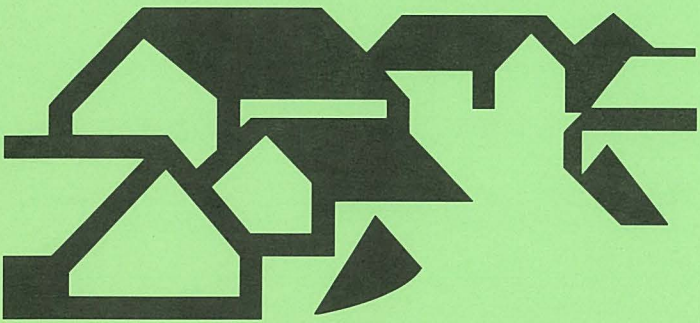


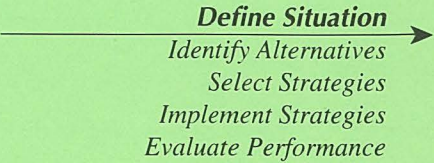
# The 1992 Pacific Northwest Residential Energy Survey – Phase I

Executive Summary  
Concordance  
Glossary

PNWRES92



*This document is a product of the  
Energy Resources Development  
and Implementation Process:*





Energy Resources Development and Implementation Process

The Energy Resources Program contains all the steps needed to plan for and manage energy resources. This chart reflects that process, with major tasks for each step. Though we display a linear process, it is a simplification; many interactions among the stages take place. Throughout the process, Bonneville asks customers, the Northwest Power Planning Council, utility and environmental groups, the public and others for their advice and comment.

Customers  
Northwest Power Planning Council  
Utility and Environmental Groups  
The Public

Defining the Resource Picture

To define the resource picture, Bonneville assesses its customers’ power requirements for the next 20 years and the supply of existing resources. Bonneville and the Northwest Power Planning Council publish energy demand forecasts, and analysts forecast how much power from existing resources will be available to meet projected uses. The difference must be met by new resources.

Identifying Alternatives

Analysts track potential resources and predict future supplies of conservation and generation resources, including imports and power exchanges. Analysts study all aspects of a resource: reliability, public opinion, cost, environmental impact, regulatory transmission and fuel constraints, and development time. Alternatives considered include opportunities for coordinating hydro system operations with Canada and for power purchases and transfers with Canadian and Southwest utilities.

Selecting Strategies

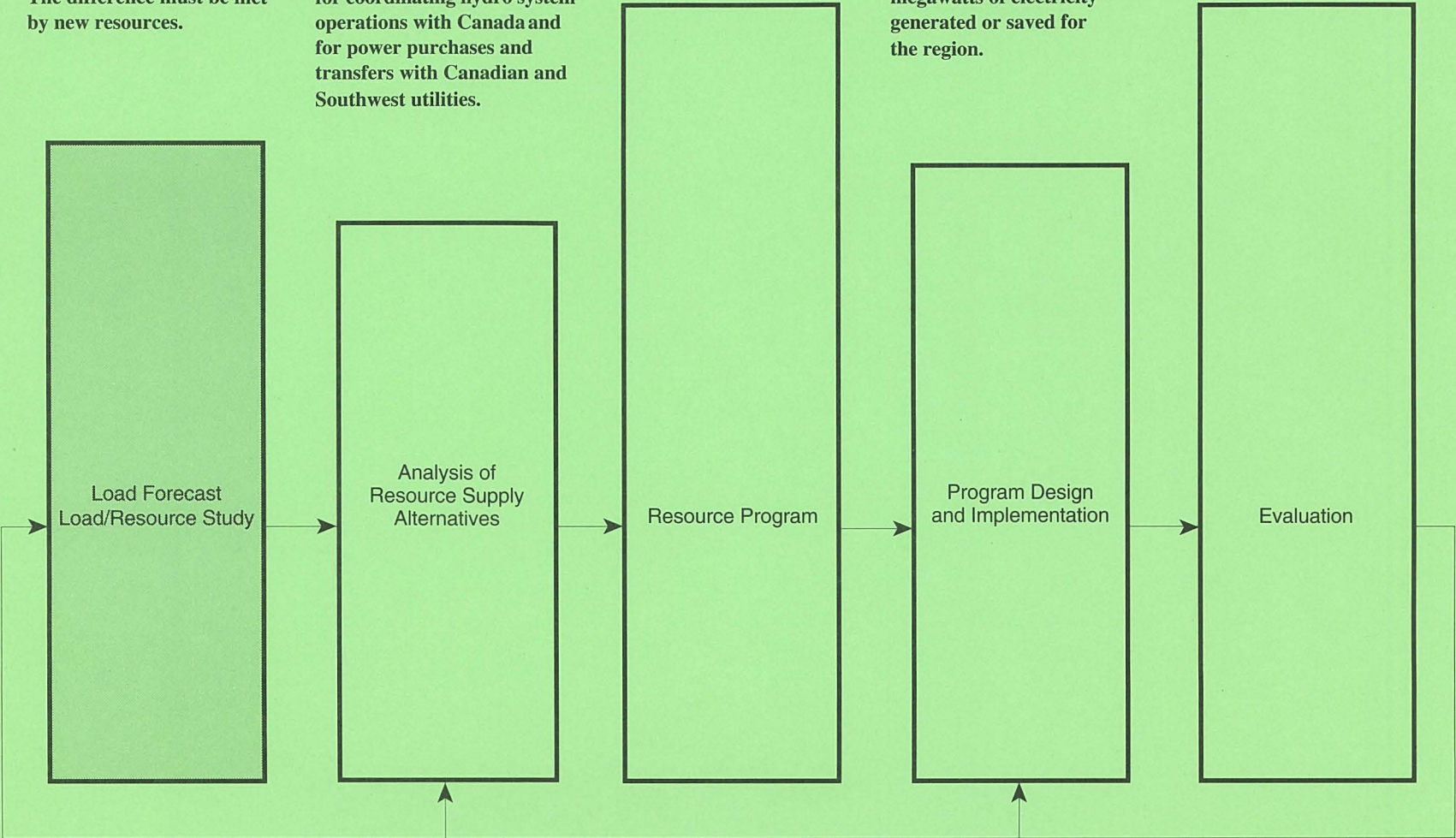
Using information on loads and resources, Bonneville weighs combinations of resources, their consequences, and public comment to choose the most appropriate and cost-effective resource strategy. The Resource Program documents this strategy.

Implementing Strategies

Fulfilling the plans in the Resource Program is the next step. Working with utilities, resource developers, interest groups, the public, and others, Bonneville sponsors conservation and generation programs and projects. BPA conducts environmental reviews of programs and projects and also provides oversight for generation projects. The result: megawatts of electricity generated or saved for the region.

Evaluating Performance

How well did actions meet BPA’s objectives? Answering this question through program evaluation provides information on energy savings, energy production, costs and other measures of program quality. It is BPA’s policy to evaluate all energy resource acquisitions.



