTILITIES								
20 SALES	7795.2	7827.4	7870.0	7910.3	7948.6	7989.2	8035.4	8084.7
21 TRANSMIS & DISTRIB LOSSES	818.5	821.9	826.3	830.6	834.6	838.9	843.7	848.9
22 SYSTEM LOAD	8613.7	8649.3	8696.3	8740.8	8783.2	8828.0	8879.1	8933.6
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	15243.6	15311.3	15394.2	15472.6	15542.1	15617.8	15700.5	15795.0
26 TOTAL REGIONAL FIRM LOAD	16557.1	16630.8	16722.0	16808.8	16884.8	16966.4	17056.6	17159.8
27 DSI ALUM TQ LOAD	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0
28 DSI NON-ALUM TQ LOAD	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
31 TOT DSI T Q TRANS LOSSES	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	16778.8	16852.5	16943.6	17030.4	17106.5	17188.0	17278.2	17381.5

1991 FINAL COUNCIL PLAN -- MEDIUM LOW CASE -- (9IFIMLP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3046.7	3073.3	3095.2	3121.9	3152.3	3185.3	3222.7	3246.6	3271.8	3293.4	3318.0	3345.1
2 DISTRIBUTION LOSSES	128.0	129.1	130.0	131.1	132.4	133.8	135.4	136.4	137.4	138.3	139.4	140.5
3 SYSTEM LOAD	3174.7	3202.4	3225.2	3253.0	3284.7	3319.1	3358.0	3382.9	3409.2	3431.7	3457.3	3485.6
4 DSI ALUM FIRM LOAD	1929.7	1864.6	1722.9	1581.5	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0
5 DSI NON-ALUM FIRM LOAD	166.0	157.5	139.3	139.3	139.7	140.1	140.6	141.1	141.3	141.8	142.1	142.1
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2095.7	2022.1	1862.2	1720.8	1578.7	1579.1	1579.6	1580.1	1580.3	1580.8	1581.1	1581.1
8 TOT DSI FIRM TRANS LOSSES	54.7	52.7	48.6	44.9	41.2	41.2	41.2	41.2	41.2	41.2	41.2	41.2
9 BPA FEDERAL AGENCIES	144.6	143.1	141.6	142.7	143.8	144.8	145.7	146.5	147.4	148.3	149.1	149.9
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	143.5	142.3	138.6	135.7	132.9	133.8	134.9	135.6	136.3	136.9	137.6	138.4
12 ADDTL FEDERAL TRAN LOSSES	63.2	65.7	64.5	62.5	63.2	59.9	57.2	57.8	56.9	57.3	57.7	58.4
13 TOTAL FEDERAL FIRM LOAD	5688.9	5642.8	5499.2	5382.1	5270.6	5304.0	5342.8	5370.3	5397.7	5422.6	5450.4	5481.1
GENERATING PUBLIC UTILITIES												
14 SALES	3456.6	3486.8	3511.6	3541.9	3576.4	3613.9	3656.2	3683.3	3712.0	3736.4	3764.3	3795.1
15 TRANSMIS & DISTRIB LOSSES	221.2	223.1	224.7	226.7	228.9	231.3	234.0	235.7	237.6	239.1	240.9	242.9
16 SYSTEM LOAD	3677.8	3709.9	3736.3	3768.6	3805.3	3845.2	3890.2	3919.1	3949.5	3975.6	4005.3	4038.0
17 PUB RESIDENTL EXCHG--RPSA	321.5	325.9	325.2	322.5	323.8	326.9	328.6	329.1	331.6	334.6	337.7	340.3
18 PUB RESIDENTL EXCHG--ETCA	10.5	10.5	10.4	10.3	10.3	10.3	10.3	10.3	10.3	10.4	10.4	10.4
19 TOTAL PUBLIC SALES	6503.3	6550.0	6606.7	6663.8	6728.8	6799.2	6878.9	6929.9	6983.8	7029.8	7082.3	7140.2
INVESTOR-OWNED UTILITIES												
20 SALES	8076.6	8099.9	8146.3	8191.8	8240.7	8296.6	8358.9	8425.9	8498.9	8569.2	8641.7	8724.7
21 TRANSMIS & DISTRIB LOSSES	848.0	850.5	855.4	860.1	865.3	871.1	877.7	884.7	892.4	899.8	907.4	916.1
22 SYSTEM LOAD	8924.6	8950.4	9001.7	9051.9	9106.0	9167.7	9236.6	9310.6	9391.2	9468.9	9549.0	9640.7
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17067.4	17072.5	17004.0	16966.5	16939.3	17067.0	17210.5	17329.9	17457.9	17575.6	17701.8	17843.6
26 TOTAL REGIONAL FIRM LOAD	18471.4	18483.1	18417.2	18382.6	18361.9	18496.9	18649.6	18780.0	18918.5	19047.1	19184.7	19339.9
27 DSI ALUM TQ LOAD	643.4	621.5	574.3	527.5	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0
28 DSI NON-ALUM TQ LOAD	55.4	52.5	46.3	46.3	46.5	46.7	47.2	47.2	47.2	47.3	47.3	47.3
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	698.8	674.0	620.7	573.8	526.5	526.7	527.2	527.2	527.2	527.3	527.3	527.3
31 TOT DSI T Q TRANS LOSSES	18.2	17.6	16.2	15.0	13.7	13.7	13.7	13.7	13.7	13.8	13.8	13.8
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	19188.4	19174.7	19054.1	18971.4	18902.2	19037.3	19190.5	19321.0	19459.4	19588.1	19725.7	19880.9

1991 FINAL COUNCIL PLAN -- MEDIUM LOW CASE -- (91FIMLP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2003	2004	2005	2006	2007	2008	2009	2010
SMALL & NONGEN PUBLIC UTILS								
1 SALES	3371.0	3409.1	3451.6	3493.5	3533.9	3575.4	3614.9	3659.0
2 DISTRIBUTION LOSSES	141.6	143.2	145.0	146.7	148.4	150.2	151.8	153.7
3 SYSTEM LOAD	3512.6	3552.3	3596.6	3640.3	3682.3	3725.5	3766.7	3812.7
4 DSI ALUM FIRM LOAD	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0
5 DSI NON-ALUM FIRM LOAD	142.1	142.2	142.3	142.3	142.3	142.6	142.8	142.8
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	1581.1	1581.2	1581.3	1581.3	1581.3	1581.6	1581.8	1581.8
8 TOT DSI FIRM TRANS LOSSES	41.2	41.2	41.2	41.2	41.2	41.2	41.3	41.3
9 BPA FEDERAL AGENCIES	150.5	151.1	151.8	152.5	153.0	153.7	154.2	154.8
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	139.1	140.2	141.4	142.5	143.7	144.8	145.9	147.1
12 ADDTL FEDERAL TRAN LOSSES	57.8	58.7	60.2	62.8	63.8	63.8	64.8	65.8
13 TOTAL FEDERAL FIRM LOAD	5508.9	5551.3	5599.1	5647.3	5692.0	5737.4	5781.5	5830.4
GENERATING PUBLIC UTILITIES								
14 SALES	3824.5	3867.8	3916.0	3963.5	4009.3	4056.4	4101.2	4151.3
15 TRANSMIS & DISTRIB LOSSES	244.8	247.5	250.6	253.7	256.6	259.6	262.5	265.7
16 SYSTEM LOAD	4069.3	4115.3	4166.6	4217.2	4265.9	4316.0	4363.7	4416.9
17 PUB RESIDENTL EXCHG--RPSA	342.7	346.3	350.2	354.4	357.9	361.7	365.1	369.8
18 PUB RESIDENTL EXCHG--ETCA	10.5	10.5	10.6	10.7	10.7	10.8	10.8	10.9
19 TOTAL PUBLIC SALES	7195.5	7276.9	7367.6	7457.1	7543.1	7631.7	7716.1	7810.3
INVESTOR-OWNED UTILITIES								
20 SALES	8807.6	8921.7	9056.5	9183.0	9309.8	9442.2	9566.8	9700.5
21 TRANSMIS & DISTRIB LOSSES	924.8	936.8	950.9	964.2	977.5	991.4	1004.5	1018.5
22 SYSTEM LOAD	9732.4	9858.5	10007.4	10147.2	10287.3	10433.7	10571.3	10719.0
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17982.5	18178.7	18405.1	18621.7	18835.3	19057.2	19267.0	19495.5
26 TOTAL REGIONAL FIRM LOAD	19490.6	19705.1	19953.1	20191.7	20425.2	20667.1	20896.5	21146.4
27 DSI ALUM TQ LOAD	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0
28 DSI NON-ALUM TQ LOAD	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	527.3	527.3	527.3	527.3	527.3	527.3	527.3	527.3
31 TOT DSI T Q TRANS LOSSES	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20031.6	20246.2	20494.2	20732.8	20966.3	21208.2	21437.6	21687.5

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3137.4	3168.7	3206.2	3252.3	3291.5	3334.7	3375.8	3416.6	3457.1	3495.7	3532.3	3574.7
2 DISTRIBUTION LOSSES	131.8	133.1	134.7	136.6	138.2	140.1	141.8	143.5	145.2	146.8	148.4	150.1
3 SYSTEM LOAD	3269.2	3301.8	3340.8	3388.9	3429.7	3474.8	3517.6	3560.1	3602.3	3642.5	3680.7	3724.8
4 DSI ALUM FIRM LOAD	2161.0	2105.0	2053.1	1986.3	1972.2	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0
5 DSI NON-ALUM FIRM LOAD	219.8	214.8	179.2	179.3	179.5	180.7	181.3	181.9	182.9	183.8	183.9	183.9
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2380.8	2319.8	2232.3	2165.5	2151.7	2131.7	2132.3	2132.9	2133.9	2134.8	2134.9	2134.9
8 TOT DSI FIRM TRANS LOSSES	62.1	60.5	58.2	56.5	56.1	55.6	55.6	55.6	55.6	55.7	55.7	55.7
9 BPA FEDERAL AGENCIES	144.6	143.1	141.6	142.7	143.8	144.8	145.7	146.5	147.4	148.3	149.1	149.9
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	153.4	152.7	151.3	150.9	151.6	152.3	153.5	154.6	155.8	156.9	157.9	159.1
12 ADDTL FEDERAL TRAN LOSSES	66.2	69.4	68.4	66.9	67.8	64.7	62.6	63.7	62.5	63.0	64.1	65.2
13 TOTAL FEDERAL FIRM LOAD	6081.5	6054.0	6001.6	5982.2	6012.0	6035.6	6079.0	6125.3	6169.5	6213.1	6254.4	6301.7
GENERATING PUBLIC UTILITIES												
14 SALES	3611.6	3691.1	3731.8	3771.9	3808.2	3858.2	3905.7	3952.9	3999.8	4044.5	4086.8	4135.8
15 TRANSMIS & DISTRIB LOSSES	231.1	236.2	238.8	241.4	243.7	246.9	250.0	253.0	256.0	258.8	261.6	264.7
16 SYSTEM LOAD	3842.7	3927.3	3970.7	4013.3	4051.9	4105.1	4155.7	4205.9	4255.8	4303.3	4348.4	4400.5
17 PUB RESIDENTL EXCHG--RPSA	331.0	336.0	336.9	336.0	338.1	342.2	344.2	346.3	350.4	355.1	359.5	363.7
18 PUB RESIDENTL EXCHG--ETCA	10.8	10.9	10.8	10.8	10.8	10.8	10.8	10.8	10.9	11.0	11.1	11.2
19 TOTAL PUBLIC SALES	6749.0	6859.8	6938.0	7024.2	7099.7	7192.9	7281.5	7369.5	7457.0	7540.2	7619.2	7710.5
INVESTOR-OWNED UTILITIES												
20 SALES	8332.5	8509.2	8652.7	8761.8	8880.7	8987.8	9107.0	9244.7	9385.8	9525.5	9645.0	9790.2
21 TRANSMIS & DISTRIB LOSSES	874.9	893.5	908.5	920.0	932.5	943.7	956.2	970.7	985.5	1000.2	1012.7	1028.0
22 SYSTEM LOAD	9207.5	9402.6	9561.2	9681.8	9813.2	9931.5	10063.2	10215.4	10371.4	10525.6	10657.7	10818.1
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17854.2	18079.2	18211.7	18341.5	18523.2	18704.5	18913.8	19141.2	19371.6	19596.2	19795.8	20033.3
26 TOTAL REGIONAL FIRM LOAD	19311.7	19564.0	19713.4	19857.2	20057.0	20252.2	20477.9	20726.6	20976.7	21222.0	21440.5	21700.4
27 DSI ALUM TQ LOAD	720.0	702.0	684.1	661.9	657.4	650.0	650.0	650.0	650.0	650.0	650.0	650.0
28 DSI NON-ALUM TQ LOAD	89.9	71.7	59.8	59.8	59.8	60.4	60.4	60.6	61.0	61.4	61.4	61.4
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	809.9	773.7	743.9	721.8	717.3	710.4	710.4	710.6	711.0	711.4	711.4	711.4
31 TOT DSI T Q TRANS LOSSES	21.1	20.2	19.4	18.8	18.7	18.5	18.5	18.5	18.5	18.6	18.6	18.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20142.7	20357.8	20476.8	20597.8	20793.0	20981.2	21206.9	21455.8	21706.2	21952.0	22170.5	22430.3

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2003	2004	2005	2006	2007	2008	2009	2010
SMALL & NONGEN PUBLIC UTILS								
1 SALES	3615.0	3660.9	3711.8	3762.0	3808.5	3856.9	3901.4	3946.7
2 DISTRIBUTION LOSSES	151.8	153.8	155.9	158.0	160.0	162.0	163.9	165.8
3 SYSTEM LOAD	3766.8	3814.7	3867.7	3920.0	3968.5	4018.9	4065.2	4112.4
4 DSI ALUM FIRM LOAD	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0
5 DSI NON-ALUM FIRM LOAD	184.2	184.2	184.5	184.5	184.8	185.1	185.1	185.1
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2135.2	2135.2	2135.5	2135.5	2135.8	2136.1	2136.1	2136.1
8 TOT DSI FIRM TRANS LOSSES	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7
9 BPA FEDERAL AGENCIES	150.5	151.1	151.8	152.5	153.0	153.7	154.2	154.8
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	160.2	161.5	162.9	164.3	165.6	167.0	168.2	169.5
12 ADDTL FEDERAL TRAN LOSSES	65.0	66.1	68.0	70.8	72.0	72.2	73.1	74.4
13 TOTAL FEDERAL FIRM LOAD	6345.6	6396.5	6453.8	6511.0	6563.0	6615.8	6664.9	6715.3
GENERATING PUBLIC UTILITIES								
14 SALES	4182.5	4235.6	4294.5	4352.5	4406.4	4462.3	4513.8	4566.2
15 TRANSMIS & DISTRIB LOSSES	267.7	271.1	274.8	278.6	282.0	285.6	288.9	292.2
16 SYSTEM LOAD	4450.2	4506.7	4569.3	4631.1	4688.4	4747.9	4802.7	4858.4
17 PUB RESIDENTL EXCHG--RPSA	367.5	371.9	376.6	381.6	385.7	390.1	394.1	398.9
18 PUB RESIDENTL EXCHG--ETCA	11.2	11.3	11.4	11.5	11.6	11.6	11.7	11.8
19 TOTAL PUBLIC SALES	7797.5	7896.6	8006.3	8114.5	8214.9	8319.2	8415.2	8512.9
INVESTOR-OWNED UTILITIES								
20 SALES	9931.5	10083.2	10254.3	10407.8	10561.2	10733.8	10889.4	11032.4
21 TRANSMIS & DISTRIB LOSSES	1042.8	1058.7	1076.7	1092.8	1108.9	1127.0	1143.4	1158.4
22 SYSTEM LOAD	10974.3	11142.0	11331.0	11500.6	11670.1	11860.8	12032.8	12190.8
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	20262.4	20513.9	20795.8	21058.2	21313.0	21590.7	21843.0	22084.3
26 TOTAL REGIONAL FIRM LOAD	21950.0	22225.1	22534.2	22822.7	23101.5	23404.5	23680.4	23944.6
27 DSI ALUM TQ LOAD	650.0	650.0	650.0	650.0	650.0	650.0	650.0	650.0
28 DSI NON-ALUM TQ LOAD	61.4	61.5	61.5	61.5	61.5	61.5	61.5	61.5
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	711.4	711.5	711.5	711.5	711.5	711.5	711.5	711.5
31 TOT DSI T Q TRANS LOSSES	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	22680.0	22955.2	23264.2	23552.7	23831.5	24134.6	24410.4	24674.6

1991 FINAL COUNCIL PLAN -- MEDIUM HIGH CASE -- (91FLMHP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3189.4	3255.8	3320.8	3387.1	3457.6	3525.8	3594.3	3655.5	3713.0	3767.8	3824.1	3885.9
2 DISTRIBUTION LOSSES	134.0	136.7	139.5	142.3	145.2	148.1	151.0	153.5	155.9	158.2	160.6	163.2
3 SYSTEM LOAD	3323.4	3392.6	3460.3	3529.4	3602.8	3673.9	3745.3	3809.1	3869.0	3926.0	3984.7	4049.1
4 DSI ALUM FIRM LOAD	2161.0	2123.0	2123.0	2115.5	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0
5 DSI NON-ALUM FIRM LOAD	274.4	264.9	247.2	247.3	247.5	248.1	248.4	249.1	249.2	249.8	251.0	212.3
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2435.4	2387.9	2370.2	2362.8	2334.5	2335.1	2335.4	2336.1	2336.2	2336.8	2318.0	2299.3
8 TOT DSI FIRM TRANS LOSSES	63.5	62.3	61.8	61.6	60.9	60.9	60.9	60.9	60.9	60.9	60.5	60.0
9 BPA FEDERAL AGENCIES	144.6	143.1	141.6	142.7	143.8	144.8	145.7	146.5	147.4	148.3	149.1	149.9
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	156.3	156.8	158.1	159.7	161.0	162.9	164.8	166.5	168.1	169.6	170.7	171.9
12 ADDTL FEDERAL TRAN LOSSES	69.2	72.8	72.7	72.0	73.3	70.6	68.9	70.5	70.3	71.5	73.0	74.8
13 TOTAL FEDERAL FIRM LOAD	6196.1	6220.5	6270.1	6333.8	6382.7	6454.6	6527.5	6596.1	6658.4	6719.7	6763.2	6812.8
GENERATING PUBLIC UTILITIES												
14 SALES	3618.5	3693.8	3767.6	3842.8	3922.8	4000.2	4077.9	4147.3	4212.6	4274.7	4338.6	4408.7
15 TRANSMIS & DISTRIB LOSSES	231.6	236.4	241.1	245.9	251.1	256.0	261.0	265.4	269.6	273.6	277.7	282.2
16 SYSTEM LOAD	3850.1	3930.2	4008.7	4088.7	4173.8	4256.2	4338.9	4412.8	4482.2	4548.3	4616.2	4690.9
17 PUB RESIDENTL EXCHG--RPSA	336.5	345.3	348.9	349.9	355.1	361.8	366.5	370.5	376.4	382.8	389.2	395.3
18 PUB RESIDENTL EXCHG--ETCA	11.0	11.2	11.2	11.2	11.3	11.4	11.5	11.6	11.7	11.8	12.0	12.1
19 TOTAL PUBLIC SALES	6808.0	6949.7	7088.5	7229.9	7380.4	7526.0	7672.3	7802.8	7925.6	8042.5	8162.7	8294.6
INVESTOR-OWNED UTILITIES												
20 SALES	8518.5	8700.5	8888.0	9056.8	9239.0	9413.7	9593.1	9785.8	9983.4	10169.3	10343.1	10546.7
21 TRANSMIS & DISTRIB LOSSES	894.4	913.5	933.2	951.0	970.1	988.4	1007.3	1027.5	1048.3	1067.8	1086.0	1107.4
22 SYSTEM LOAD	9412.9	9614.0	9821.2	10007.8	10209.1	10402.1	10600.4	10813.4	11031.7	11237.1	11429.2	11654.1
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	18153.8	18428.5	18735.4	19039.5	19345.0	19667.0	19993.9	20318.8	20640.1	20944.3	21220.6	21538.3
26 TOTAL REGIONAL FIRM LOAD	19639.2	19944.8	20280.1	20610.4	20945.6	21293.0	21646.8	22002.3	22352.3	22685.0	22988.6	23337.8
27 DSI ALUM TQ LOAD	720.0	708.0	708.0	705.5	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0
28 DSI NON-ALUM TQ LOAD	91.3	88.3	82.3	82.3	82.3	82.7	83.0	83.2	83.2	83.3	77.0	70.8
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	811.3	796.3	790.3	787.8	778.3	778.7	779.0	779.2	779.2	779.3	773.0	766.8
31 TOT DSI T Q TRANS LOSSES	21.2	20.8	20.6	20.5	20.3	20.3	20.3	20.3	20.3	20.3	20.2	20.0
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20471.7	20761.8	21690.9	21418.8	21744.2	22091.9	22446.2	22801.7	23151.8	23484.6	23781.7	24124.6

1991 FINAL COUNCIL PLAN -- MEDIUM HIGH CASE -- (91FIMHP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2003	2004	2005	2006	2007	2008	2009	2010
SMALL & NONGEN PUBLIC UTILS								
1 SALES	3947.1	4015.2	4084.4	4156.0	4221.2	4287.1	4357.3	4428.4
2 DISTRIBUTION LOSSES	165.8	168.6	171.5	174.6	177.3	180.1	183.0	186.0
3 SYSTEM LOAD	4112.9	4183.9	4255.9	4330.6	4398.5	4467.1	4540.3	4614.4
4 DSI ALUM FIRM LOAD	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0
5 DSI NON-ALUM FIRM LOAD	212.4	212.3	212.6	212.7	212.7	213.3	213.3	213.3
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2299.4	2299.3	2299.6	2299.7	2299.7	2300.3	2300.3	2300.3
8 TOT DSI FIRM TRANS LOSSES	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
9 BPA FEDERAL AGENCIES	150.5	151.1	151.8	152.5	153.0	153.7	154.2	154.8
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	173.6	175.5	177.4	179.4	181.2	183.0	185.0	186.9
12 ADDTL FEDERAL TRAN LOSSES	75.0	76.6	79.1	82.3	84.0	84.7	86.4	88.0
13 TOTAL FEDERAL FIRM LOAD	6879.2	6954.3	7031.8	7112.4	7184.4	7256.8	7334.2	7412.6
GENERATING PUBLIC UTILITIES								
14 SALES	4478.1	4555.4	4633.9	4715.2	4789.1	4863.8	4943.5	5024.2
15 TRANSMIS & DISTRIB LOSSES	286.6	291.5	296.6	301.8	306.5	311.3	316.4	321.5
16 SYSTEM LOAD	4764.7	4847.0	4930.4	5017.0	5095.6	5175.1	5259.9	5345.7
17 PUB RESIDENTL EXCHG--RPSA	401.3	407.9	414.4	421.6	427.5	433.7	440.1	447.6
18 PUB RESIDENTL EXCHG--ETCA	12.3	12.4	12.6	12.7	12.8	12.9	13.1	13.3
19 TOTAL PUBLIC SALES	8425.2	8570.7	8718.3	8871.2	9010.4	9150.9	9300.8	9452.6
INVESTOR-OWNED UTILITIES								
20 SALES	10746.6	10983.1	11236.6	11483.9	11704.9	11951.4	12204.7	12436.8
21 TRANSMIS & DISTRIB LOSSES	1128.4	1153.2	1179.8	1205.8	1229.0	1254.9	1281.5	1305.9
22 SYSTEM LOAD	11875.0	12136.3	12416.5	12689.7	12933.9	13206.3	13486.2	13742.6
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	21869.5	22252.1	22654.2	23055.2	23416.0	23804.2	24208.1	24592.6
26 TOTAL REGIONAL FIRM LOAD	23698.9	24117.6	24558.7	24999.0	25394.0	25818.2	26260.3	26680.9
27 DSI ALUM TQ LOAD	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0
28 DSI NON-ALUM TQ LOAD	70.9	70.8	71.1	71.2	71.2	71.2	71.2	71.2
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	766.9	766.8	767.1	767.2	767.2	767.2	767.2	767.2
31 TOT DSI T Q TRANS LOSSES	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	24485.8	24904.4	25345.8	25786.2	26181.1	26605.4	27047.5	27468.1

1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91F1HP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3298.2	3405.9	3499.3	3605.5	3716.0	3816.0	3920.9	4005.5	4091.6	4183.0	4272.8	4366.6
2 DISTRIBUTION LOSSES	138.5	143.0	147.0	151.4	156.1	160.3	164.7	168.2	171.8	175.7	179.5	183.4
3 SYSTEM LOAD	3436.7	3549.0	3646.3	3756.9	3872.1	3976.3	4085.6	4173.7	4263.4	4358.7	4452.3	4550.0
4 DSI ALUM FIRM LOAD	2160.5	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0
5 DSI NON-ALUM FIRM LOAD	316.8	315.0	316.0	316.0	316.0	316.0	316.0	316.0	316.0	316.0	278.5	241.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2477.3	2475.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2438.5	2401.0
8 TOT DSI FIRM TRANS LOSSES	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	63.6	62.6
9 BPA FEDERAL AGENCIES	144.6	143.1	141.6	142.7	143.8	144.8	145.7	146.5	147.4	148.3	149.1	149.9
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	160.3	163.2	165.7	168.7	171.7	174.5	177.4	179.7	182.1	184.6	186.2	187.7
12 ADDTL FEDERAL TRAN LOSSES	72.8	77.8	78.8	79.0	81.4	79.3	78.4	80.8	81.7	83.8	86.1	88.8
13 TOTAL FEDERAL FIRM LOAD	6359.0	6475.4	6575.6	6690.7	6812.3	6918.2	7030.5	7124.3	7218.1	7319.0	7379.8	7445.3
GENERATING PUBLIC UTILITIES												
14 SALES	3742.0	3864.2	3970.1	4090.6	4215.9	4329.4	4448.5	4544.4	4642.1	4745.8	4847.7	4954.1
15 TRANSMIS & DISTRIB LOSSES	239.5	247.3	254.1	261.8	269.8	277.1	284.7	290.8	297.1	303.7	310.2	317.1
16 SYSTEM LOAD	3981.4	4111.5	4224.2	4352.4	4485.8	4606.5	4733.2	4835.2	4939.2	5049.6	5157.9	5271.2
17 PUB RESIDENTL EXCHG--RPSA	348.0	361.2	367.7	372.4	381.7	391.6	399.8	406.0	414.7	425.0	434.9	444.2
18 PUB RESIDENTL EXCHG--ETCA	11.4	11.7	11.8	11.9	12.2	12.4	12.6	12.7	12.9	13.2	13.4	13.6
19 TOTAL PUBLIC SALES	7040.2	7270.1	7469.4	7696.1	7932.0	8145.4	8369.4	8549.9	8733.7	8928.9	9120.5	9320.8
INVESTOR-OWNED UTILITIES												
20 SALES	8821.0	9137.7	9422.8	9720.0	10036.8	10328.0	10633.7	10891.8	11200.9	11514.3	11811.3	12128.0
21 TRANSMIS & DISTRIB LOSSES	926.2	959.5	989.4	1020.6	1053.9	1084.4	1116.5	1143.6	1176.1	1209.0	1240.2	1273.4
22 SYSTEM LOAD	9747.2	10097.1	10412.2	10740.6	11090.6	11412.4	11750.2	12035.4	12377.0	12723.3	13051.5	13401.4
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	18730.3	19273.2	19757.0	20282.1	20835.9	21341.6	21872.2	22311.6	22805.5	23315.0	23767.1	24247.4
26 TOTAL REGIONAL FIRM LOAD	20267.6	20863.9	21392.0	21963.7	22568.7	23117.1	23693.9	24174.9	24714.3	25271.8	25769.3	26297.9
27 DSI ALUM TQ LOAD	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0
28 DSI NON-ALUM TQ LOAD	105.8	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	92.5	80.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	825.8	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	812.5	800.0
31 TOT DSI T Q TRANS LOSSES	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.2	20.9
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	21114.9	21710.5	22238.5	22810.2	23415.2	23963.6	24540.4	25021.4	25560.8	26118.3	26603.0	27118.7