PNW/RES92-I Primary Documentation Series

- Book 1:** Volumes A and B. The Executive Summary, the Concordance, and the Glossary (A) and the Report on Methodology and the Technical Appendix (B).
- Book 2:** Volume C. Item-by-item cross-tabulations for the Pacific Northwest Region.
- Book 3:** Volume D. Item-by-item cross-tabulations for the four Bonneville Area Offices (Puget Sound, Lower Columbia, Upper Columbia, and Snake River).
- Book 4:** Volume E. Item-by-item cross-tabulations for the four Pacific Northwest states served by Bonneville (Western Montana, Idaho, Washington, and Oregon).
- Book 5:** Volume F. Selected cross-tabulations for the Pacific Northwest Region.
- Book 6:** Volumes G, H, and I. Selected cross-tabulations for the three publicly-owned generating utility domains: Eastern Washington (G), Western Washington (H), and Western Oregon (I).
- Book 7:** Volumes J, K, L, M, N, and O. Selected cross-tabulations for the six publicly-owned non-generating utility domains: Western Montana (J), Idaho (K), Eastern Washington (L), Western Washington (M), Eastern Oregon (N), and Western Oregon (O).
- Book 8:** Volumes P, Q, R, S, T, and U. Selected cross-tabulations for the six investor-owned utility domains: Western Montana (P), Idaho (Q), Eastern Washington (R), Western Washington (S), Eastern Oregon (T), and Western Oregon (U).
- Book 9:** Volumes V, W, X and Y. Selected cross-tabulations for Bonneville’s four Area Offices: Puget Sound (V), Lower Columbia (W), Upper Columbia (X), and Snake River (Y).
- Book 10:** Volumes Z, AA, AB, and AC. Selected cross-tabulations for the four states served by Bonneville: Washington (Z), Oregon (AA), Idaho (AB), and Western Montana (AC).
- Book 11:** Volumes AD, AE, and AF. Selected cross-tabulations for the three categories of utilities in the Pacific Northwest: Public Generating (AD), Public Non-Generating (AE), and Investor-Owned (AF).
- Book 12:** Volume AG. A report of a post-survey of PNW/RES92-I non-respondents (conducted in late Spring 1993) and their reason(s) for not completing the original survey.



# **The 1992 Pacific Northwest Residential Energy Survey Phase I**

**(PNWRES92-I)**

**Executive Summary**

**Concordance**

**Glossary**

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Bonneville Power Administration  
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**Telephone Data File (TDF)** contains records of interviews which were begun and in which respondents passed the screening questions but still for some reason did not complete the survey. (See **Telephone Call Outcome Files**)

**Telephone Successful Completions File (TSCF)** contains all completed surveys. (See **Telephone Call Outcome Files**)

**Upper Columbia Area Office** is located in Spokane, Washington.

**Utility** is an organization which sells energy to the general public. For the purpose of this study, three types of Pacific Northwest electric utilities were designated: public generating (PG), public non-generating (PN), and investor-owned (IO).

**Weekly Reports** is a series of documents sent to **BPA** by **AMPG** every week to report on the progress of **PNWRES92-I**. Information was reported by task and

included descriptions of work completed for the previous week and projections for work to be completed the during the upcoming week.

**Weights** are values associated with respondents' raw data. They are used to estimate population and sub-population totals by "weighting up" the raw data. For **PNWRES92-I**, the designed weighting system was based upon regional and sub-regional counts of **Occupied Housing Units (OHUs)** that were derived from 1990 U.S. Census data and upon the sample frequencies in the **New Domains**. A second set of weights was developed for **BPA's** four **Area Offices**. (See **OHUs, Area Office, New Domains**)

**Weighted Data** are data which have been derived by applying a set of weights to the raw data. The weighted **PNWRES92-I** data are displayed in the lower tables in **Volumes C-AG**. (See **Raw Data, Weights**)

# PREFACE

This document contains the Executive Summary, the Concordance, and the Glossary from the *primary documentation* for the **1992 Pacific Northwest Residential Energy Survey, Phase I (PNWRES92-I)**.<sup>1</sup> Its few pages are designed to serve as an introduction to and as an overview of the survey, its processes, and its results.

The complete 33-volume set of primary documentation provides information needed by energy analysts and interpreters with respect to planning, execution, data collection, and data management of the **PNWRES92-I** process. Thirty of these volumes are devoted to different "views" of the data themselves, with each view having a special purpose or interest as its focus. Analyses and interpretations of these data will be the subjects of forthcoming publications.

Conducted during the late summer and fall months of 1992, **PNWRES92-I** had the over-arching goal of satisfying basic requirements for a variety of information about the stock of residential units in Bonneville's service region. Surveys with a similar goal were conducted in 1979 and 1983 and were respectively designated **PNWRES79** and **PNWRES83**.

<sup>1</sup> From its planning stages, **PNWRES92** was conceived as and intended to be a two-phase study: Phase I, the Telephone Survey, was to provide a modest amount of data on a large number (some 20,000) of Pacific Northwest households; Phase II, the On-Site Survey, was to provide a great deal of data on relatively few (perhaps 2,000-3,000) of the households interviewed in Phase I. Phase I households were intended also to provide a surrogate population of the region's households for specially focused future surveys.

PNWRES92-I differed from its two predecessors in several ways. It was designed to ...

... be conducted as a telephone survey—in contrast to an on-site/in-person interview.

.... include all classes of housing units in the Pacific Northwest—in contrast to those that could be reached only through cooperating electric utilities.

... assure coverage of six geographic sub-regions<sup>2</sup> and three utility types<sup>3</sup>—in contrast, again, to depending upon the cooperation and effort of a selection of electric utilities.

... provide data on some 20,000 housing units—in contrast to some 4,000-5,000 housing units interviewed in PNWRES79 and PNWRES83.

... provide a surrogate population of Pacific Northwest households as a basis for future, fine-tuned surveys aimed at specific issues or limited data needs.

In order to provide a record of intention and achievement, the 33 coordinated volumes—designated **Volume A through Volume AG**—were prepared by PNWRES92-I's principal contractor, the Applied Management & Planning Group of Los Angeles, CA. These volumes are collected and published in a series of 12 "books," each of which contains a particular subgroup of the 33 volumes:

**Book 1: Volumes A and B.** The Executive Summary, the Concordance, and the Glossary (A)<sup>4</sup> and the Report on Methodology and the Technical Appendix (B).

**Book 2: Volume C.** Item-by-item crosstabulations<sup>5</sup> for the Pacific Northwest Region.

**Book 3: Volume D.** Item-by-item crosstabulations for the four Bonneville Area Offices (Puget Sound, Lower Columbia, Upper Columbia, and Snake River).

**Book 4: Volume E.** Item-by-item crosstabulations for the four Pacific Northwest states served by Bonneville (Western Montana, Idaho, Washington, and Oregon).

<sup>2</sup> Western Montana, Idaho, Eastern Washington, Western Washington, Eastern Oregon, and Western Oregon.

<sup>3</sup> Publicly-Owned Generating Utilities, Publicly-Owned Non-Generating Utilities, and Investor-Owned Utilities.

<sup>4</sup> Thus this stand-alone document contains all of **Volume A**.

<sup>5</sup> Item-by-item crosstabulations display all responses to each of 80 survey items (excepting confidential/sensitive items like names and addresses) for each of the 15 survey domains and for the Region (**Volume C**), Bonneville's four Area Offices (**Volume D**), and the four Pacific Northwest states (**Volume E**).

maximum is attained by setting the parameter to the value of 0.5.

PNWRES92-I's stated precision requirement called for each domain's binomial parameter to be estimated with as small a standard error as possible, adhering to the requirement that domains involving publicly-owned utilities would have standard errors half as large as those involving investor-owned utilities. Given an initial planned total sample size of some 20,000 completed interviews, this resulted in sample sizes of about 1,900 for publicly-owned utilities and 475 for investor-owned utilities. Thus, the maximum standard errors were 0.011 and 0.023, respectively, for the two types of utilities. (See **Survey Design**)

SAS is a commercial software system for data management and analysis with the capabilities of information storage and retrieval, data modification and programming, report writing, statistical analysis, and file handling. It is a product of SAS Institute, Inc., located in Cary, North Carolina.

Snake River Area Office is located in Walla Walla, Washington.