1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91F1HP)
CALENDAR YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2003	2004	2005	2006	2007	2008	2009	2010
SMALL & NONGEN PUBLIC UTILS								
1 SALES	4457.5	4564.7	4677.8	4785.2	4890.1	4997.4	5105.2	5216.2
2 DISTRIBUTION LOSSES	187.2	191.7	196.5	201.0	205.4	209.9	214.4	219.1
3 SYSTEM LOAD	4644.7	4756.5	4874.3	4986.2	5095.5	5207.3	5319.6	5435.3
4 DSI ALUM FIRM LOAD	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0
5 DSI NON-ALUM FIRM LOAD	241.0	241.0	241.0	241.0	241.0	241.0	241.0	241.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0
8 TOT DSI FIRM TRANS LOSSES	62.6	62.6	62.6	62.6	62.6	62.6	62.6	62.6
9 BPA FEDERAL AGENCIES	150.5	151.1	151.8	152.5	153.0	153.7	154.2	154.8
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	190.2	193.2	196.3	199.3	202.2	205.1	208.1	211.1
12 ADDTL FEDERAL TRAN LOSSES	90.1	92.9	96.6	101.1	104.0	106.1	108.8	111.1
13 TOTAL FEDERAL FIRM LOAD	7544.3	7662.5	7787.9	7908.0	8023.7	8141.2	8259.9	8381.5
GENERATING PUBLIC UTILITIES								
14 SALES	5057.1	5178.9	5307.1	5429.0	5548.0	5669.7	5792.0	5918.0
15 TRANSMIS & DISTRIB LOSSES	323.7	331.4	339.7	347.5	355.1	362.9	370.7	378.7
16 SYSTEM LOAD	5380.8	5510.3	5646.8	5776.5	5903.1	6032.6	6162.7	6296.8
17 PUB RESIDENTIAL EXCHG--RPSA	453.2	463.7	474.6	485.5	495.3	505.5	515.7	527.2
18 PUB RESIDENTIAL EXCHG--ETCA	13.8	14.1	14.4	14.6	14.9	15.1	15.3	15.6
19 TOTAL PUBLIC SALES	9514.6	9743.6	9984.9	10214.3	10438.1	10667.1	10897.3	11134.2
INVESTOR-OWNED UTILITIES								
20 SALES	12413.0	12751.5	13138.0	13489.5	13839.8	14197.4	14555.4	14908.1
21 TRANSMIS & DISTRIB LOSSES	1303.4	1338.9	1379.5	1416.4	1453.2	1490.7	1528.3	1565.3
22 SYSTEM LOAD	13716.4	14090.4	14517.5	14905.9	15293.0	15688.1	16083.7	16473.4
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	24726.9	25295.0	25923.7	26505.2	27080.0	27667.2	28256.0	28846.3
26 TOTAL REGIONAL FIRM LOAD	26821.5	27443.2	28132.2	28770.4	29399.8	30041.8	30686.3	31331.7
27 DSI ALUM TQ LOAD	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0
28 DSI NON-ALUM TQ LOAD	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
31 TOT DSI T Q TRANS LOSSES	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	27642.4	28264.1	28953.1	29591.3	30220.7	30862.7	31507.2	32152.6

1991 FINAL COUNCIL PLAN -- LOW CASE -- (91FILP)

OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	2986.0	2966.5	2962.6	2958.4	2958.7	2965.1	2975.8	2983.3	2984.6	2983.8	2984.6	2989.7
2 DISTRIBUTION LOSSES	125.4	124.6	124.4	124.3	124.3	124.5	125.0	125.3	125.4	125.3	125.4	125.6
3 SYSTEM LOAD	3111.5	3091.1	3087.0	3082.6	3082.9	3089.6	3100.8	3108.6	3110.0	3109.2	3109.9	3115.2
4 DSI ALUM FIRM LOAD	2055.5	1795.3	1596.8	1379.0	1107.6	1027.0	1027.0	1027.0	1027.0	992.9	770.7	549.0
5 DSI NON-ALUM FIRM LOAD	151.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2207.0	1895.3	1696.8	1479.0	1207.6	1127.0	1127.0	1127.0	1127.0	1092.9	870.7	649.0
8 TOT DSI FIRM TRANS LOSSES	57.4	49.4	44.2	38.5	31.4	29.4	29.4	29.4	29.4	28.5	22.7	16.9
9 BPA FEDERAL AGENCIES	143.8	144.5	141.7	142.1	143.3	144.3	145.2	146.1	147.0	147.8	148.7	149.5
10 USBR	67.2	67.3	67.3	67.2	67.3	67.3	67.4	67.5	67.5	67.5	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	144.6	136.0	130.6	124.9	117.8	116.0	116.3	116.5	116.6	115.7	110.0	104.3
12 ADDTL FEDERAL TRAN LOSSES	59.1	61.8	61.7	57.0	56.7	57.1	49.3	49.7	48.9	47.8	47.7	47.8
13 TOTAL FEDERAL FIRM LOAD	5733.1	5396.0	5185.1	4952.8	4675.5	4601.4	4606.1	4615.4	4616.9	4581.0	4354.6	4133.6
GENERATING PUBLIC UTILITIES												
14 SALES	3387.5	3365.6	3361.1	3356.4	3356.7	3364.1	3376.3	3384.7	3386.2	3385.3	3386.2	3391.9
15 TRANSMIS & DISTRIB LOSSES	216.8	215.4	215.1	214.8	214.8	215.3	216.1	216.6	216.7	216.7	216.7	217.1
16 SYSTEM LOAD	3604.3	3581.0	3576.2	3571.2	3571.6	3579.4	3592.4	3601.3	3602.9	3601.9	3602.9	3609.0
17 PUB RESIDENTL EXCHG--RPSA	316.3	313.8	314.4	306.6	304.8	304.5	304.8	303.0	302.5	302.5	304.0	304.3
18 PUB RESIDENTL EXCHG--ETCA	10.5	10.2	10.1	9.9	9.7	9.7	9.6	9.5	9.4	9.4	9.4	9.4
19 TOTAL PUBLIC SALES	6373.6	6332.0	6323.7	6314.7	6315.4	6329.2	6352.2	6368.0	6370.8	6369.1	6370.7	6381.6
INVESTOR-OWNED UTILITIES												
20 SALES	7973.1	7809.9	7834.2	7791.2	7781.3	7777.6	7760.1	7766.1	7772.9	7759.9	7768.2	7775.4
21 TRANSMIS & DISTRIB LOSSES	837.2	820.0	822.6	818.1	817.0	816.6	814.8	815.4	816.2	814.8	815.7	816.4
22 SYSTEM LOAD	8810.3	8629.9	8656.8	8609.2	8598.3	8594.3	8574.9	8581.5	8589.1	8574.7	8583.8	8591.8
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	16944.6	16429.1	16243.7	15974.3	15694.9	15625.5	15631.9	15654.6	15665.1	15617.3	15405.9	15203.2
26 TOTAL REGIONAL FIRM LOAD	18327.7	17786.9	17598.1	17313.2	17025.4	16955.0	16953.4	16978.2	16988.8	16937.6	16721.3	16514.5
27 DSI ALUM TQ LOAD	655.4	598.5	532.3	459.8	369.1	342.0	342.0	342.0	342.0	330.8	257.0	183.0
28 DSI NON-ALUM TQ LOAD	49.7	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	705.1	631.5	565.3	492.8	402.1	375.0	375.0	375.0	375.0	363.8	290.0	216.0
31 TOT DSI T Q TRANS LOSSES	18.4	16.4	14.7	12.8	10.4	9.8	9.8	9.8	9.8	9.5	7.6	5.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	19051.1	18434.9	18178.1	17818.9	17437.9	17339.8	17338.2	17363.0	17373.6	17310.8	17018.8	16736.1

1991 FINAL COUNCIL PLAN -- LOW CASE -- (91FILP)											
OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST											
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011		
SMALL & NONGEN PUBLIC UTILS											
1 SALES	2995.9	3007.1	3024.6	3042.6	3058.5	3073.7	3090.2	3109.1	3119.3		
2 DISTRIBUTION LOSSES	125.8	126.3	127.0	127.8	128.5	129.1	129.8	130.6	131.0		
3 SYSTEM LOAD	3121.8	3133.4	3151.6	3170.4	3186.9	3202.8	3220.0	3239.7	3250.3		
4 DSI ALUM FIRM LOAD	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0		
5 DSI NON-ALUM FIRM LOAD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7 TOTAL DSI FIRM LOAD	649.0	649.0	649.0	649.0	649.0	649.0	649.0	649.0	649.0		
8 TOT DSI FIRM TRANS LOSSES	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9		
9 BPA FEDERAL AGENCIES	150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1		
10 USBR	67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1		
11 FEDERAL TRANSMIS LOSSES	104.5	104.9	105.4	105.9	106.3	106.8	107.2	107.8	108.1		
12 ADDTL FEDERAL TRAN LOSSES	47.3	46.8	47.2	49.3	50.4	50.0	49.3	50.4	50.4		
13 TOTAL FEDERAL FIRM LOAD	4140.6	4152.7	4172.5	4194.7	4213.4	4229.9	4247.6	4269.5	4281.0		
GENERATING PUBLIC UTILITIES											
14 SALES	3399.1	3411.8	3431.6	3452.0	3470.0	3487.4	3506.1	3527.5	3539.0		
15 TRANSMIS & DISTRIB LOSSES	217.5	218.4	219.6	220.9	222.1	223.2	224.4	225.8	226.5		
16 SYSTEM LOAD	3616.6	3630.2	3651.2	3673.0	3692.1	3710.6	3730.5	3753.3	3765.5		
17 PUB RESIDENTIAL EXCHG--RPSA	304.7	305.6	307.0	308.7	310.0	311.1	312.4	313.9	315.6		
18 PUB RESIDENTIAL EXCHG--ETCA	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3		
19 TOTAL PUBLIC SALES	6395.0	6419.0	6456.2	6494.6	6528.5	6561.1	6596.3	6636.6	6658.3		
INVESTOR-OWNED UTILITIES											
20 SALES	7792.8	7813.2	7851.2	7891.0	7929.8	7964.7	8018.1	8060.8	8118.2		
21 TRANSMIS & DISTRIB LOSSES	818.2	820.4	824.4	828.6	832.6	836.3	841.9	846.4	852.4		
22 SYSTEM LOAD	8611.1	8633.5	8675.6	8719.6	8762.5	8800.9	8860.0	8907.2	8970.7		
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		
25 TOTAL REGIONAL FIRM SALES	15234.8	15279.7	15355.8	15434.7	15508.1	15576.1	15665.4	15749.0	15828.8		
26 TOTAL REGIONAL FIRM LOAD	16548.2	16596.4	16679.3	16767.2	16848.0	16921.4	17018.0	17109.9	17197.2		
27 DSI ALUM TQ LOAD	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0		
28 DSI NON-ALUM TQ LOAD	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0		
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
30 TOTAL DSI TOP QTL LOAD	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0		
31 TOT DSI T Q TRANS LOSSES	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6		
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
33 TOTAL REGIONAL LOAD	16769.9	16818.0	16901.0	16988.9	17069.6	17143.1	17239.6	17331.5	17418.8		

1991 FINAL COUNCIL PLAN -- MEDIUM LOW CASE -- (91FIMLP)

OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST		1997-1998		1999-2000		2000-2001		2001-2002	
1990-1991	1992-1993	1994-1995	1996-1997	1998-1999	1999-2000	2000-2001	2001-2002	2001-2002	2002-2003
SMALL & NONGEN PUBLIC UTILS									
1 SALES	3043.4	3060.2	3084.4	3108.8	3137.4	3169.1	3204.3	3234.8	3259.4
2 DISTRIBUTION LOSSES	127.8	128.5	129.5	130.6	131.8	133.1	134.6	135.9	136.9
3 SYSTEM LOAD	3171.2	3188.7	3213.9	3239.3	3269.1	3302.2	3338.9	3370.7	3396.3
4 DSI ALUM FIRM LOAD	2072.0	1904.7	1797.8	1654.3	1491.5	1439.0	1439.0	1439.0	1439.0
5 DSI NON-ALUM FIRM LOAD	184.7	171.3	159.0	139.3	139.4	140.1	140.3	140.9	141.1
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2256.7	2075.9	1936.8	1793.5	1630.9	1579.1	1579.3	1579.9	1580.1
8 TOT DSI FIRM TRANS LOSSES	58.7	54.1	50.5	46.7	42.4	41.2	41.2	41.2	41.2
9 BPA FEDERAL AGENCIES	143.8	144.5	141.7	142.1	143.3	144.3	145.2	146.1	147.0
10 USBR	67.2	67.3	67.3	67.2	67.3	67.3	67.4	67.5	67.5
11 FEDERAL TRANSMIS LOSSES	147.5	143.3	140.3	137.2	135.7	133.4	134.4	135.2	135.9
12 ADDTL FEDERAL TRAN LOSSES	61.7	65.4	66.3	62.2	62.8	63.9	56.7	57.7	57.3
13 TOTAL FEDERAL FIRM LOAD	5848.1	5685.2	5566.3	5441.6	5307.2	5290.2	5321.9	5357.1	5384.1
GENERATING PUBLIC UTILITIES									
14 SALES	3452.9	3472.1	3499.5	3527.2	3559.7	3595.7	3635.7	3670.2	3698.1
15 TRANSMIS & DISTRIB LOSSES	221.0	222.2	224.0	225.7	227.8	230.1	232.7	234.9	236.7
16 SYSTEM LOAD	3673.9	3694.3	3723.5	3752.9	3787.5	3825.8	3868.4	3905.1	3934.8
17 PUB RESIDENTL EXCHG--RPSA	322.3	323.7	327.4	322.2	323.2	325.4	328.2	328.5	330.3
18 PUB RESIDENTL EXCHG--ETCA	10.6	10.5	10.5	10.4	10.3	10.3	10.3	10.3	10.3
19 TOTAL PUBLIC SALES	6496.3	6532.4	6583.9	6636.0	6697.1	6764.8	6840.0	6905.0	6957.5
INVESTOR-OWNED UTILITIES									
20 SALES	8092.1	8029.8	8131.6	8165.7	8220.1	8274.9	8322.5	8394.3	8468.8
21 TRANSMIS & DISTRIB LOSSES	849.7	843.1	853.8	857.4	863.1	868.9	873.9	881.4	889.2
22 SYSTEM LOAD	8941.7	8872.9	8985.4	9023.1	9083.2	9143.8	9196.4	9275.7	9358.0
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17236.0	17029.8	17041.3	16984.6	16938.7	17010.5	17134.4	17272.8	17400.8
26 TOTAL REGIONAL FIRM LOAD	18643.7	18432.5	18455.1	18397.7	18357.9	18439.8	18566.6	18717.9	18856.9
27 DSI ALUM TO LOAD	660.9	634.9	599.3	551.6	497.5	480.0	480.0	480.0	480.0
28 DSI NON-ALUM TO LOAD	60.9	57.2	46.3	46.3	46.4	46.7	46.8	47.2	47.3
29 DSI HANNA TO LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	721.8	692.1	645.5	597.9	543.9	526.7	526.8	527.2	527.3
31 TOT DSI T Q TRANS LOSSES	18.8	18.0	16.8	15.6	14.2	13.7	13.7	13.7	13.8
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	19384.3	19142.6	19117.5	19011.2	18916.0	18980.2	19107.2	19258.8	19397.8
									19515.8
									19658.7
									19802.3

	1991 FINAL COUNCIL PLAN OPERATING YEAR3 MEANS										-- MEDIUM LOW CASE -- (91F1MLP) FOR AVERAGE REGIONAL FORECAST				
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011						
SMALL & NONGEN PUBLIC UTILS															
1 SALES	3358.3	3390.4	3430.7	3472.9	3514.0	3555.0	3595.4	3637.3	3659.0						
2 DISTRIBUTION LOSSES	141.0	142.4	144.1	145.9	147.6	149.3	151.0	152.8	153.7						
3 SYSTEM LOAD	3499.3	3532.8	3574.8	3618.8	3661.6	3704.3	3746.5	3790.1	3812.7						
4 DSI ALUM FIRM LOAD	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0						
5 DSI NON-ALUM FIRM LOAD	142.1	142.1	142.2	142.3	142.3	142.3	142.8	142.8	142.8						
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
7 TOTAL DSI FIRM LOAD	1581.1	1581.1	1581.2	1581.3	1581.3	1581.3	1581.8	1581.8	1581.8						
8 TOT DSI FIRM TRANS LOSSES	41.2	41.2	41.2	41.2	41.2	41.2	41.3	41.3	41.3						
9 BPA FEDERAL AGENCIES	150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1						
10 USBR	67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1						
11 FEDERAL TRANSMIS LOSSES	138.8	139.7	140.8	142.0	143.1	144.3	145.4	146.6	147.2						
12 ADDTL FEDERAL TRAN LOSSES	58.1	58.2	59.0	62.0	63.6	63.9	63.8	65.8	65.8						
13 TOTAL FEDERAL FIRM LOAD	5495.3	5530.3	5575.1	5624.1	5670.3	5715.0	5759.5	5806.9	5830.7						
GENERATING PUBLIC UTILITIES															
14 SALES	3810.3	3846.8	3892.6	3940.5	3987.1	4033.5	4079.5	4127.0	4151.3						
15 TRANSMIS & DISTRIB LOSSES	243.9	246.2	249.1	252.2	255.2	258.1	261.1	264.1	265.7						
16 SYSTEM LOAD	4054.1	4093.0	4141.7	4192.7	4242.3	4291.7	4340.6	4391.1	4416.9						
17 PUB RESIDENTL EXCHG--RPSA	341.5	344.6	348.3	352.4	356.2	359.8	363.4	367.2	370.3						
18 PUB RESIDENTL EXCHG--ETCA	10.5	10.5	10.6	10.6	10.7	10.8	10.8	10.9	10.9						
19 TOTAL PUBLIC SALES	7168.5	7237.2	7323.3	7413.4	7501.1	7588.5	7674.9	7764.3	7810.3						
INVESTOR-OWNED UTILITIES															
20 SALES	8770.2	8867.6	8992.9	9121.6	9247.7	9371.9	9512.1	9635.3	9740.7						
21 TRANSMIS & DISTRIB LOSSES	920.9	931.1	944.2	957.8	971.0	984.0	998.8	1011.7	1022.8						
22 SYSTEM LOAD	9691.0	9798.6	9937.1	10079.4	10218.7	10356.0	10510.9	10647.0	10763.5						
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0						
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0						
25 TOTAL REGIONAL FIRM SALES	17917.8	18084.5	18296.8	18516.4	18730.9	18943.0	19170.9	19384.1	19536.0						
26 TOTAL REGIONAL FIRM LOAD	19420.4	19602.0	19834.0	20076.2	20311.3	20542.7	20790.9	21025.0	21191.1						
27 DSI ALUM TQ LOAD	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0						
28 DSI NON-ALUM TQ LOAD	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3						
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
30 TOTAL DSI TOP QTL LOAD	527.3	527.3	527.3	527.3	527.3	527.3	527.3	527.3	527.3						
31 TOT DSI T Q TRANS LOSSES	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8						
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
33 TOTAL REGIONAL LOAD	19961.4	20143.0	20375.1	20617.2	20852.4	21083.8	21332.0	21566.1	21732.2						

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95)

OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST		1990-	1991-	1992-	1993-	1994-	1995-	1996-	1997-	1998-	1999-	2000-	2001-	2002-
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS														
1 SALES		3099.0	3149.5	3186.7	3230.4	3273.7	3313.5	3355.6	3396.5	3437.2	3476.7	3514.3	3553.9	
2 DISTRIBUTION LOSSES		130.2	132.3	133.8	135.7	137.5	139.2	140.9	142.7	144.4	146.0	147.6	149.3	
3 SYSTEM LOAD		3229.2	3281.8	3320.5	3366.1	3411.2	3452.6	3496.5	3539.2	3581.6	3622.8	3661.9	3703.1	
4 DSI ALUM FIRM LOAD		2182.5	2142.0	2079.1	2016.3	1975.9	1959.3	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	
5 DSI NON-ALUM FIRM LOAD		205.3	242.3	178.8	179.2	179.3	180.2	181.0	181.5	182.4	183.3	183.8	183.9	
6 DSI HANNA FIRM LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7 TOTAL DSI FIRM LOAD		2387.8	2384.3	2257.8	2195.4	2155.2	2139.4	2132.0	2132.5	2133.4	2134.3	2134.8	2134.9	
8 TOT DSI FIRM TRANS LOSSES		62.3	62.2	58.9	57.2	56.2	55.8	55.6	55.6	55.6	55.7	55.7	55.7	
9 BPA -FEDERAL AGENCIES		143.8	144.5	141.7	142.1	143.3	144.3	145.2	146.1	147.0	147.8	148.7	149.5	
10 USER		67.2	67.3	67.3	67.2	67.3	67.3	67.4	67.5	67.5	67.5	67.6	67.7	
11 FEDERAL TRANSMIS LOSSES		152.6	153.8	151.5	151.0	151.2	151.9	152.9	154.1	155.2	156.4	157.4	158.5	
12 ADPITL FEDERAL TRAN LOSSES		64.3	68.9	70.0	66.5	67.2	68.6	61.7	63.4	63.4	62.5	63.5	65.0	
13 TOTAL FEDERAL FIRM LOAD		6044.9	6100.5	6008.9	5988.4	5995.4	6024.2	6055.8	6102.7	6148.1	6191.4	6234.0	6278.7	
GENERATING PUBLIC UTILITIES														
14 SALES		3560.1	3651.1	3710.3	3754.7	3793.4	3833.9	3882.7	3930.0	3977.1	4022.8	4066.3	4112.1	
15 TRANSMIS & DISTRIB LOSSES		227.8	233.7	237.5	240.3	242.8	245.4	248.5	251.5	254.5	257.5	260.2	263.2	
16 SYSTEM LOAD		3787.9	3884.8	3947.8	3995.0	4036.1	4079.3	4131.2	4181.5	4231.6	4280.3	4326.5	4375.2	
17 PUB RESIDENTL EXCHG--RPSA		328.1	333.2	338.2	334.9	337.3	340.3	343.6	345.0	348.4	352.4	357.9	361.7	
18 PUB RESIDENTL EXCHG--ETCA		10.8	10.8	10.9	10.8	10.8	10.8	10.8	10.8	10.8	10.9	11.0	11.1	
19 TOTAL PUBLIC SALES		6659.1	6800.7	6897.0	6985.1	7067.1	7147.4	7238.3	7326.6	7414.3	7499.6	7580.6	7665.9	
INVESTOR-OWNED UTILITIES														
20 SALES		8263.4	8361.8	8590.6	8703.9	8826.9	8941.5	9042.2	9178.6	9323.0	9447.8	9586.6	9716.3	
21 TRANSMIS & DISTRIB LOSSES		867.7	878.0	902.0	913.9	926.8	938.9	949.4	963.7	978.9	992.0	1006.6	1020.2	
22 SYSTEM LOAD		9131.1	9239.8	9492.6	9617.8	9753.7	9880.4	9991.7	10142.3	10301.9	10439.8	10593.1	10736.5	
23 IOU RESIDENTIAL EXCHANGE		-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	
24 COLOCKUM		180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	
25 TOTAL REGIONAL FIRM SALES		17701.3	17938.5	18134.4	18273.8	18439.7	18620.0	18805.2	19031.2	19265.1	19477.0	19698.3	19914.4	
26 TOTAL REGIONAL FIRM LOAD		19143.9	19405.2	19629.2	19781.2	19965.2	20163.9	20358.7	20606.6	20861.6	21091.5	21333.6	21570.5	
27 DSI ALUM TQ LOAD		697.4	714.0	693.1	671.9	658.5	652.9	650.0	650.0	650.0	650.0	650.0	650.0	
28 DSI NON-ALUM TQ LOAD		84.4	80.8	59.7	59.8	59.8	60.1	60.4	60.4	60.9	61.2	61.4	61.4	
29 DSI HANNA TQ LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30 TOTAL DSI TOP QTL LOAD		781.8	794.8	752.8	731.8	718.3	713.0	710.4	710.4	710.9	711.2	711.4	711.4	
31 TOT DSI T Q TRANS LOSSES		20.4	20.7	19.6	19.1	18.7	18.6	18.5	18.5	18.5	18.5	18.6	18.6	
32 OTHER INTERRUPTIBLE LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
33 TOTAL REGIONAL LOAD		19946.2	20220.7	20401.6	20532.0	20702.2	20895.5	21087.6	21335.6	21591.0	21821.2	22063.6	22300.5	

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95)											
OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST											
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011		
SMALL & NONGEN PUBLIC UTILS											
1 SALES	3595.2	3638.4	3686.8	3737.3	3785.7	3833.1	3879.5	3924.4	3946.7		
2 DISTRIBUTION LOSSES	151.0	152.8	154.8	157.0	159.0	161.0	162.9	164.8	165.8		
3 SYSTEM LOAD	3746.2	3791.2	3841.6	3894.3	3944.6	3994.1	4042.4	4089.2	4112.4		
4 DSI ALUM FIRM LOAD	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0		
5 DSI NON-ALUM FIRM LOAD	184.1	184.1	184.3	184.5	184.6	185.0	185.1	185.1	185.1		
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7 TOTAL DSI FIRM LOAD	2135.1	2135.1	2135.3	2135.5	2135.6	2136.0	2136.1	2136.1	2136.1		
8 TOT DSI FIRM TRANS LOSSES	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7		
9 BPA FEDERAL AGENCIES	150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1		
10 USBR	67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1		
11 FEDERAL TRANSMIS LOSSES	159.7	160.9	162.3	163.7	165.0	166.3	167.6	168.9	169.5		
12 ADDTL FEDERAL TRAN LOSSES	65.0	65.5	66.7	69.7	71.7	72.1	72.3	74.4	74.4		
13 TOTAL FEDERAL FIRM LOAD	6324.0	6371.3	6425.3	6483.2	6537.7	6589.9	6640.5	6691.2	6715.6		
GENERATING PUBLIC UTILITIES											
14 SALES	4159.9	4209.9	4265.9	4324.4	4380.3	4435.2	4488.8	4540.8	4566.2		
15 TRANSMIS & DISTRIB LOSSES	266.2	269.4	273.0	276.8	280.3	283.8	287.3	290.6	292.2		
16 SYSTEM LOAD	4426.1	4479.3	4539.0	4601.1	4660.6	4719.0	4776.1	4831.4	4858.4		
17 PUB RESIDENTL EXCHG--RPSA	365.6	369.8	374.3	379.2	383.7	388.0	392.1	396.2	399.4		
18 PUB RESIDENTL EXCHG--ETCA	11.2	11.3	11.4	11.5	11.5	11.6	11.7	11.7	11.8		
19 TOTAL PUBLIC SALES	7755.0	7848.2	7952.7	8061.7	8165.9	8268.3	8368.3	8465.2	8512.9		
INVESTOR-OWNED UTILITIES											
20 SALES	9865.8	10010.9	10173.3	10333.3	10486.1	10643.0	10820.4	10962.7	11078.2		
21 TRANSMIS & DISTRIB LOSSES	1035.9	1051.1	1068.2	1085.0	1101.0	1117.5	1136.1	1151.1	1163.2		
22 SYSTEM LOAD	10901.7	11062.0	11241.4	11418.3	11587.1	11760.5	11956.5	12113.8	12241.4		
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		
25 TOTAL REGIONAL FIRM SALES	20153.9	20392.8	20660.7	20930.6	21188.3	21448.7	21726.8	21966.6	22130.4		
26 TOTAL REGIONAL FIRM LOAD	21831.8	22092.6	22385.7	22682.6	22965.4	23249.5	23553.1	23816.4	23995.4		
27 DSI ALUM TQ LOAD	650.0	650.0	650.0	650.0	650.0	650.0	650.0	650.0	650.0		
28 DSI NON-ALUM TQ LOAD	61.4	61.4	61.5	61.5	61.5	61.5	61.5	61.5	61.5		
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
30 TOTAL DSI TOP QTL LOAD	711.4	711.4	711.5	711.5	711.5	711.5	711.5	711.5	711.5		
31 TOT DSI T Q TRANS LOSSES	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6		
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
33 TOTAL REGIONAL LOAD	22561.8	22822.5	23115.8	23412.7	23695.5	23979.6	24283.1	24546.4	24725.5		