States, for the purposes of reporting this study, are those in the Pacific Northwest: Oregon, Washington, Idaho and Western Montana. Data from the surrounding states were incorporated into PNWRES92-I datasets in the following manner: responses from California and parts of Nevada were allocated to Western or Eastern Oregon, while responses from Nevada, Utah, and Wyoming were allocated to Idaho or to Western Montana according to their adjacencies.

Survehard is the computerized version of the survey instrument designed for use on ISA's CATI system. (See **CATI, Survey Instrument**)

**Survey Design** is a set of strategies and procedures for conducting a survey. The sample design for PNWRES92-I was a stratified random sample, conducted with CATI technology. In each of the nine public utility domains, a sample size of 1,905 housing units was sought. In each of the six private utility domains, a sample size of 476 housing units was sought. (See **Sampling Error**)

**Survey Instrument** is the script devised and used by the surveyors to elicit data.

**Telephone Call Disposition File (TCDF)** is the largest of five data files designed to track the number of telephone calls placed during fieldwork. This file contains the disposition of all telephone calls, including disconnections, fax machines, non-residential numbers, etc. It also includes the attempts made to potential respondents. (See **Telephone Call Outcome Files**)

**Telephone Call Outcome Files** are five files designed to document the outcome of every telephone call placed during the survey. The five files were the **Telephone Calls Disposition File (TCDF)**; the **Telephone Respondent Information File (TRIF)**, the **Telephone Data File (TDF)**, the **Telephone Successful Completions File (TSCF)**, and the **Flagged Successful Completions File (FSCF)**. (See **Telephone Call Disposition File, Telephone Respondent Information File, Telephone Data File, Telephone Successful Completions File, Flagged Successful Completions File**).

**Telephone Respondent Information File (TRIF)** provides a record of all respondents who expressed a willingness to begin the survey were included in the TRIF. This file primarily logged respondents who refused to complete after a certain question or who did not qualify to complete the survey due to the screening questions. (See **Telephone Call Outcome Files**)

their **New Domains** according to their confirmed ZIP code.

**Occupied Housing Units (OHUs)**, according to the U.S. Bureau of the Census, is the set of housing units that are " ... classified as occupied if a person or group of persons is living in [them] at the time of the interview or if the occupants are only temporarily absent, for example, on vacation.... By definition of the count of occupied housing units is the same as the count of households."<sup>11</sup>

**Quad-Weekly Reports** refers to a series of documents, prepared for **BPA** and generated every four weeks by **AMPG**, which describe the progress-to-date for **PNWRES92-I** and projects and activities to be completed in the ensuing four weeks.

**Pacific Northwest Residential Energy Survey - Phase I (PNWRES92-I)** is the subject of this family of reports. It was a telephone survey that was conducted to obtain data on the energy use of residences in the Pacific Northwest. A total of 20,170 surveys were completed. The results of the study will allow the **Bonneville Power Administration** and other members of the Pacific Northwest's energy-planning community to forecast residential energy use in the region and to plan for appropriate conservation programs.

**Pretest** is a small-scale tryout of a survey's instrument and field methods. The pretest allows for changes and improvements to be made in the survey instrument and the methodologies prior to launching the full effort.

**Puget Sound Area Office** is located in Seattle, Washington.

**Random Digit Dialing (RDD)** is the process of dialing randomly-generated telephone numbers. Properly conducted, RDD planning yields a sample such that

every telephone number within the desired population has the same probability of being selected.

**Raw Data** are data generated during the conduct of a survey's fieldwork. With respect to **PNWRES92-I**, these data are maintained in **SAS** datasets in **BPA's** mainframe computer. The term also applies to the display of counts contained in the upper tables of **Volumes C-AG**. (See **Weighted Data**)

**Residence** (See **Housing Unit**)

**Response Rate** is the ratio of the number of respondents who completed the survey to the number of eligible residential telephone numbers which were dialed.

**Return Rate** is the ratio of the number of respondents who completed the survey to the total number of telephone numbers which were dialed.

**Rounding**, for this study, is the process of converting fractional numbers to whole numbers. Weighted estimates in **PNWRES92-I** are published as integers (i.e., they are rounded to the nearest whole number). (See **Weighted Data**)

**Rounding Error** is an error resulting from **rounding**.

**Sample**, as used in surveys, is a subset of a population under study. The population for **PNWRES92-I** was all housing units located in the Pacific Northwest which, at the time of the survey, had telephone service; the sample is the set of 20,170 household for whom completed surveys were obtained.

**Sampling Domain**. (See **Domain**)

**Sampling Error**, for **PNWRES92-I**, was defined to be the maximum standard error of an estimated binomial parameter. This

- Book 5: Volume F.** Selected crosstabulations<sup>6</sup> for the Pacific Northwest Region.
- Book 6: Volumes G, H, and I.** Selected crosstabulations for the three publicly-owned *generating* utility domains: Eastern Washington (**G**), Western Washington (**H**), and Western Oregon (**I**).
- Book 7: Volumes J, K, L, M, N, and O.** Selected crosstabulations for the six publicly-owned *non-generating* utility domains: Western Montana (**J**), Idaho (**K**), Eastern Washington (**L**), Western Washington (**M**), Eastern Oregon (**N**), and Western Oregon (**O**).
- Book 8: Volumes P, Q, R, S, T, and U.** Selected crosstabulations for the six investor-owned utility domains: Western Montana (**P**), Idaho (**Q**), Eastern Washington (**R**), Western Washington (**S**), Eastern Oregon (**T**), and Western Oregon (**U**).
- Book 9: Volumes V, W, X, and Y.** Selected crosstabulations for Bonneville's four Area Offices: Puget Sound (**V**), Lower Columbia (**W**), Upper Columbia (**X**), and Snake River (**Y**).
- Book 10: Volumes Z, AA, AB, and AC.** Selected crosstabulations for the four states served by Bonneville: Washington (**Z**), Oregon (**AA**), Idaho (**AB**), and Western Montana (**AC**).
- Book 11: Volumes AD, AE, and AF.** Selected crosstabulations for the three categories of utilities in the Pacific Northwest: Public Generating (**AD**), Public Non-Generating (**AE**), and Investor-Owned (**AF**).
- Book 12: Volume AG.** A report of a post-survey study of PNWRES92-I non-respondents (conducted in late Spring 1993) and their reason(s) for not completing the original survey.

*For additional information, comments, or data requests, contact David Mills: 503-230-7505.*

*To obtain copies of the reports, contact Kim Andersen, End-Use Research Section (RPEE), Bonneville Power Administration, P.O. Box 3621, Portland, OR 97208-3621: 503-230-5712.*

*Individually-bound copies of Volume A (Executive Summary, Concordance, and Glossary) may be obtained from Bonneville's Public Information Office: 503-230-3055.*

<sup>6</sup> "Selected crosstabulations" refers to a set of nine survey items of wide interest (Dwelling Type, Ownership Type, Year-of-Construction, Dwelling Size, Primary Space-Heating Fuel, Primary Water-Heating Fuel, Household Income for 1991, Utility Type, and Space-Heating Fuels: Systems and Equipment) that were crosstabulated among themselves and thus yielded 36 two-way tables for each of the several views displayed in **Volumes F through AF**.

**Foundation** refers to the survey’s Question 26 in which respondents were queried regarding their dwellings’ type of foundation. When respondents tried to gave multiple responses, interviewers probed for the foundation of the largest area of the dwelling. The primary foundation types were concrete slab, crawl space, and basement.