1991 FINAL COUNCIL PLAN -- MEDIUM HIGH CASE -- (91F1MHP)

FOR AVERAGE REGIONAL FORECAST													
		1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002
SMALL & NONGEN PUBLIC UTILS													
1 SALES	3140.3	3223.2	3288.9	3354.5	3422.9	3492.3	3560.7	3625.4	3684.8	3740.9	3796.4	3855.5	3855.5
2 DISTRIBUTION LOSSES	131.9	135.4	138.1	140.9	143.8	146.7	149.5	152.3	154.8	157.1	159.4	161.9	161.9
3 SYSTEM LOAD	3272.2	3358.6	3427.0	3495.4	3566.7	3639.0	3710.2	3777.7	3839.5	3898.0	3955.9	4017.5	4017.5
4 DSI ALUM FIRM LOAD	2182.5	2142.0	2123.0	2123.0	2097.5	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0
5 DSI NON-ALUM FIRM LOAD	239.5	278.3	246.9	247.2	247.3	248.0	248.3	248.8	249.1	249.4	249.8	252.2	252.2
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2422.0	2420.3	2369.9	2370.2	2344.8	2335.0	2335.3	2335.8	2336.1	2336.4	2336.8	2337.2	2337.2
8 TOT DSI FIRM TRANS LOSSES	63.2	63.1	61.8	61.8	61.1	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9
9 BPA FEDERAL AGENCIES	143.8	144.5	141.7	142.1	143.3	144.3	145.2	146.1	147.0	147.8	148.7	149.5	149.5
10 USBR	67.2	67.3	67.3	67.2	67.3	67.3	67.4	67.5	67.5	67.5	67.6	67.7	67.7
11 FEDERAL TRANSMIS LOSSES	154.6	156.8	157.2	159.0	160.3	162.0	163.9	165.7	167.3	168.9	170.4	171.1	171.1
12 ADDTL FEDERAL TRAN LOSSES	66.8	72.1	73.9	71.3	72.7	74.1	67.9	70.1	70.4	70.8	72.2	74.1	74.1
13 TOTAL FEDERAL FIRM LOAD	6126.6	6219.6	6237.0	6305.3	6355.0	6421.7	6489.9	6562.8	6627.7	6689.4	6751.6	6779.0	6779.0
GENERATING PUBLIC UTILITIES													
14 SALES	3563.6	3657.3	3731.8	3806.3	3884.0	3962.7	4040.2	4113.7	4180.9	4244.6	4307.6	4374.7	4374.7
15 TRANSMIS & DISTRIB LOSSES	228.1	234.1	238.8	243.6	248.6	253.6	258.6	263.3	267.6	271.6	275.7	280.0	280.0
16 SYSTEM LOAD	3791.7	3891.4	3970.7	4050.0	4132.6	4216.3	4298.8	4376.9	4448.5	4516.2	4583.3	4654.7	4654.7
17 PUB RESIDENTL EXCHG--RPSA	332.5	341.0	349.1	347.7	352.6	358.6	364.6	368.2	373.5	379.2	386.6	392.4	392.4
18 PUB RESIDENTL EXCHG--ETCA	10.9	11.1	11.2	11.2	11.2	11.4	11.5	11.6	11.6	11.7	11.9	12.1	12.1
19 TOTAL PUBLIC SALES	6703.9	6880.5	7020.7	7160.9	7306.9	7454.9	7600.9	7739.1	7865.7	7985.4	8104.0	8230.2	8230.2
INVESTOR-OWNED UTILITIES													
20 SALES	8374.6	8549.3	8804.7	8969.9	9153.5	9334.6	9498.6	9692.9	9893.3	10068.4	10258.1	10444.0	10444.0
21 TRANSMIS & DISTRIB LOSSES	879.3	897.7	924.5	941.8	961.1	980.1	997.3	1017.7	1038.8	1057.2	1077.1	1096.6	1096.6
22 SYSTEM LOAD	9253.9	9446.9	9729.2	9911.8	10114.6	10314.7	10495.9	10710.6	10932.1	11125.5	11335.2	11540.7	11540.7
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17891.5	18241.9	18584.4	18890.4	19195.8	19516.2	19827.4	20161.3	20489.5	20785.6	21095.3	21370.6	21370.6
26 TOTAL REGIONAL FIRM LOAD	19352.2	19737.9	20116.9	20447.0	20782.2	21132.7	21464.6	21830.3	22188.4	22511.2	22850.1	23154.4	23154.4
27 DSI ALUM TQ LOAD	697.4	714.0	708.0	708.0	699.5	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0
28 DSI NON-ALUM TQ LOAD	79.2	92.6	82.3	82.3	82.3	82.6	82.8	83.0	83.2	83.3	83.3	83.3	83.3
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	776.6	806.6	790.3	790.3	781.8	778.6	778.8	779.0	779.2	779.3	779.3	779.3	779.3
31 TOT DSI T Q TRANS LOSSES	20.3	21.0	20.6	20.6	20.4	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20149.1	20565.6	20927.8	21257.9	21584.4	21931.6	22263.8	22629.7	22987.8	23310.8	23649.7	23941.1	23941.1

	1991 FINAL COUNCIL PLAN OPERATING YEAR MEANS										-- MEDIUM HIGH CASE -- (91FIMHP) FOR AVERAGE REGIONAL FORECAST									
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011		2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011	
SMALL & NONGEN PUBLIC UTILS																				
1 SALES	3917.0	3981.7	4050.4	4120.8	4189.2	4254.7	4322.8	4393.4	4428.4		3917.0	3981.7	4050.4	4120.8	4189.2	4254.7	4322.8	4393.4	4428.4	
2 DISTRIBUTION LOSSES	164.5	167.2	170.1	173.1	175.9	178.7	181.6	184.5	186.0		164.5	167.2	170.1	173.1	175.9	178.7	181.6	184.5	186.0	
3 SYSTEM LOAD	4081.5	4149.0	4220.5	4293.9	4365.1	4433.4	4504.3	4578.0	4614.4		4081.5	4149.0	4220.5	4293.9	4365.1	4433.4	4504.3	4578.0	4614.4	
4 DSI ALUM FIRM LOAD	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0		2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	
5 DSI NON-ALUM FIRM LOAD	212.4	212.3	212.5	212.6	212.7	213.0	213.3	213.3	213.3		212.4	212.3	212.5	212.6	212.7	213.0	213.3	213.3	213.3	
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7 TOTAL DSI FIRM LOAD	2299.4	2299.3	2299.5	2299.6	2299.7	2300.0	2300.3	2300.3	2300.3		2299.4	2299.3	2299.5	2299.6	2299.7	2300.0	2300.3	2300.3	2300.3	
8 TOT DSI FIRM TRANS LOSSES	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0		60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	
9 BPA FEDERAL AGENCIES	150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1		150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1	
10 USBR	67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1		67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1	
11 FEDERAL TRANSMIS LOSSES	172.8	174.6	176.5	178.5	180.3	182.2	184.1	186.0	187.0		172.8	174.6	176.5	178.5	180.3	182.2	184.1	186.0	187.0	
12 ADDTL FEDERAL TRAN LOSSES	74.9	75.7	77.5	81.1	83.5	84.4	85.2	88.0	88.0		74.9	75.7	77.5	81.1	83.5	84.4	85.2	88.0	88.0	
13 TOTAL FEDERAL FIRM LOAD	6846.7	6917.2	6993.4	7073.2	7149.3	7221.3	7295.8	7374.9	7412.9		6846.7	6917.2	6993.4	7073.2	7149.3	7221.3	7295.8	7374.9	7412.9	
GENERATING PUBLIC UTILITIES																				
14 SALES	4444.5	4517.9	4595.8	4675.8	4753.3	4827.6	4904.9	4985.1	5024.2		4444.5	4517.9	4595.8	4675.8	4753.3	4827.6	4904.9	4985.1	5024.2	
15 TRANSMIS & DISTRIB LOSSES	284.4	289.1	294.1	299.2	304.2	309.0	313.9	319.0	321.5		284.4	289.1	294.1	299.2	304.2	309.0	313.9	319.0	321.5	
16 SYSTEM LOAD	4728.9	4807.1	4890.0	4975.0	5057.5	5136.6	5218.8	5304.1	5345.7		4728.9	4807.1	4890.0	4975.0	5057.5	5136.6	5218.8	5304.1	5345.7	
17 PUB RESIDENTIAL EXCHG--RPSA	398.4	404.7	411.2	418.2	424.6	430.6	437.0	443.5	448.1		398.4	404.7	411.2	418.2	424.6	430.6	437.0	443.5	448.1	
18 PUB RESIDENTIAL EXCHG--EICA	12.2	12.3	12.5	12.6	12.8	12.9	13.0	13.1	13.3		12.2	12.3	12.5	12.6	12.8	12.9	13.0	13.1	13.3	
19 TOTAL PUBLIC SALES	8361.5	8499.7	8646.2	8796.6	8942.5	9082.3	9227.6	9378.5	9452.6		8361.5	8499.7	8646.2	8796.6	8942.5	9082.3	9227.6	9378.5	9452.6	
INVESTOR-OWNED UTILITIES																				
20 SALES	10652.5	10869.4	11115.5	11363.5	11596.7	11823.7	12088.7	12323.5	12488.3		10652.5	10869.4	11115.5	11363.5	11596.7	11823.7	12088.7	12323.5	12488.3	
21 TRANSMIS & DISTRIB LOSSES	1118.5	1141.3	1167.1	1193.2	1217.6	1241.5	1269.3	1294.0	1311.3		1118.5	1141.3	1167.1	1193.2	1217.6	1241.5	1269.3	1294.0	1311.3	
22 SYSTEM LOAD	11771.0	12010.6	12282.6	12556.7	12814.4	13065.2	13358.0	13617.5	13799.6		11771.0	12010.6	12282.6	12556.7	12814.4	13065.2	13358.0	13617.5	13799.6	
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	
25 TOTAL REGIONAL FIRM SALES	21711.4	22067.0	22460.5	22859.8	23239.6	23607.4	24018.5	24404.9	24644.5		21711.4	22067.0	22460.5	22859.8	23239.6	23607.4	24018.5	24404.9	24644.5	
26 TOTAL REGIONAL FIRM LOAD	23526.6	23914.9	24346.0	24784.9	25201.2	25603.1	26052.6	26476.5	26738.3		23526.6	23914.9	24346.0	24784.9	25201.2	25603.1	26052.6	26476.5	26738.3	
27 DSI ALUM TQ LOAD	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0		696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0	
28 DSI NON-ALUM TQ LOAD	70.9	70.8	71.0	71.1	71.2	71.2	71.2	71.2	71.2		70.9	70.8	71.0	71.1	71.2	71.2	71.2	71.2	71.2	
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30 TOTAL DSI TOP QTL LOAD	766.9	766.8	767.0	767.1	767.2	767.2	767.2	767.2	767.2		766.9	766.8	767.0	767.1	767.2	767.2	767.2	767.2	767.2	
31 TOT DSI T Q TRANS LOSSES	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
33 TOTAL REGIONAL LOAD	24313.5	24701.8	25133.0	25572.0	25988.4	26390.3	26839.7	27263.6	27525.4		24313.5	24701.8	25133.0	25572.0	25988.4	26390.3	26839.7	27263.6	27525.4	

1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91FHP)
OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3209.5	3353.0	3453.4	3553.3	3661.7	3766.9	3869.4	3963.9	4049.3	4138.1	4228.7	4320.5
2 DISTRIBUTION LOSSES	134.8	140.8	145.0	149.2	153.8	158.2	162.5	166.5	170.1	173.8	177.6	181.5
3 SYSTEM LOAD	3344.3	3493.8	3598.4	3702.5	3815.5	3925.1	4031.9	4130.4	4219.3	4311.9	4406.3	4502.0
4 DSI ALUM FIRM LOAD	2182.5	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0
5 DSI NON-ALUM FIRM LOAD	261.3	314.3	315.8	316.0	316.0	316.0	316.0	316.0	316.0	316.0	316.0	241.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2443.8	2474.3	2475.8	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2401.0
8 TOT DSI FIRM TRANS LOSSES	63.8	64.5	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	62.6
9 BPA FEDERAL AGENCIES	143.8	144.5	141.7	142.1	143.3	144.3	145.2	146.1	147.0	147.8	148.7	149.5
10 USBR	67.2	67.3	67.3	67.2	67.3	67.3	67.4	67.5	67.5	67.5	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	157.1	161.8	164.5	167.3	170.3	173.2	176.0	178.6	181.0	183.4	185.9	186.5
12 ADDTL FEDERAL TRAN LOSSES	70.1	76.3	79.5	80.5	82.5	82.5	76.9	80.0	81.3	82.7	84.9	87.8
13 TOTAL FEDERAL FIRM LOAD	6226.2	6418.0	6527.2	6633.1	6752.8	6868.3	6973.4	7078.6	7172.1	7269.4	7369.4	7394.4
GENERATING PUBLIC UTILITIES												
14 SALES	3642.6	3804.9	3918.7	4032.2	4155.2	4274.4	4390.7	4497.9	4594.7	4695.5	4798.3	4902.5
15 TRANSMIS & DISTRIB LOSSES	233.1	243.5	250.8	258.1	265.9	273.6	281.0	287.9	294.1	300.5	307.1	313.8
16 SYSTEM LOAD	3875.8	4048.4	4169.5	4290.2	4421.1	4548.0	4671.7	4785.7	4888.8	4996.0	5105.4	5216.3
17 PUB RESIDENTL EXCHG--RPSEA	339.8	354.7	366.5	368.3	377.2	386.8	396.3	402.6	410.4	419.5	430.7	439.7
18 PUB RESIDENTL EXCHG--ETCA	11.1	11.5	11.7	11.8	12.0	12.3	12.5	12.6	12.8	13.0	13.3	13.5
19 TOTAL PUBLIC SALES	6852.1	7157.9	7372.1	7585.5	7816.9	8041.3	8260.1	8461.8	8644.0	8833.6	9027.0	9223.1
INVESTOR-OWNED UTILITIES												
20 SALES	8569.6	8918.2	9292.1	9569.9	9885.6	10192.4	10476.6	10766.9	11057.0	11349.6	11665.9	11969.4
21 TRANSMIS & DISTRIB LOSSES	899.8	936.4	975.7	1004.8	1038.0	1070.2	1100.0	1130.5	1161.0	1191.7	1224.9	1256.8
22 SYSTEM LOAD	9469.4	9854.6	10267.8	10574.7	10923.5	11262.6	11576.6	11897.4	12217.9	12541.4	12890.8	13226.2
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	18256.4	18942.1	19529.0	20020.8	20569.0	21101.3	21605.4	22098.3	22571.4	23054.6	23565.2	23990.7
26 TOTAL REGIONAL FIRM LOAD	19751.4	20500.9	21144.5	21678.0	22277.4	22858.9	23401.8	23941.7	24458.8	24986.8	25545.6	26016.9
27 DSI ALUM TQ LOAD	697.4	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0
28 DSI NON-ALUM TQ LOAD	86.4	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	80.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	783.8	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	800.0
31 TOT DSI T Q TRANS LOSSES	20.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	20.9
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20555.7	21347.5	21991.0	22524.5	23124.0	23705.4	24248.3	24788.2	25305.3	25833.3	26392.2	26837.8

1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91FHP)												
OPERATING YEAR MEANS FOR AVERAGE REGIONAL FORECAST												
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011			
SMALL & NONGEN PUBLIC UTILS												
1 SALES	4412.8	4512.0	4622.2	4732.4	4838.6	4944.7	5052.2	5161.6	5216.2			
2 DISTRIBUTION LOSSES	185.3	189.5	194.1	198.8	203.2	207.7	212.2	216.8	219.1			
3 SYSTEM LOAD	4598.1	4701.5	4816.3	4931.2	5041.8	5152.3	5264.4	5378.4	5455.3			
4 DSI ALUM FIRM LOAD	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0			
5 DSI NON-ALUM FIRM LOAD	241.0	241.0	241.0	241.0	241.0	241.0	241.0	241.0	241.0			
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
7 TOTAL DSI FIRM LOAD	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0			
8 TOT DSI FIRM TRANS LOSSES	62.6	62.6	62.6	62.6	62.6	62.6	62.6	62.6	62.6			
9 BPA FEDERAL AGENCIES	150.2	150.8	151.5	152.2	152.8	153.4	153.9	154.5	155.1			
10 USBR	67.7	67.8	67.9	67.9	68.0	68.0	68.0	68.1	68.1			
11 FEDERAL TRANSMIS LOSSES	189.1	191.8	194.8	197.9	200.8	203.7	206.7	209.7	211.2			
12 ADDTL FEDERAL TRAN LOSSES	89.5	91.5	94.5	99.3	102.9	105.1	107.2	111.1	111.1			
13 TOTAL FEDERAL FIRM LOAD	7495.7	7604.4	7726.0	7849.4	7967.2	8083.5	8201.2	8322.9	8381.8			
GENERATING PUBLIC UTILITIES												
14 SALES	5007.2	5119.9	5244.9	5369.9	5490.3	5610.7	5732.7	5856.9	5918.0			
15 TRANSMIS & DISTRIB LOSSES	320.5	327.7	335.7	343.7	351.4	359.1	366.9	374.8	378.7			
16 SYSTEM LOAD	5327.7	5447.5	5580.6	5713.6	5841.7	5969.8	6099.6	6231.8	6296.8			
17 PUB RESIDENTIAL EXCHG--RPSA	448.8	458.6	469.2	480.2	490.5	500.5	510.7	521.1	527.8			
18 PUB RESIDENTIAL EXCHG--ETCA	13.7	13.9	14.2	14.5	14.7	14.9	15.2	15.4	15.6			
19 TOTAL PUBLIC SALES	9420.0	9631.8	9867.2	10102.3	10328.9	10555.4	10784.9	11018.6	11134.2			
INVESTOR-OWNED UTILITIES												
20 SALES	12277.8	12588.1	12952.2	13318.2	13668.3	14014.1	14389.6	14735.9	14969.9			
21 TRANSMIS & DISTRIB LOSSES	1289.2	1321.7	1360.0	1398.4	1435.2	1471.5	1510.9	1547.3	1571.8			
22 SYSTEM LOAD	13566.9	13909.9	14312.2	14716.6	15103.5	15485.5	15900.5	16283.1	16541.8			
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0			
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0			
25 TOTAL REGIONAL FIRM SALES	24496.8	25019.6	25619.7	26221.7	26798.9	27371.8	27977.5	28558.1	28908.4			
26 TOTAL REGIONAL FIRM LOAD	26570.2	27141.8	27798.8	28459.7	29092.4	29718.8	30381.4	31017.8	31400.4			
27 DSI ALUM TQ LOAD	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0			
28 DSI NON-ALUM TQ LOAD	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0			
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
30 TOTAL DSI TOP QTL LOAD	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0			
31 TOT DSI T Q TRANS LOSSES	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9			
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
33 TOTAL REGIONAL LOAD	27391.1	27962.6	28619.6	29280.5	29913.3	30539.7	31202.2	31838.6	32221.2			

1991 FINAL COUNCIL PLAN -- LOW CASE -- (91FILP)
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	2977.6	2965.7	2961.5	2957.5	2959.7	2967.1	2978.9	2983.8	2984.7	2983.4	2985.4	2991.2
2 DISTRIBUTION LOSSES	125.1	124.6	124.4	124.2	124.3	124.6	125.1	125.3	125.4	125.3	125.4	125.6
3 SYSTEM LOAD	3102.7	3090.3	3085.9	3081.7	3084.0	3091.7	3104.0	3109.1	3110.1	3108.7	3110.8	3116.9
4 DSI ALUM FIRM LOAD	1975.8	1748.8	1540.8	1325.2	1050.0	1027.0	1027.0	1027.0	1027.0	949.7	694.4	549.0
5 DSI NON-ALUM FIRM LOAD	124.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2100.6	1848.8	1640.8	1425.2	1150.0	1127.0	1127.0	1127.0	1127.0	1049.7	794.4	649.0
8 TOT DSI FIRM TRANS LOSSES	54.9	48.3	42.9	37.2	30.0	29.4	29.4	29.4	29.4	27.5	20.9	16.9
9 BPA FEDERAL AGENCIES	144.1	144.2	141.3	142.4	143.5	144.5	145.4	146.3	147.2	148.0	148.9	149.7
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	141.8	134.9	129.3	123.6	116.4	116.1	116.4	116.6	116.6	114.7	108.2	104.4
12 ADDTL FEDERAL TRAN LOSSES	59.1	61.8	60.8	57.0	56.7	55.0	49.3	49.6	48.5	47.8	47.9	47.8
13 TOTAL FEDERAL FIRM LOAD	5615.6	5347.2	5125.4	4897.1	4617.9	4601.6	4609.6	4616.1	4616.9	4536.4	4277.8	4135.5
GENERATING PUBLIC UTILITIES												
14 SALES	3378.6	3364.7	3360.0	3355.4	3357.8	3366.2	3379.5	3385.2	3386.3	3384.8	3387.0	3393.6
15 TRANSMIS & DISTRIB LOSSES	216.2	215.3	215.0	214.7	214.9	215.4	216.3	216.7	216.7	216.6	216.8	217.2
16 SYSTEM LOAD	3594.8	3580.1	3575.1	3570.1	3572.7	3581.6	3595.8	3601.9	3603.0	3601.4	3603.8	3610.8
17 PUB RESIDENTL EXCHG--RPSA	314.6	314.0	312.9	305.4	304.3	304.6	304.4	302.4	302.5	302.7	303.9	304.3
18 PUB RESIDENTL EXCHG--ETCA	10.3	10.2	10.0	9.8	9.7	9.6	9.6	9.5	9.4	9.4	9.4	9.4
19 TOTAL PUBLIC SALES	6356.2	6330.4	6321.6	6312.8	6317.5	6333.2	6358.3	6369.0	6371.0	6368.1	6372.4	6384.8
INVESTOR-OWNED UTILITIES												
20 SALES	7935.7	7825.1	7826.3	7790.3	7776.6	7776.8	7761.5	7765.6	7770.7	7761.9	7768.0	7781.6
21 TRANSMIS & DISTRIB LOSSES	833.2	821.6	821.8	818.0	816.5	816.6	815.0	815.4	815.9	815.0	815.6	817.1
22 SYSTEM LOAD	8769.0	8646.7	8648.1	8608.3	8593.1	8593.3	8576.5	8581.0	8586.6	8576.9	8583.6	8598.6
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	16783.9	16395.7	16177.2	15918.0	15634.9	15628.9	15639.7	15655.4	15663.4	15575.3	15331.3	15212.8
26 TOTAL REGIONAL FIRM LOAD	18159.4	17754.0	17528.5	17255.5	16963.8	16956.6	16961.8	16978.9	16986.5	16894.8	16645.2	16524.9
27 DSI ALUM TQ LOAD	645.8	582.9	513.7	441.9	349.8	342.0	342.0	342.0	342.0	316.5	231.5	183.0
28 DSI NON-ALUM TQ LOAD	42.7	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	688.5	615.9	546.7	474.9	382.8	375.0	375.0	375.0	375.0	349.5	264.5	216.0
31 TOT DSI T Q TRANS LOSSES	18.0	16.1	14.3	12.4	10.0	9.8	9.8	9.8	9.8	9.2	7.0	5.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	18865.8	18386.0	18089.5	17742.8	17356.5	17341.4	17346.6	17363.7	17371.2	17253.4	16916.7	16746.5

1991 FINAL COUNCIL PLAN -- LOW CASE -- (9FILP)										
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST										
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010		
SMALL & NONGEN PUBLIC UTILS										
1 SALES	2997.3	3010.9	3028.9	3046.7	3061.8	3077.5	3094.1	3113.9		
2 DISTRIBUTION LOSSES	125.9	126.5	127.2	128.0	128.6	129.3	130.0	130.8		
3 SYSTEM LOAD	3123.2	3137.4	3156.1	3174.6	3190.4	3206.7	3224.1	3244.7		
4 DSI ALUM FIRM LOAD	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0		
5 DSI NON-ALUM FIRM LOAD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7 TOTAL DSI FIRM LOAD	649.0	649.0	649.0	649.0	649.0	649.0	649.0	649.0		
8 TOT DSI FIRM TRANS LOSSES	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9		
9 BPA FEDERAL AGENCIES	150.3	150.9	151.6	152.3	152.9	153.5	154.1	154.7		
10 USBR	67.8	67.8	67.9	67.9	68.0	68.1	68.1	68.1		
11 FEDERAL TRANSMIS LOSSES	104.6	105.0	105.5	106.0	106.4	106.9	107.3	107.9		
12 ADDTL FEDERAL TRAN LOSSES	47.0	46.8	47.6	49.6	50.5	50.1	49.5	50.4		
13 TOTAL FEDERAL FIRM LOAD	4141.9	4156.9	4177.7	4199.4	4217.2	4234.2	4252.1	4274.8		
GENERATING PUBLIC UTILITIES										
14 SALES	3400.5	3415.8	3436.2	3456.4	3473.6	3491.4	3510.2	3532.7		
15 TRANSMIS & DISTRIB LOSSES	217.6	218.6	219.9	221.2	222.3	223.4	224.7	226.1		
16 SYSTEM LOAD	3618.1	3634.5	3656.1	3677.6	3695.9	3714.8	3734.9	3758.7		
17 PUB RESIDENTIAL EXCHG--RPSA	304.7	305.9	307.4	309.2	310.2	311.4	312.7	314.6		
18 PUB RESIDENTIAL EXCHG--ETCA	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3		
19 TOTAL PUBLIC SALES	6397.8	6426.8	6465.0	6503.0	6535.3	6568.8	6604.3	6646.6		
INVESTOR-OWNED UTILITIES										
20 SALES	7790.6	7818.1	7858.9	7899.9	7937.7	7978.5	8022.8	8071.0		
21 TRANSMIS & DISTRIB LOSSES	818.0	820.9	825.2	829.5	833.5	837.7	842.4	847.5		
22 SYSTEM LOAD	8608.6	8639.0	8684.1	8729.4	8771.2	8816.2	8865.2	8918.5		
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		
24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		
25 TOTAL REGIONAL FIRM SALES	15235.6	15292.6	15372.5	15452.2	15522.9	15597.8	15678.3	15769.4		
26 TOTAL REGIONAL FIRM LOAD	16548.6	16610.4	16697.9	16786.4	16864.2	16945.2	17032.1	17132.0		
27 DSI ALUM TQ LOAD	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0		
28 DSI NON-ALUM TQ LOAD	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0		
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
30 TOTAL DSI TOP QTL LOAD	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0		
31 TOT DSI T Q TRANS LOSSES	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6		
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
33 TOTAL REGIONAL LOAD	16770.3	16832.0	16919.5	17008.0	17085.9	17166.8	17253.8	17353.7		

1991 FINAL COUNCIL PLAN -- MEDIUM LOW CASE -- (91FIMLP)
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3045.0	3066.4	3089.5	3115.0	3144.4	3176.8	3213.0	3240.4	3265.3	3287.8	3311.6	3338.0
2 DISTRIBUTION LOSSES	127.9	128.8	129.8	130.8	132.1	133.4	134.9	136.1	137.1	138.1	139.1	140.2
3 SYSTEM LOAD	3172.8	3195.2	3219.2	3245.8	3276.5	3310.2	3347.9	3376.5	3402.4	3425.9	3450.7	3478.2
4 DSI ALUM FIRM LOAD	2004.6	1889.1	1760.3	1621.5	1454.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0
5 DSI NON-ALUM FIRM LOAD	174.4	164.8	139.2	139.3	139.5	140.1	140.4	141.0	141.3	141.7	142.1	142.1
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2179.0	2053.9	1899.5	1760.8	1593.5	1579.1	1579.4	1580.0	1580.3	1580.7	1581.1	1581.1
8 TOT DSI FIRM TRANS LOSSES	56.9	53.6	49.6	45.9	41.6	41.2	41.2	41.2	41.2	41.2	41.2	41.2
9 BPA FEDERAL AGENCIES	144.1	144.2	141.3	142.4	143.5	144.5	145.4	146.3	147.2	148.0	148.9	149.7
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	145.7	143.0	139.5	136.6	133.0	133.6	134.6	135.4	136.1	136.8	137.4	138.2
12 ADDTL FEDERAL TRAN LOSSES	62.0	65.7	65.5	62.3	63.0	62.0	56.9	57.7	57.1	57.2	57.7	58.3
13 TOTAL FEDERAL FIRM LOAD	5770.9	5669.2	5532.3	5415.2	5276.9	5296.7	5331.7	5363.3	5390.5	5416.1	5443.4	5473.2
GENERATING PUBLIC UTILITIES												
14 SALES	3454.6	3478.7	3504.9	3533.8	3567.2	3603.8	3644.9	3676.1	3704.3	3729.9	3756.9	3786.9
15 TRANSMIS & DISTRIB LOSSES	221.1	222.6	224.3	226.2	228.3	230.6	233.3	235.3	237.1	238.7	240.4	242.4
16 SYSTEM LOAD	3675.6	3701.3	3729.2	3759.9	3795.5	3834.5	3878.1	3911.3	3941.4	3968.6	3997.3	4029.2
17 PUB RESIDENTL EXCHG--RPSA	321.8	324.8	326.5	321.8	323.4	326.2	328.4	328.5	331.0	333.6	337.2	339.7
18 PUB RESIDENTL EXCHG--ETCA	10.6	10.5	10.4	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.4	10.4
19 TOTAL PUBLIC SALES	6499.5	6545.1	6594.4	6648.7	6711.6	6780.6	6857.8	6915.4	6969.6	7017.6	7068.4	7124.9
INVESTOR-OWNED UTILITIES												
20 SALES	8084.8	8062.6	8141.4	8183.2	8226.8	8289.3	8339.2	8408.7	8482.3	8545.7	8621.7	8703.9
21 TRANSMIS & DISTRIB LOSSES	848.9	846.6	854.8	859.2	863.8	870.4	875.6	882.9	890.6	897.3	905.3	913.9
22 SYSTEM LOAD	8933.7	8909.2	8996.2	9042.4	9090.6	9159.7	9214.8	9291.6	9372.9	9443.0	9526.9	9617.8
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
2+ COLOCKUM	180.0	180.0	180.0	181.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17154.8	17053.1	17023.8	16982.5	16922.7	17040.9	17169.3	17298.9	17426.8	17539.6	17667.7	17807.3
26 TOTAL REGIONAL FIRM LOAD	18560.3	18459.7	18437.7	18397.5	18342.9	18470.9	18604.6	18746.3	18884.8	19007.6	19147.6	19300.1
27 DSI ALUM TQ LOAD	655.4	629.7	586.8	540.8	485.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0
28 DSI NON-ALUM TQ LOAD	59.5	55.0	46.3	46.3	46.5	46.7	47.0	47.2	47.2	47.3	47.3	47.3
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	714.9	684.7	633.1	587.1	531.5	526.7	527.0	527.2	527.2	527.3	527.3	527.3
31 TOT DSI T Q TRANS LOSSES	18.7	17.9	16.5	15.3	13.9	13.7	13.7	13.7	13.7	13.8	13.8	13.8
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	19293.9	19162.2	19087.3	18999.9	18888.3	19011.3	19145.4	19287.2	19425.7	19548.6	19688.6	19841.1