**Flagged Successful Completion File (FSCF)** contained results of interviews which were completed but did not pass quality control (due to conflicting or illogical responses). **ISA** staff cleaned data and, when necessary, recontacted respondents to remove as many files as possible from the FSCF and place them in the **Telephone Successful Completions File**. (See **TSCF, Telephone Call Outcome Files**)

**Frequencies** are counts of individual values attained by a variable. (See **Crosstabulation Tables, Raw Data, Weighted Data**)

**Fuel Type** is one of the following commodities: electricity, wood, natural gas, fuel oil, propane/bottled gas, kerosene, and coal. Respondents were asked to name the fuel used most in their homes to heat space and water.

**Group Quarters**, according to the U.S. Bureau of the Census, " ... are living arrangements for institutional inmates or for other groups containing nine or more persons not related to the person in charge...."<sup>11</sup>

**Household**, according to the U.S. Bureau of the Census, "... consists of all persons who occupy a housing unit. By definition, the count of households is the same as the

count of occupied housing units."<sup>11</sup> (See **Occupied Housing Units**)

**Housing Unit**, according to the U.S. Bureau of the Census, "... is a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which occupants do not live and eat with any other persons in the structure and that have direct access from the outside of the building or through a common hall that is used or intended for use by the occupants of another unit or by the general public. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements (except as ... group quarters)."<sup>11</sup> (See **Group Quarters**)

**Interviewing Services of America (ISA)** conducted the fieldwork for **PNWRES92-I** as a subcontractor to **AMPG**. **ISA** is located in Van Nuys, California. (See **CATI, Fieldwork**)

**Lower Columbia Area Office** is located in Portland, Oregon.

**Methodology** covers all activities related to the planning, design, data collection, analysis, and reporting of **PNWRES92-I**.

**New Domains** is a term coined during the processing of **PNWRES92-I** data. It was created to accommodate respondents whose data could reasonably place them in a different domain than expected by their telephone number. Thus, at the design stage, each possible telephone number was placed in one of the 15 "Design Domains." During fieldwork, respondents reported their actual domains when they were queried about their utility; these were used to determine each respondent’s **New Domain**. Those respondents who were not queried about their utility were allocated to

<sup>11</sup> Definitions adapted from *Supplement to the American Housing Survey for Selected Metropolitan Areas in 1988*, H171/88, U.S. Department of Commerce, Bureau of the Census, Washington, DC, 1993.



power wholesale to utilities. Located in Portland, Oregon, BPA's main service territory includes Washington, Oregon, Idaho, Western Montana, and portions of surrounding states. Bonneville contracted the conduct of PNWRES92-I in order to support the forecasting of future energy needs in the Pacific Northwest. (See **States**)

**Bonneville Power Plus (BPP)** is a software system which allows personal computer access to the tables and reports of PNWRES92-I through a Microsoft Windows-based system.

**Computer-Aided Telephone Interviewing (CATI)** employs interactive computing systems to assist interviewers and their supervisors in performing the basic data-collection task of telephone interview surveys.

**Concordance**, as used here, is a specific text-and-graphics display which provides an index to PNWRES92-I's volumes of tables and reports; it appears in each of the 33 volumes.

**Crosstabulation Tables** show combined frequency distributions of two or more variables. In PNWRES92-I, item-by-item crosstabulation tables were produced for the 15 sampling domains, for the three utility types within Bonneville's four Area Offices, and for the three utility types within the four states. Crosstabulation tables also were produced to examine nine specific survey items: type of dwelling; ownership type; year of construction; size (in square feet); type of space-heating fuel; type of water-heating fuel; household income; utility type; and type of space-heating equipment. These are presented for the region, the 15 sampling domains, the four area offices, the four states, and the three utility types. (See **Frequencies**)

**Data** are those elements of information that are either

- (a) quantified by their basic nature (e.g., floor area or annual income) or
- (b) capable of being quantified (e.g., type of dwelling or strength of an opinion).

For the most part, the word "data" is used in these documents to refer to the values collected during the conduct of PNWRES92-I.

**Domain** is used in sampling and survey practice to designate a particular subset of a population that is of special interest. In PNWRES92-I, the domains (also called sampling domains) refer to the 15 strata of the initial survey design. These domains were determined by stratifying the target population of Pacific Northwest households according to three utility types (investor-owned, public generating and public non-generating) and six geographical areas (Idaho; Western Montana; the 19 Oregon counties west of the Cascade ridge; the 17 Oregon counties east of the Cascade ridge; the 19 Washington counties west of the Cascade ridge; and the 20 Washington counties east of the Cascade ridge). Three of the possible domains were empty (in late 1992, there were no public generating utilities in Eastern Oregon, Idaho or Montana); therefore, there were 15 active sampling domains in the survey itself. (See **New Domains**)

**Dwelling** (See **Housing Unit**)

**Fieldwork** is a term used to cover the data-collection aspects of a survey. For PNWRES92-I, the fieldwork consisted of telephoning residences in the Pacific Northwest to conduct the survey and recording the responses. The effort lasted approximately 14 weeks during the fourth quarter of 1992 and was conducted using ISA's CATI system. During fieldwork, a record of every call that was made was entered into one of five telephone-record files. (See **CATI**, **ISA**, **Telephone Call Outcome Files**)

# 1992 Pacific Northwest Residential Energy Survey Phase I

## VOLUME A Executive Summary Project Concordance Glossary

Prepared for  
**Bonneville Power Administration**  
Portland, Oregon

by  
**Applied Management & Planning Group**  
Los Angeles

Contract No.: DE-AC79-92BP25174

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# GLOSSARY

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Acronyms, Initialisms,  
and Jargon

AMPG (See Applied Management & Planning Group)

BPA (See Bonneville Power Administration)

BPP (See Bonneville Power Plus)

CATI (See Computer-Aided Telephone Interviewing)

Crosstabs, Crosstabulations (See Crosstabulation Tables)

FSCF (See Flagged Successful Completion File)

ISA (See Interviewing Services of America)

OHUs (See Occupied Housing Units)

PNWRES92-I (See Pacific Northwest Residential Energy Survey - Phase I)

RDD (See Random Digit Dialing)

SAS (See SAS)

TCDF (See Telephone Call Disposition File)

TRIF (See Telephone Respondent Information File)

TDF (See Telephone Data File)

TSCF (See Telephone Successful Completion File)

General  
Terminology

Applied Management & Planning Group (AMPG) is a small business enterprise contracted by the **Bonneville Power Administration** to conduct the **Pacific Northwest Residential Energy Survey, Phase I (PNWRES92-I)**. AMPG is located in West Los Angeles, California.

**Area Offices** are four geographic-based entities (**Lower Columbia, Puget Sound, Snake River, and Upper Columbia**) which oversee the field operations of the **Bonneville Power Administration**.