1991 FINAL COUNCIL PLAN -- MEDIUM LOW CASE -- (9IFIMLP)										
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST										
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010		
SMALL & NONGEN PUBLIC UTILS										
1 SALES	3364.3	3399.3	3440.6	3482.7	3523.4	3564.6	3604.6	3647.6		
2 DISTRIBUTION LOSSES	141.3	142.8	144.5	146.3	148.0	149.7	151.4	153.2		
3 SYSTEM LOAD	3505.6	3542.0	3585.1	3628.9	3671.4	3714.3	3756.0	3800.8		
4 DSI ALUM FIRM LOAD	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0	1439.0		
5 DSI NON-ALUM FIRM LOAD	142.1	142.1	142.3	142.3	142.3	142.3	142.8	142.8		
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7 TOTAL DSI FIRM LOAD	1581.1	1581.1	1581.3	1581.3	1581.3	1581.3	1581.8	1581.8		
8 TOT DSI FIRM TRANS LOSSES	41.2	41.2	41.2	41.2	41.2	41.2	41.3	41.3		
9 BPA FEDERAL AGENCIES	150.3	150.9	151.6	152.3	152.9	153.5	154.1	154.7		
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1		
11 FEDERAL TRANSMIS LOSSES	138.9	139.9	141.0	142.2	143.4	144.5	145.6	146.8		
12 ADDTL FEDERAL TRAN LOSSES	57.9	58.4	59.5	62.3	63.8	64.1	64.3	65.8		
13 TOTAL FEDERAL FIRM LOAD	5501.6	5540.2	5586.4	5635.0	5680.7	5725.7	5769.9	5818.0		
GENERATING PUBLIC UTILITIES										
14 SALES	3816.6	3856.2	3903.1	3950.8	3997.0	4043.7	4089.2	4137.8		
15 TRANSMIS & DISTRIB LOSSES	244.3	246.8	249.8	252.8	255.8	258.8	261.7	264.8		
16 SYSTEM LOAD	4060.9	4103.0	4152.8	4203.6	4252.8	4302.5	4350.9	4402.7		
17 PUB RESIDENTL EXCHG--RPSA	342.1	345.5	349.2	353.5	357.1	360.8	364.3	368.6		
18 PUB RESIDENTL EXCHG--ETCA	10.5	10.5	10.6	10.7	10.7	10.8	10.8	10.9		
19 TOTAL PUBLIC SALES	7180.9	7255.4	7343.6	7433.4	7520.4	7608.3	7693.8	7785.4		
INVESTOR-OWNED UTILITIES										
20 SALES	8784.0	8891.0	9021.4	9150.2	9275.7	9407.6	9533.7	9664.6		
21 TRANSMIS & DISTRIB LOSSES	922.3	933.5	947.2	960.8	973.9	987.8	1001.0	1014.8		
22 SYSTEM LOAD	9706.3	9824.5	9968.7	10110.9	10249.7	10395.4	10534.7	10679.4		
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		
24 COLCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		
25 TOTAL REGIONAL FIRM SALES	17944.1	18126.3	18345.9	18565.1	18778.3	18998.8	19211.5	19434.7		
26 TOTAL REGIONAL FIRM LOAD	19448.8	19647.7	19887.9	20129.6	20363.2	20603.7	20835.5	21080.1		
27 DSI ALUM TO LOAD	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0		
28 DSI NON-ALUM TO LOAD	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3		
29 DSI HANNA TO LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
30 TOTAL DSI TOP QTL LOAD	527.3	527.3	527.3	527.3	527.3	527.3	527.3	527.3		
31 TOT DSI T Q TRANS LOSSES	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8		
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
33 TOTAL REGIONAL LOAD	19989.8	20188.7	20429.0	20670.6	20904.3	21144.8	21376.6	21621.2		

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95) FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST												
	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3123.0	3160.0	3198.2	3242.3	3278.1	3323.5	3365.1	3406.0	3446.6	3485.7	3522.8	3563.7
2 DISTRIBUTION LOSSES	131.2	132.7	134.3	136.2	137.7	139.6	141.3	143.1	144.8	146.4	148.0	149.7
3 SYSTEM LOAD	3254.1	3292.7	3332.5	3378.5	3415.8	3463.1	3506.5	3549.1	3591.4	3632.1	3670.8	3713.4
4 DSI ALUM FIRM LOAD	2172.3	2123.5	2068.3	1999.0	1975.8	1953.3	1951.0	1951.0	1951.0	1951.0	1951.0	1951.0
5 DSI NON-ALUM FIRM LOAD	211.7	229.3	179.2	179.3	179.3	180.4	181.2	181.7	182.7	183.5	183.9	183.9
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2384.0	2352.8	2247.5	2178.3	2155.2	2133.8	2132.2	2132.7	2134.5	2134.5	2134.9	2134.9
8 TOT DSI FIRM TRANS LOSSES	62.2	61.4	58.6	56.8	56.2	55.6	55.6	55.6	55.6	55.7	55.7	55.7
9 BPA FEDERAL AGENCIES	144.1	144.2	141.3	142.4	143.5	144.5	145.4	146.3	147.2	148.0	148.9	149.7
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	153.1	153.3	151.5	150.9	151.3	152.0	153.2	154.3	155.5	156.6	157.7	158.8
12 ADDTL FEDERAL TRAN LOSSES	64.7	69.2	69.4	66.6	67.5	66.7	62.2	63.4	63.1	62.8	63.7	65.0
13 TOTAL FEDERAL FIRM LOAD	6067.4	6079.5	6009.4	5984.0	6000.6	6027.5	6066.9	6113.2	6158.3	6201.6	6243.6	6289.5
GENERATING PUBLIC UTILITIES												
14 SALES	3592.6	3673.7	3722.5	3765.1	3792.7	3844.8	3893.0	3940.3	3987.2	4032.5	4075.5	4122.7
15 TRANSMIS & DISTRIB LOSSES	229.9	235.1	238.2	241.0	242.7	246.1	249.1	252.2	255.2	258.1	260.8	263.8
16 SYSTEM LOAD	3822.6	3908.8	3960.7	4006.1	4035.4	4090.8	4142.1	4192.4	4242.4	4290.6	4336.3	4386.5
17 PUB RESIDENTL EXCHG--RPSA	330.1	334.7	338.1	335.1	337.2	341.3	344.0	345.3	349.4	353.7	358.7	362.7
18 PUB RESIDENTL EXCHG--ETCA	10.8	10.9	10.8	10.8	10.8	10.8	10.8	10.8	10.9	11.0	11.1	11.2
19 TOTAL PUBLIC SALES	6715.6	6833.7	6920.7	7007.4	7070.9	7168.3	7258.1	7346.3	7433.9	7518.2	7598.3	7686.4
INVESTOR-OWNED UTILITIES												
20 SALES	8296.0	8431.0	8623.0	8737.2	8847.6	8967.8	9072.2	9209.2	9351.8	9483.4	9612.6	9753.5
21 TRANSMIS & DISTRIB LOSSES	871.1	885.2	905.4	917.4	929.0	941.6	952.6	967.0	981.9	995.8	1009.3	1024.1
22 SYSTEM LOAD	9167.0	9316.2	9528.4	9654.5	9776.6	9909.4	10024.8	10176.1	10333.7	10479.1	10621.9	10777.4
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	17787.0	18008.9	18179.6	18312.5	18464.5	18661.7	18855.3	19081.9	19314.0	19531.7	19742.4	19972.0
26 TOTAL REGIONAL FIRM LOAD	19237.0	19484.5	19678.5	19824.6	19992.7	20207.8	20413.8	20661.8	20914.5	21151.3	21381.8	21633.4
27 DSI ALUM TQ LOAD	710.9	708.0	689.3	666.2	658.6	650.8	650.0	650.0	650.0	650.0	650.0	650.0
28 DSI NON-ALUM TQ LOAD	88.5	76.5	59.8	59.8	59.8	60.3	60.4	60.5	61.0	61.3	61.4	61.4
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	799.4	784.5	749.2	726.0	718.4	711.1	710.4	710.5	711.0	711.3	711.4	711.4
31 TOT DSI T Q TRANS LOSSES	20.8	20.5	19.5	18.9	18.7	18.5	18.5	18.5	18.5	18.5	18.6	18.6
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20057.3	20289.5	20447.2	20569.6	20729.9	20937.4	21142.7	21390.8	21644.0	21881.1	22111.8	22363.3

1991 FINAL COUNCIL PLAN -- MEDIUM CASE -- (91F2MP) (M-TERM MRG=1/95)

FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010
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SMALL & NONGEN PUBLIC UTILS

1 SALES	3604.6	3649.0	3698.6	3749.0	3796.5	3844.3	3889.8	3934.9
2 DISTRIBUTION LOSSES	151.4	153.3	155.3	157.5	159.5	161.5	163.4	165.3
3 SYSTEM LOAD	3755.9	3802.3	3854.0	3906.4	3955.9	4005.8	4053.2	4100.2

4 DSI ALUM FIRM LOAD

5 DSI NON-ALUM FIRM LOAD	184.2	184.1	184.5	184.5	184.6	185.0	185.1	185.1
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2135.2	2135.1	2135.5	2135.5	2135.6	2136.0	2136.1	2136.1

8 TOT DSI FIRM TRANS LOSSES

9 BPA FEDERAL AGENCIES	150.3	150.9	151.6	152.3	152.9	153.5	154.1	154.7
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	159.9	161.2	162.6	164.0	165.3	166.6	167.9	169.1

12 ADDTL FEDERAL TRAN LOSSES

13 TOTAL FEDERAL FIRM LOAD	6334.2	6383.1	6438.8	6496.4	6549.6	6602.3	6652.0	6702.6
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GENERATING PUBLIC UTILITIES

14 SALES	4170.0	4221.4	4278.7	4337.0	4392.0	4447.3	4500.0	4552.2
15 TRANSMIS & DISTRIB LOSSES	266.9	270.2	273.8	277.6	281.1	284.6	288.0	291.3
16 SYSTEM LOAD	4436.8	4491.5	4552.5	4614.5	4673.0	4731.9	4788.0	4843.5

17 PUB RESIDENTL EXCHG--RPSA

18 PUB RESIDENTL EXCHG--ETCA	366.6	370.8	375.4	380.5	384.8	389.1	393.1	397.6
19 TOTAL PUBLIC SALES	7774.5	7870.4	7977.3	8085.9	8188.4	8291.7	8389.8	8487.1

INVESTOR-OWNED UTILITIES

20 SALES	9892.4	10042.6	10209.8	10367.9	10520.0	10688.7	10848.1	10994.0
21 TRANSMIS & DISTRIB LOSSES	1038.7	1054.5	1072.0	1088.6	1104.6	1122.3	1139.0	1154.4
22 SYSTEM LOAD	10931.1	11097.0	11281.8	11456.6	11624.6	11811.0	11987.2	12148.4

23 IOU RESIDENTIAL EXCHANGE

24 COLOCKUM	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
25 TOTAL REGIONAL FIRM SALES	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0

26 TOTAL REGIONAL FIRM LOAD

27 DSI ALUM TQ LOAD	20200.2	20446.8	20722.2	20989.6	21244.9	21517.8	21776.2	22020.0
28 DSI NON-ALUM TQ LOAD	21882.2	22151.7	22453.1	22747.4	23027.3	23325.2	23607.2	23874.5

29 DSI ALUM TQ LOAD

30 DSI NON-ALUM TQ LOAD	650.0	650.0	650.0	650.0	650.0	650.0	650.0	650.0
31 DSI HANNA TQ LOAD	61.4	61.4	61.5	61.5	61.5	61.5	61.5	61.5
32 TOTAL DSI TOP QTL LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

33 TOTAL DSI T Q TRANS LOSSES

34 TOTAL DSI T Q TRANS LOSSES	711.4	711.4	711.5	711.5	711.5	711.5	711.5	711.5
35 TOTAL INTERRUPTIBLE LOAD	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
36 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

37 TOTAL REGIONAL LOAD

38 TOTAL REGIONAL LOAD	22612.1	22881.6	23183.2	23477.5	23757.3	24055.3	24337.2	24604.5
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1991 FINAL COUNCIL PLAN -- MEDIUM HIGH CASE -- (91FIMHP)

FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST		1991-	1992-	1993-	1994-	1995-	1996-	1997-	1998-	1999-	2000-	2001-	2002-
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
SMALL & NONGEN PUBLIC UTILS													
1 SALES		3163.5	3238.6	3304.0	3369.9	3439.3	3508.1	3576.6	3639.7	3698.1	3753.6	3809.5	3869.9
2 DISTRIBUTION LOSSES		132.9	136.0	138.8	141.5	144.5	147.3	150.2	152.9	155.3	157.6	160.0	162.5
3 SYSTEM LOAD		3296.4	3374.6	3442.8	3511.5	3583.8	3655.5	3726.8	3792.5	3853.4	3911.2	3969.5	4032.4
4 DSI ALUM FIRM LOAD		2172.3	2132.5	2123.0	2121.5	2090.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0
5 DSI NON-ALUM FIRM LOAD		256.0	272.1	247.2	247.2	247.3	248.1	248.3	248.9	249.2	249.5	240.5	212.3
6 DSI HANNA FIRM LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD		2428.3	2404.6	2370.2	2368.7	2337.3	2335.1	2335.3	2335.9	2336.2	2336.5	2327.5	2299.3
8 TOT DSI FIRM TRANS LOSSES		63.3	62.7	61.8	61.8	61.0	60.9	60.9	60.9	60.9	60.9	60.7	60.0
9 BPA FEDERAL AGENCIES		144.1	144.2	141.3	142.4	143.5	144.5	145.4	146.3	147.2	148.0	148.9	149.7
10 USBR		67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES		155.3	156.8	157.6	159.4	160.5	162.4	164.3	166.0	167.7	169.2	170.6	171.5
12 ADDTL FEDERAL TRAN LOSSES		67.4	72.6	73.4	71.5	73.0	72.5	68.3	70.3	70.3	71.0	72.5	74.5
13 TOTAL FEDERAL FIRM LOAD		6158.9	6220.1	6252.4	6320.8	6365.5	6437.4	6507.5	6578.5	6642.2	6703.6	6756.6	6795.0
GENERATING PUBLIC UTILITIES													
14 SALES		3588.1	3673.6	3747.8	3822.6	3901.3	3979.4	4057.1	4128.7	4195.1	4258.0	4321.4	4389.9
15 TRANSMIS & DISTRIB LOSSES		229.6	235.1	239.9	244.6	249.7	254.7	259.6	264.2	268.5	272.5	276.6	281.0
16 SYSTEM LOAD		3817.8	3908.8	3987.7	4067.3	4151.0	4234.1	4316.7	4392.9	4463.5	4530.5	4598.0	4670.9
17 PUB RESIDENTL EXCHG--RPSA		334.6	343.1	349.3	348.2	353.8	360.3	365.6	369.0	374.9	381.0	388.0	393.9
18 PUB RESIDENTL EXCHG--ETCA		11.0	11.2	11.2	11.2	11.3	11.4	11.5	11.6	11.7	11.8	12.0	12.1
19 TOTAL PUBLIC SALES		6751.7	6912.3	7051.8	7192.6	7340.6	7487.6	7633.7	7768.4	7893.2	8011.6	8130.9	8259.8
INVESTOR-OWNED UTILITIES													
20 SALES		8441.9	8620.0	8846.8	9016.4	9190.2	9376.5	9542.5	9736.0	9934.9	10114.8	10296.5	10494.7
21 TRANSMIS & DISTRIB LOSSES		886.4	905.1	928.9	946.7	965.0	984.5	1002.0	1022.3	1043.2	1062.1	1081.1	1101.9
22 SYSTEM LOAD		9328.3	9525.1	9775.7	9963.2	10155.2	10361.0	10544.5	10758.3	10978.0	11176.9	11377.7	11596.6
23 IOU RESIDENTIAL EXCHANGE		-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCKUM		180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES		18013.3	18328.3	18657.3	18967.4	19259.1	19591.0	19904.4	20234.1	20558.9	20858.5	21151.5	21451.1
26 TOTAL REGIONAL FIRM LOAD		19485.0	19834.0	20195.8	20551.2	20851.7	21212.5	21548.7	21909.8	22263.8	22591.0	22912.3	23242.5
27 DSI ALUM TQ LOAD		710.9	711.0	708.0	707.5	697.0	696.0	696.0	693.0	696.0	696.0	696.0	696.0
28 DSI NON-ALUM TQ LOAD		86.6	90.6	82.3	82.3	82.3	82.7	82.9	83.1	83.2	83.3	80.2	70.8
29 DSI HANNA TQ LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD		797.5	801.6	790.3	789.8	779.3	778.7	778.9	779.1	779.2	779.3	776.2	766.8
31 TOT DSI T Q TRANS LOSSES		20.8	20.9	20.6	20.6	20.3	20.3	20.3	20.3	20.3	20.3	20.5	20.0
32 OTHER INTERRUPTIBLE LOAD		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD		26303.3	26656.5	27006.7	27341.6	27651.4	28011.5	28348.0	28709.2	29063.3	29390.6	29708.7	30029.3