**Bonneville Power Administration (BPA)** is one of the U.S. Department of Energy's five power marketing agencies. **BPA** supplies



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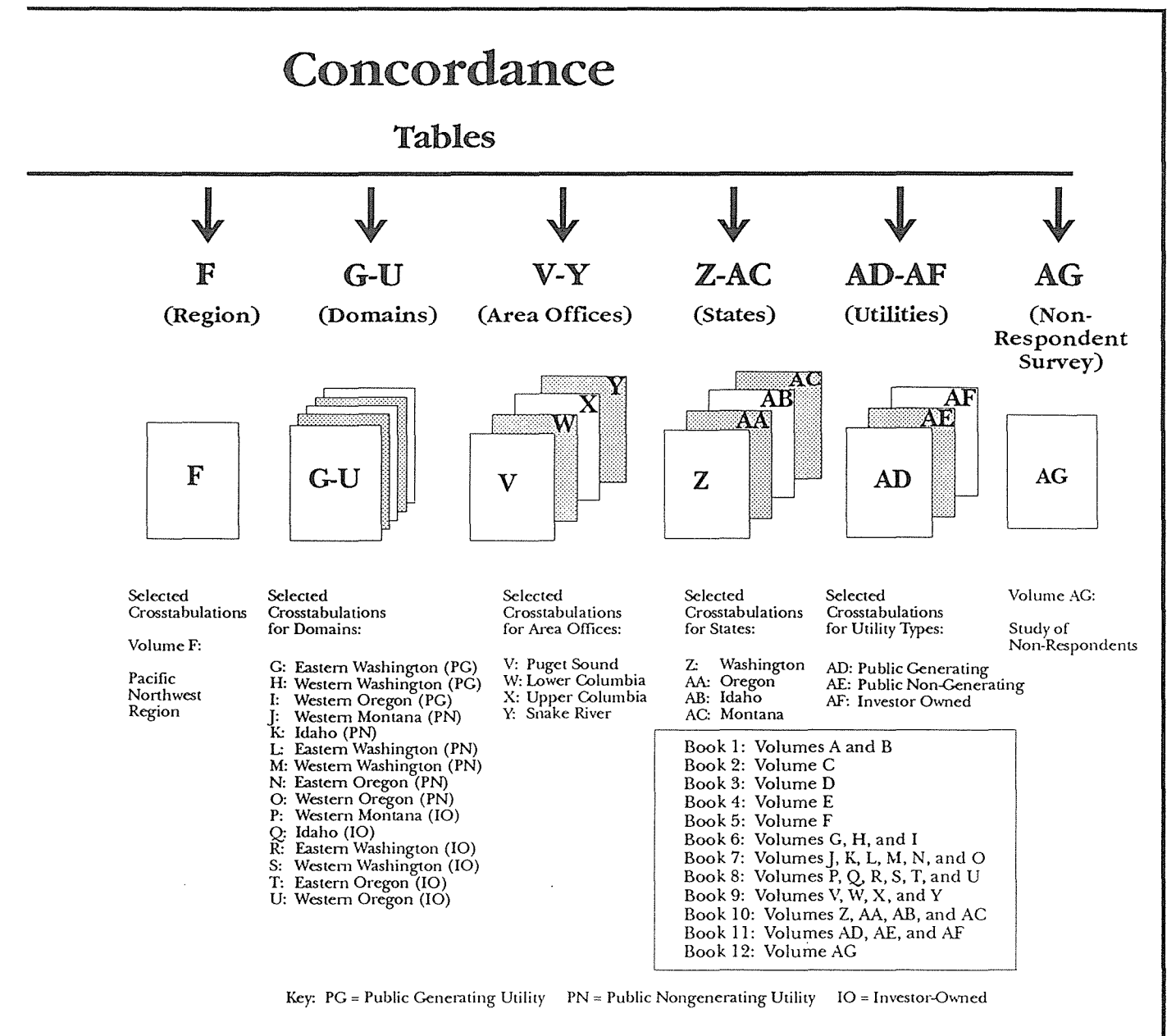
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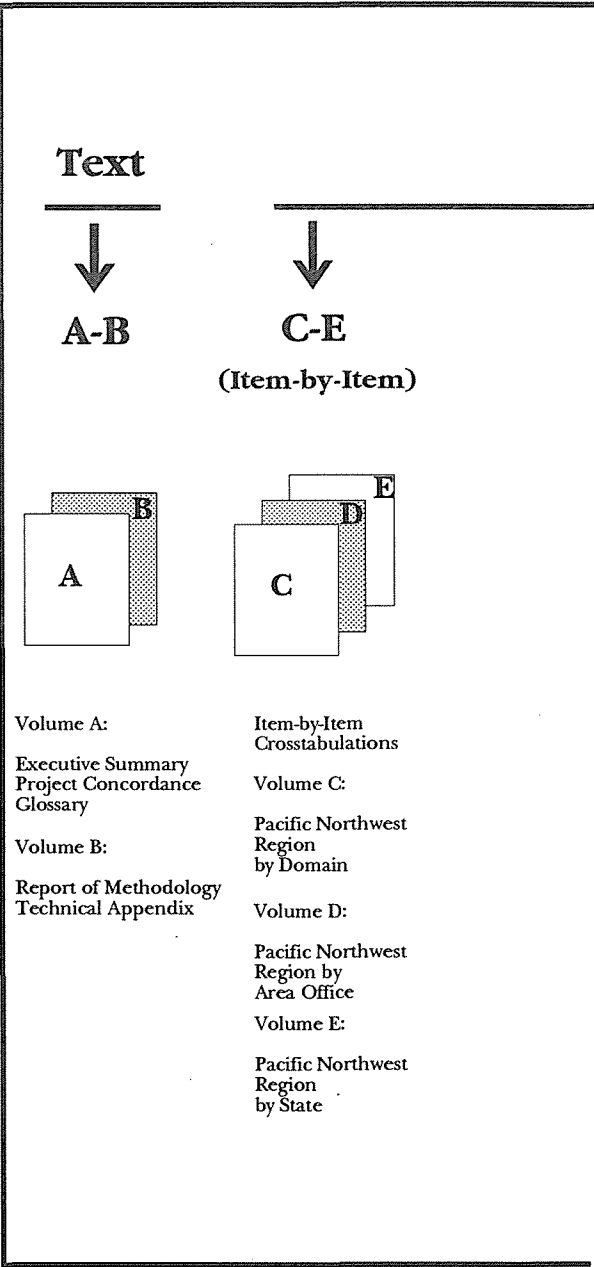


# CONCORDANCE

This **Concordance** is a "road map" to the material generated as primary documentation to PNWRES92-I.

Its basis is the set of 33 reports, **Volume A** through **Volume AG**, produced at the conclusion of the data-collecting activity.

These volumes are collected and published in a series of 12 **books** whose contents are indicated in the rectangle displayed in the **Concordance's** lower right corner. The **books** are available through the channels indicated at the end of the Preface.



# EXECUTIVE SUMMARY

This Executive Summary outlines the general processes employed in and the major findings from the conduct of Phase I of the Pacific Northwest Residential Energy Survey (PNWRES92-I) during the last quarter of 1992. This study was Bonneville's third comprehensive residential survey of the region, conducted to provide data on energy usage, conservation awareness and behaviors, and associated consumer characteristics for use in forecasting and planning.

The summary is divided into four sections:

**BACKGROUND** sets the stage with respect to the need for the survey, relates it to previous work, outlines the implementation processes, and summarizes the data products.

**PROFILING THE RESPONDENTS** summarizes the survey results under these six categories:

- Demographics
- Housing Units
- Room Inventory
- Appliance Inventory
- Air-Conditioning/Heating/  
Water-Heating
- Opinion

**REPORTS AND CROSS-TABULATIONS** describes the various individual documents.

**BONNEVILLE POWER PLUS** provides a short description of an Excel-spreadsheet-based software program that contains all of the tabulated material in a format that encourages browsing among the tables and charts, with special feature that they can be copied directly into other Windows-based documents.

REPORTS AND CROSSTABULATIONS

Numerous reports and crosstabulations are available from this study. There are 33 printed volumes in the primary documentation; they are also accessible from menu-driven software (**Bonneville Power Plus**). **Volume A** includes this Executive Summary, the Concordance, and the Glossary. **Volume B** includes the Report on Methodology and the Technical Appendices. **Volumes C** through **AF** show tables and charts from the study.

Item-by-item crosstabulations are provided for the 15 sampling domains within the region (**Volume C**), the three utility types within the four Area Offices (**Volume D**), and the three utility types within the four states (**Volume E**).

Selected crosstabulations examine nine survey items: type of dwelling,

ownership type, years of construction, size (in square feet), type of space-heating fuel, type of water-heating fuel, household income, utility type, and type of space-heating equipment. These items are tabled separately for the region (**Volume F**), the 15 sampling domains (**Volumes G-U**), the four Area Offices (**Volumes V-Y**), the four states (**Volumes Z-AC**), and the three utility types (**Volumes AD-AF**). Each table is accompanied by a bar chart based on the weighted data.

**Volume AG** is a report on the non-respondents.

The **Concordance** (pages 18-19) provides an index to the various tables and reports of the study.

BONNEVILLE POWER PLUS

As part of its contracted work, AMPG developed a personal computer system to support the PNWRES92-I reports. Called **Bonneville Power Plus**, this system operates under Windows 3.1 and uses Microsoft’s Excel 4.0 and Word for Windows 2.0c programs. The files consist primarily of a spreadsheet-based system of tabulations which are accessed through a menu-driven format. In addition to the data tables, **Bonneville Power Plus** provides menu-

accessible charts of the weighted data. Although the files used directly by **Bonneville Power Plus** are protected from being overwritten, each table and chart can be saved from the display screen to new files; from there they can be modified and used in any Windows application.

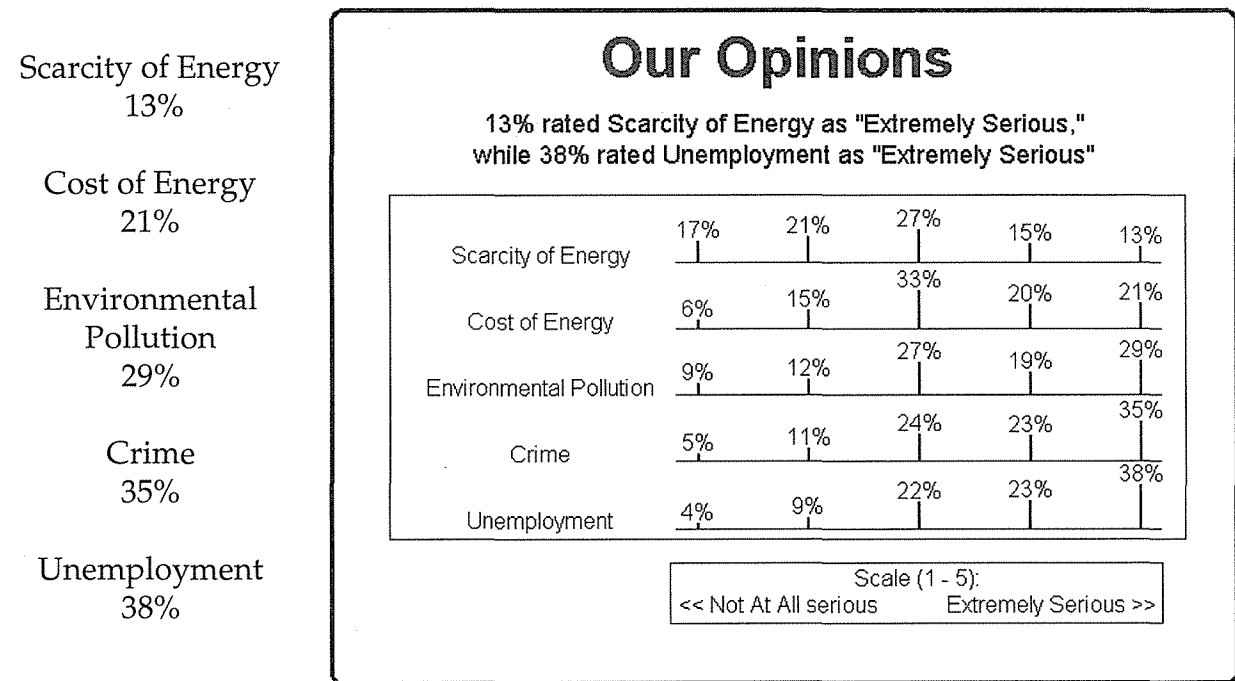
Documentation for **Bonneville Power Plus** is contained in **Volume B: Technical Appendices**.



PROFILING THE RESPONDENTS (continued)

Opinion

Asked to rate the seriousness of five socio-economic issues in their own state on a scale of 1 to 5, with 1 being "Not At All Serious" and 5 being "Extremely Serious," the following percentages of respondents gave "Extremely Serious" ratings to the issues:



Asked about their exposure to several conservation-based programs:

- 54% had seen or heard about low interest weatherization loans
- 38% had seen or heard about utility or state weatherization programs
- 28% had seen or heard about efficient appliance programs.
- 16% had had their homes weatherized by the state or utility since moving in

Asked about the level of the energy efficiency of their homes:

- 26% replied that it was "as efficient as it can be"
- 31% replied that "little improvement can be made"
- 25% replied that "moderate improvement can be made"
- 10% replied that "a lot of improvement can be made"
- 6% replied that "a great deal of improvement can be made"

Thus, 57% indicated that little or no energy efficiency improvement could be made in their homes

BACKGROUND

A necessary element in Bonneville’s forecasting and conservation planning is information about consumers’ energy use and factors affecting energy consumption. Energy-use data from residential surveys conducted in 1979 and 1983 have been used extensively by Bonneville, the Pacific Northwest Utilities Conference Committee, the Northwest Power Planning Council, and several of the region’s utilities.

Since 1983, both increased fuel prices and conservation programs have affected consumer behavior and have thus made it necessary to update the residential database used for energy forecasting. To improve the accuracy of these forecasts in the 1990s, more detailed information was required concerning the use of residential energy in the Pacific Northwest. The result was Bonneville’s planning and implementing its third regional residential survey, PNWRES92-I.

A team of Bonneville staff members from the Office of Energy Resources designed the data collection as a telephone survey. The Applied Management & Planning Group (AMPG), Los Angeles, California, was selected to implement the survey, summarize the data, and prepare the primary documentation. Interviewing Services of America (ISA), Van Nuys, California, was subcontracted by AMPG to conduct the telephone interviews.

PNWRES92-I used random digit dialing (RDD) and computer-assisted telephone interviewing (CATI). The sample was stratified into 15 sampling domains defined by six geographic areas<sup>7</sup> and three utility types.<sup>8</sup> Interviews were conducted from September 3, 1992, to December 9, 1992. A total of 20,170 interviews were completed across the 15 domains. Population total weights were created for each domain by the dividing estimated<sup>9</sup> occupied housing counts by the number of interviews in the survey in that domain.

As indicated in the **Concordance** (pages 18-19), the survey’s full documentation is divided among 33 different volumes, each of which is designed to support the survey process or to address particular

<sup>7</sup> Western Montana, Idaho, Eastern Washington, Western Washington, Eastern Oregon, Western Oregon.

<sup>8</sup> Public generating, public non-generating, and investor-owned. Because no public generating utilities operated in Western Montana, Eastern Oregon, or Idaho when PNWRES92-I was conducted, three of the utility/geographic cells were empty, and the sampling design contained a total of 15 domains.