1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91FIHP)
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	1990- 1991	1991- 1992	1992- 1993	1993- 1994	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002
SMALL & NONGEN PUBLIC UTILS												
1 SALES	3251.4	3378.0	3475.1	3578.0	3687.4	3790.1	3893.7	3983.6	4069.3	4159.3	4249.6	4342.3
2 DISTRIBUTION LOSSES	136.6	141.9	146.0	150.3	154.9	159.2	163.5	167.3	170.9	174.7	178.5	182.4
3 SYSTEM LOAD	3388.0	3519.9	3621.1	3728.3	3842.2	3949.3	4057.3	4150.9	4240.2	4334.0	4428.0	4524.7
4 DSI ALUM FIRM LOAD	2172.1	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0
5 DSI NON-ALUM FIRM LOAD	288.1	314.5	316.0	316.0	316.0	316.0	316.0	316.0	316.0	316.0	297.3	241.0
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2460.2	2474.5	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2476.0	2457.3	2401.0
8 TOT DSI FIRM TRANS LOSSES	64.2	64.5	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.6	64.1	62.6
9 BPA FEDERAL AGENCIES	144.1	144.2	141.3	142.4	143.5	144.5	145.4	146.3	147.2	148.0	148.9	149.7
10 USBR	67.3	67.3	67.2	67.3	67.3	67.4	67.4	67.5	67.5	67.6	67.6	67.7
11 FEDERAL TRANSMIS LOSSES	158.5	162.4	165.0	167.9	170.9	173.7	176.6	179.1	181.5	184.0	186.0	187.1
12 ADDTL FEDERAL TRAN LOSSES	70.9	77.1	79.2	78.4	81.0	81.0	77.5	80.3	81.4	83.1	85.5	88.2
13 TOTAL FEDERAL FIRM LOAD	6289.0	6445.3	6549.8	6660.2	6781.0	6891.9	7000.2	7100.1	7193.8	7292.7	7373.3	7418.3
GENERATING PUBLIC UTILITIES												
14 SALES	3687.0	3831.4	3941.7	4058.3	4182.3	4299.0	4416.5	4518.7	4615.9	4718.0	4820.4	4925.6
15 TRANSMIS & DISTRIB LOSSES	236.0	245.2	252.3	259.7	267.7	275.1	282.7	289.2	295.4	301.9	308.5	315.2
16 SYSTEM LOAD	3923.0	4076.6	4193.9	4318.0	4450.0	4574.1	4699.2	4807.8	4911.3	5019.9	5128.9	5240.8
17 PUB RESIDENTIAL EXCHG--RPSA	344.1	358.0	367.4	369.8	379.4	389.4	398.1	403.9	412.6	422.2	432.8	442.0
18 PUB RESIDENTIAL EXCHG--ETCA	11.4	11.7	11.8	11.9	12.1	12.4	12.6	12.7	12.9	13.1	13.4	13.6
19 TOTAL PUBLIC SALES	6938.4	7209.4	7416.8	7636.3	7869.7	8089.1	8310.3	8502.2	8685.2	8877.3	9069.9	9267.9
INVESTOR-OWNED UTILITIES												
20 SALES	8687.1	9020.9	9356.6	9646.4	9952.8	10261.2	10549.9	10825.0	11123.7	11425.9	11732.5	12046.7
21 TRANSMIS & DISTRIB LOSSES	912.1	947.2	982.4	1012.9	1045.0	1077.4	1107.7	1136.6	1168.0	1199.7	1231.9	1264.9
22 SYSTEM LOAD	9599.3	9968.1	10339.0	10659.3	10997.9	11338.6	11657.6	11961.6	12291.7	12625.6	12964.4	13311.6
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
24 COLOCUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
25 TOTAL REGIONAL FIRM SALES	18477.2	19096.2	19637.9	20148.4	20689.4	21218.2	21729.0	22197.0	22679.5	23174.8	23656.2	24113.0
26 TOTAL REGIONAL FIRM LOAD	19991.2	20670.0	21262.8	21817.5	22408.8	22984.6	23537.0	24049.5	24576.7	25118.3	25646.6	26150.7
27 DSI ALUM TQ LOAD	710.9	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0
28 DSI NON-ALUM TQ LOAD	97.4	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.8	98.8	80.0
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30 TOTAL DSI TOP QTL LOAD	808.3	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	825.0	818.8	800.0
31 TOT DSI T Q TRANS LOSSES	21.1	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.4	20.9
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 TOTAL REGIONAL LOAD	20820.6	21516.5	22109.3	22664.0	23255.4	23831.2	24383.5	24896.1	25423.3	25964.8	26486.7	26971.6

1991 FINAL COUNCIL PLAN -- MEDIUM HIGH CASE -- (91F1MHP)

FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST

	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010
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SMALL & NONGEN PUBLIC UTILS

1 SALES	3931.2	3997.6	4066.5	4137.5	4204.3	4270.0	4339.1	4410.0
2 DISTRIBUTION LOSSES	165.1	167.9	170.8	173.8	176.6	179.3	182.2	185.2
3 SYSTEM LOAD	4096.3	4165.5	4237.2	4311.2	4380.9	4449.3	4521.3	4595.2
4 DSI ALUM FIRM LOAD	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0	2087.0
5 DSI NON-ALUM FIRM LOAD	212.4	212.3	212.5	212.6	212.7	213.2	213.3	213.3
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 TOTAL DSI FIRM LOAD	2299.4	2299.3	2299.5	2299.6	2299.7	2300.2	2300.3	2300.3
8 TOT DSI FIRM TRANS LOSSES	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
9 BPA FEDERAL AGENCIES	150.3	150.9	151.6	152.3	152.9	153.5	154.1	154.7
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1
11 FEDERAL TRANSMIS LOSSES	173.2	175.0	176.9	178.9	180.7	182.6	184.5	186.4
12 ADDTL FEDERAL TRAN LOSSES	74.8	76.1	78.2	81.6	83.8	84.8	85.7	88.0
13 TOTAL FEDERAL FIRM LOAD	6861.9	6934.7	7011.4	7091.6	7166.0	7238.4	7313.9	7392.7

GENERATING PUBLIC UTILITIES

14 SALES	4459.5	4534.7	4612.8	4695.4	4769.3	4843.8	4922.1	5002.6
15 TRANSMIS & DISTRIB LOSSES	285.4	290.2	295.2	300.4	305.2	310.0	315.0	320.2
16 SYSTEM LOAD	4744.9	4824.9	4908.1	4993.8	5074.5	5153.8	5237.2	5322.7
17 PUB RESIDENTL EXCHG--RPSA	399.8	406.3	412.8	420.0	426.1	432.2	438.6	445.7
18 PUB RESIDENTL EXCHG--ETCA	12.2	12.4	12.5	12.7	12.8	12.9	13.1	13.2
19 TOTAL PUBLIC SALES	8391.7	8532.3	8679.3	8830.8	8973.6	9113.8	9261.2	9412.5

INVESTOR-OWNED UTILITIES

20 SALES	10692.0	10920.3	11170.7	11419.6	11646.0	11887.0	12137.9	12375.0
21 TRANSMIS & DISTRIB LOSSES	1122.7	1146.6	1172.9	1199.1	1222.8	1248.1	1274.5	1299.4
22 SYSTEM LOAD	11814.7	12066.9	12343.6	12618.7	12868.8	13135.1	13412.3	13674.4

23 IOU RESIDENTIAL EXCHANGE

23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
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24 COLOCKUM

24 COLOCKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
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25 TOTAL REGIONAL FIRM SALES

25 TOTAL REGIONAL FIRM SALES	21780.3	22150.6	22549.0	22950.3	23320.2	23702.5	24101.5	24490.6
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26 TOTAL REGIONAL FIRM LOAD

26 TOTAL REGIONAL FIRM LOAD	23601.5	24006.5	24443.0	24884.0	25289.4	25707.3	26143.4	26569.8
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27 DSI ALUM TQ LOAD

27 DSI ALUM TQ LOAD	696.0	696.0	696.0	696.0	696.0	696.0	696.0	696.0
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28 DSI NON-ALUM TQ LOAD

28 DSI NON-ALUM TQ LOAD	70.9	70.8	71.0	71.1	71.2	71.2	71.2	71.2
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29 DSI HANNA TQ LOAD

29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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30 TOTAL DSI TOP QTL LOAD

30 TOTAL DSI TOP QTL LOAD	766.9	766.8	767.0	767.1	767.2	767.2	767.2	767.2
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31 TOT DSI T Q TRANS LOSSES

31 TOT DSI T Q TRANS LOSSES	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
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32 OTHER INTERRUPTIBLE LOAD

32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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33 TOTAL REGIONAL LOAD

33 TOTAL REGIONAL LOAD	24388.4	24793.3	25230.0	25671.1	26076.5	26494.5	26930.6	27357.0
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1991 FINAL COUNCIL PLAN -- HIGH CASE -- (91FIHP)										
FISCAL YEAR MEANS FOR AVERAGE REGIONAL FORECAST										
	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010		
SMALL & NONGEN PUBLIC UTILS										
1 SALES	4433.9	4536.9	4648.5	4757.4	4862.9	4969.6	5077.3	5187.5		
2 DISTRIBUTION LOSSES	186.2	190.6	195.2	199.8	204.2	208.7	213.2	217.9		
3 SYSTEM LOAD	4620.1	4727.5	4843.7	4957.2	5067.2	5178.3	5290.5	5405.3		
4 DSI ALUM FIRM LOAD	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0	2160.0		
5 DSI NON-ALUM FIRM LOAD	241.0	241.0	241.0	241.0	241.0	241.0	241.0	241.0		
6 DSI HANNA FIRM LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7 TOTAL DSI FIRM LOAD	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0	2401.0		
8 TOT DSI FIRM TRANS LOSSES	62.6	62.6	62.6	62.6	62.6	62.6	62.6	62.6		
9 BPA FEDERAL AGENCIES	150.3	150.9	151.6	152.3	152.9	153.5	154.1	154.7		
10 USBR	67.8	67.8	67.9	67.9	68.0	68.0	68.1	68.1		
11 FEDERAL TRANSMIS LOSSES	189.6	192.4	195.5	198.5	201.4	204.3	207.3	210.3		
12 ADDTL FEDERAL TRAN LOSSES	89.7	92.1	95.5	100.0	103.4	105.8	107.8	111.1		
13 TOTAL FEDERAL FIRM LOAD	7518.6	7631.7	7755.2	7877.0	7993.9	8111.0	8228.8	8350.5		
GENERATING PUBLIC UTILITIES										
14 SALES	5029.5	5166.2	5272.7	5396.3	5516.1	5637.1	5759.2	5884.2		
15 TRANSMIS & DISTRIB LOSSES	321.9	329.4	337.5	345.4	353.0	360.8	368.6	376.6		
16 SYSTEM LOAD	5351.4	5475.6	5610.2	5741.7	5869.1	5997.9	6127.8	6260.8		
17 PUB RESIDENTL EXCHG--RPSA	451.0	461.2	471.9	483.0	493.0	503.1	513.3	524.3		
18 PUB RESIDENTL EXCHG--ETCA	13.8	14.1	14.4	14.6	14.8	15.1	15.3	15.6		
19 TOTAL PUBLIC SALES	9463.4	9683.2	9921.2	10153.7	10379.0	10606.7	10836.5	11071.7		
INVESTOR-OWNED UTILITIES										
20 SALES	12335.9	12661.9	13037.4	13398.1	13747.0	14104.0	14461.1	14814.7		
21 TRANSMIS & DISTRIB LOSSES	1295.3	1329.5	1368.9	1406.8	1443.4	1480.9	1518.4	1555.5		
22 SYSTEM LOAD	13631.2	13991.4	14406.3	14804.9	15190.4	15584.9	15979.5	16370.2		
23 IOU RESIDENTIAL EXCHANGE	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0		
24 COLOKUM	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0		
25 TOTAL REGIONAL FIRM SALES	24598.5	25144.8	25759.2	26353.1	26927.9	27513.2	28100.8	28690.1		
26 TOTAL REGIONAL FIRM LOAD	26681.2	27278.7	27951.7	28603.6	29233.4	29873.8	30516.2	31161.6		
27 DSI ALUM TQ LOAD	720.0	720.0	720.0	720.0	720.0	720.0	720.0	720.0		
28 DSI NON-ALUM TQ LOAD	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0		
29 DSI HANNA TQ LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
30 TOTAL DSI TOP QTL LOAD	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0		
31 TOT DSI T Q TRANS LOSSES	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9		
32 OTHER INTERRUPTIBLE LOAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
33 TOTAL REGIONAL LOAD	27502.0	28099.6	28772.6	29424.5	30054.3	30694.6	31337.0	31982.4		

END

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