<sup>9</sup> Counts were taken from Bonneville’s Financial and Operations (F&O) database for all utilities and adjusted by using state and sub-state vacancy rates as measured by the 1990 census. These calculations were done both at the sampling domain level and at the level of Bonneville’s four area offices, yielding two sets of weights.

special interests in the region. For example, **Volume E** provides item-by-item crosstabulations of interviewees' responses for each of the four states, while **Volume K** is devoted to crosstabulations of nine special questions for public non-generating

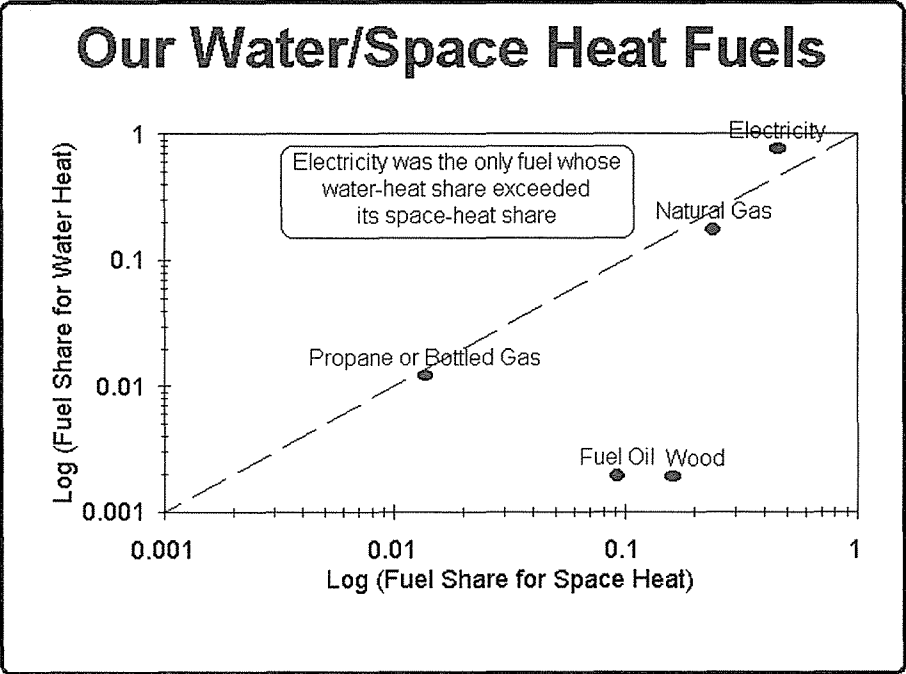
utilities in Idaho. This Executive Summary, however, focuses on region-level estimates for a few selected items of general interest. This information appears in the section, **Profiling the Respondents**, starting on page 11.

**PROFILING THE RESPONDENTS (continued)**

**Air-Conditioning, Space-Heating, and Water-Heating**

Few respondents knew nothing about or refused to comment on their use of various domestic fuels for space-conditioning and water-heating. Thus, these summary percentages are estimates based upon an estimated 3.55 million households.

- Air-conditioning System:**
- no air-conditioning 76%
  - window or wall units 8%
  - central electric system 7%
  - heat pump 6%
  - evaporative cooler 2%
  - central gas system 1%



- Primary Space-Heating Fuel:**
- electricity 46%
  - natural gas 24%
  - wood or presto logs 16%
  - fuel oil, propane, or bottled gas 11%

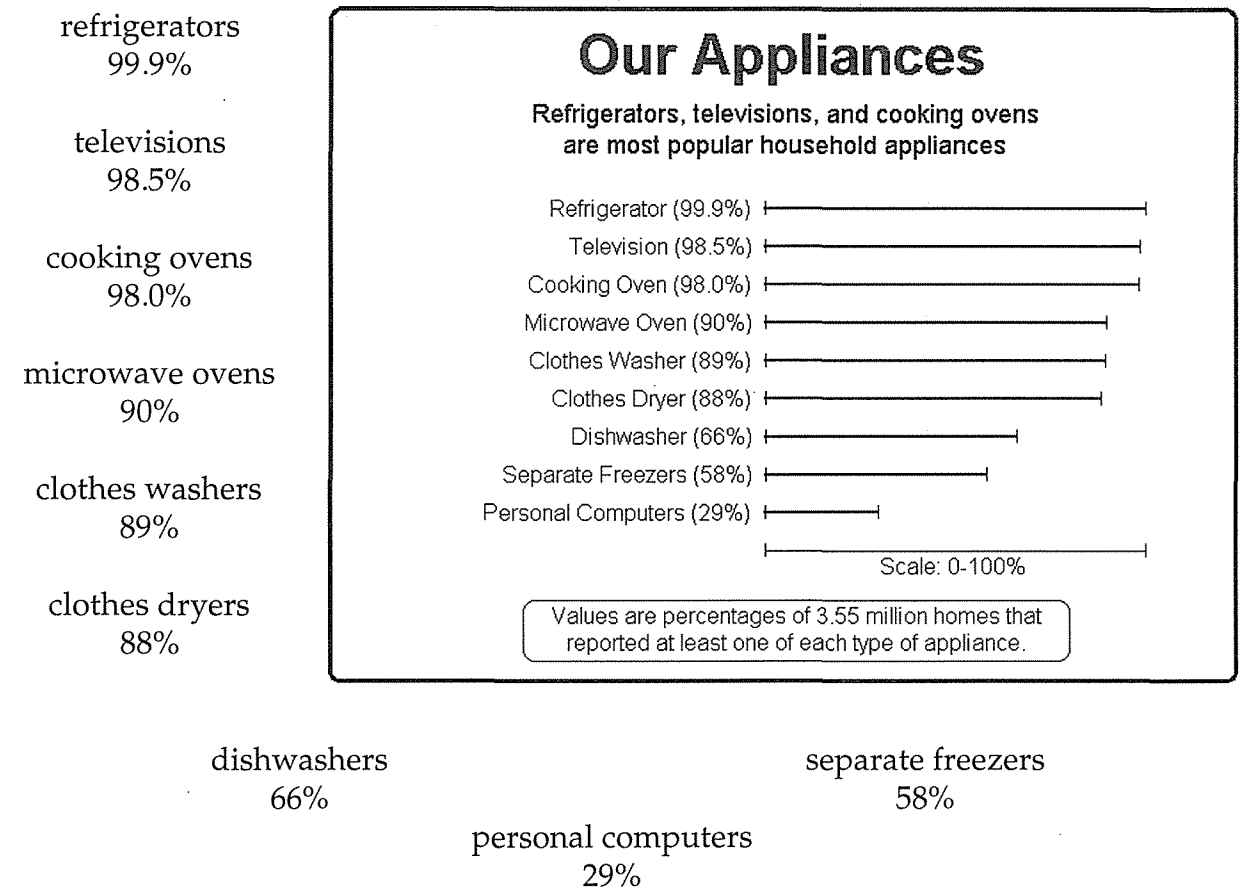
- Primary Water-Heating Fuel:**
- electricity 76%
  - natural gas 17%
  - wood or presto logs 0.2%
  - fuel oil, propane, or bottled gas 1%



PROFILING THE RESPONDENTS (continued)

Appliances

Regarding the types and numbers of appliances in their homes, the following percentages of respondents reported that they had at least one of the indicated types of appliances:



In terms of the *numbers of each type of appliance*, there was one reversal within the "possession" sequence given above:

The average number of televisions per household was 1.81, while the average number of refrigerators was 1.18.

PROFILING THE RESPONDENTS

This profile consists of a selection of PNWRES92-I variables and their region-wide estimates.<sup>10</sup> The details are grouped into 6 subsets: **Demographics**, **Housing Units**, **Rooms**, **Appliances**, **Space-Heating/Water-Heating/Air-Conditioning**, and **Opinion**.

Demographics

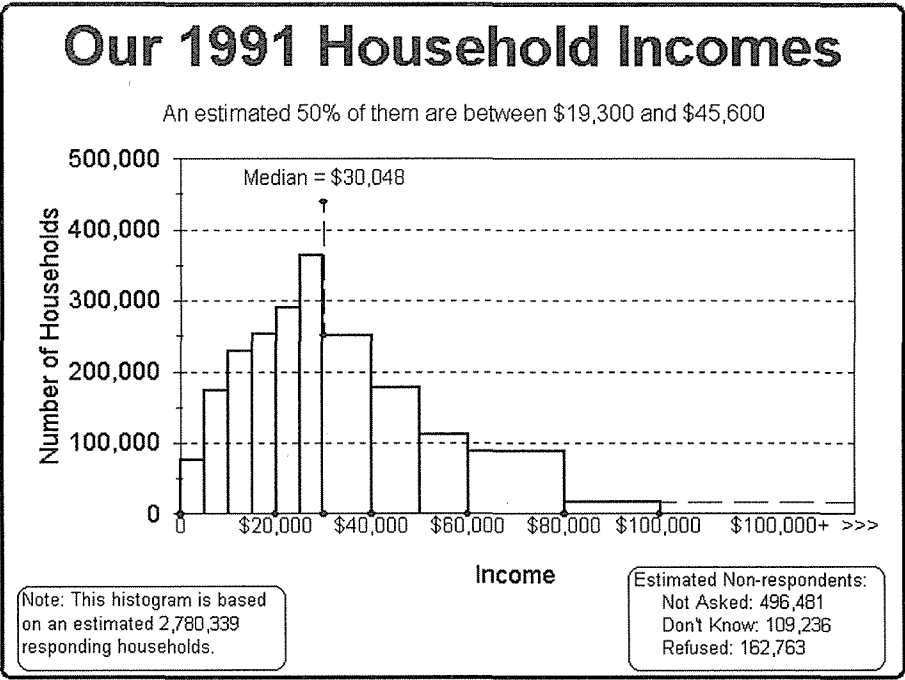
Of the individuals considered *most knowledgeable* about energy in their households:

57% were female

30% had graduated from college, while 7% had not finished high school

36% lived in households with two people, while 16% lived alone

80% lived in households with no children under 6 years old



68% had no children aged 6 to 17 years

7% had income less than \$10,000

77% lived with no one aged 65 or older

2% had income greater than \$100,000

61% would authorize release of their utility billing information

Median family income for 1991 was slightly larger than \$30,000.

<sup>10</sup> More specifically, the quantifications used here are derived from the domain-weighted frequencies that appear in **Volume C: Item-by-Item Results: Region and Domains**.

PROFILING THE RESPONDENTS (continued)

Housing Units

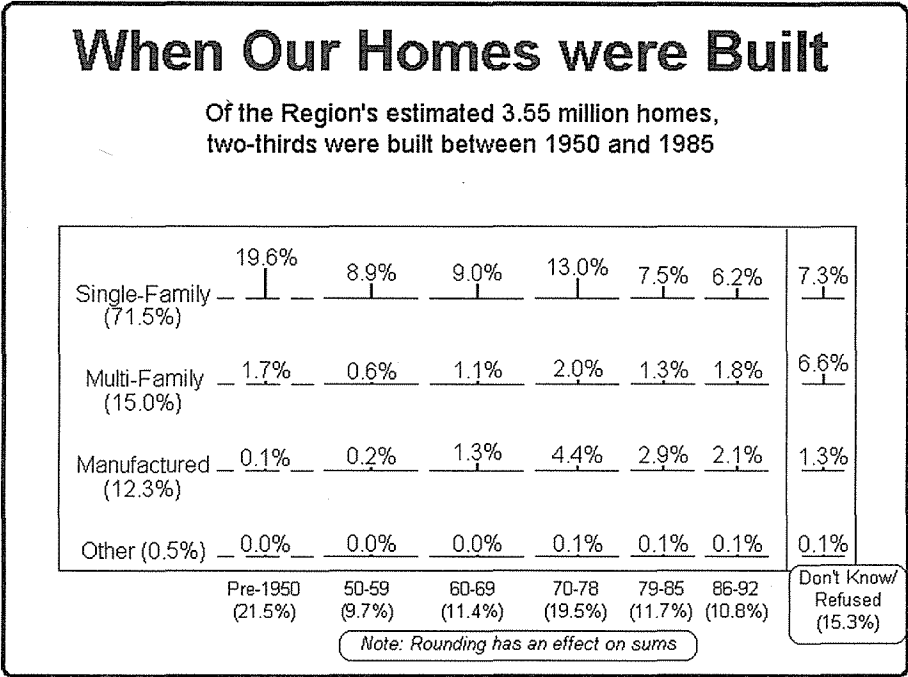
In describing their housing units, respondents reported that:

72% of the households lived in single-family dwellings

22% of the housing units were constructed before 1950

74% of the respondents owned their homes

39% had moved into their homes since 1989



21% of their dwellings had vaulted ceilings

37% of their dwellings were built on foundations with crawl space

26% had basements

25% did not know the floor area of their dwellings.

Of the 75% those who did know the floor area:

17% reported less than 92.9 square meters (1,000 square feet), while 28% reported more than 186 square meters (2,000 square feet).

Median dwelling size was 171 square meters (1,857 square feet).

PROFILING THE RESPONDENTS (continued)

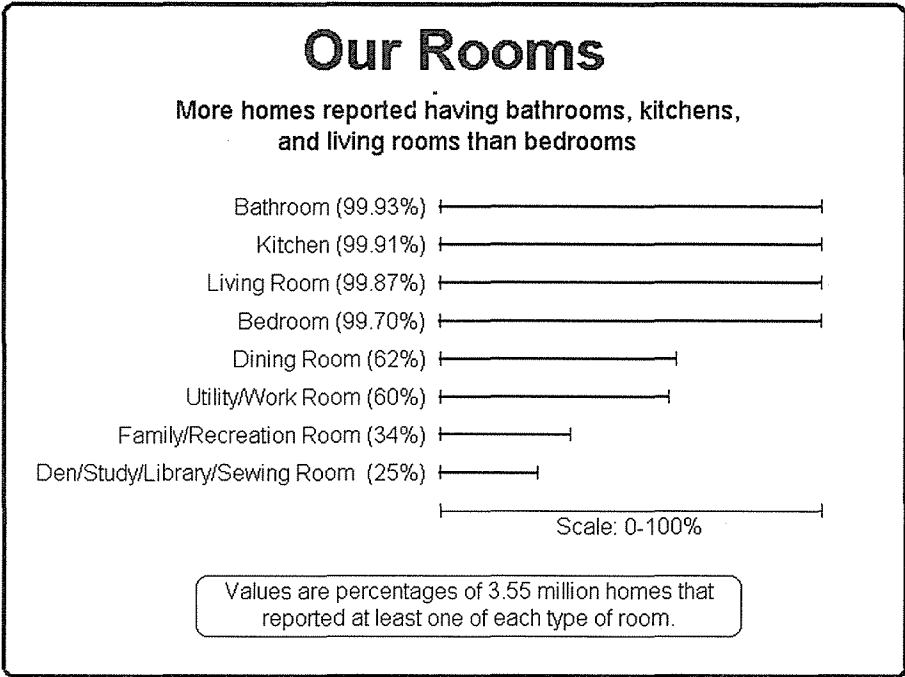
Rooms

When asked about the numbers of types of rooms in their homes, respondents reported:

99.9% of the households had at least one bathroom, while 57% had more than one bathroom

99.9% had kitchens, but 1 in 1,000 had none

99.7% had at least one bedroom, while 65% had 3 or more bedrooms



99.9% had living rooms

60% had utility or work rooms

62% had dining rooms

34% had family rooms

25% had dens, studies, libraries, or sewing rooms

The "average" Pacific Northwest home had 2.86 bedrooms and 1.73 bathrooms.