

Bills, Nelson L.; Kelleher, Michael J.

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An Overview of the 1988 Rural Household and Farm Energy Use Survey

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STAFF PAPER

AN OVERVIEW OF THE 1988 RURAL HOUSEHOLD
AND FARM ENERGY USE SURVEY

by

Nelson L. Bills
Michael J. Kelleher

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Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York, 14853

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Preface

This report gives a brief summary of the 1988 Rural Household and Farm Energy Use Survey. Complete survey results are stored in computer files maintained in the Department of Agricultural Economics at Cornell University. Information on individual survey respondents is confidential; individuals are encouraged to inquire about procedures for obtaining additional data summaries.

The survey was structured around rural customers who are served under a NMPC residential rate. This rate is designed for the occupants of residential units but includes customers who conduct farming operations and are jointly metered and billed for farm and residence electric power use at their premises. The survey instrument was designed to collect demographic information and to determine the use of electric appliance and electric energy-saving measures in each household. Customers with farming operations supplied additional information on the utilization of electric-powered farm equipment.

To achieve statistically reliable results, 5,816 customers were sampled from a list frame which controlled for the kilowatt hours (kwh) of electric power used during 1987.¹ Respondents were contacted on a five-part mailing schedule from March through May 1988; 3,958 (68 percent) customers provided usable survey data.

This overview is divided into two sections. The first is a description of rural NMPC household characteristics based on data from all respondents. The second section describes the size, type and electrical equipment configurations for farms in the NMPC service area.

ENERGY USE IN RURAL HOUSEHOLDS

Most rural NMPC customers reside in older, single-family homes. Approximately 5 percent of total respondents indicated

¹ The sampling frame was NMPC customers served under the S.C.-1 rate and who are classified as farm customers.

living in a duplex, and less than 2 percent reported living in a mobile home (Figure 2). Fewer than 8 percent live in homes constructed in the last 20 years (Figure 3). In contrast, over 85 percent of the respondents live in homes built more than 40 years ago.

Fifty percent of these homes are heated by a forced hot air furnace. The bulk of these furnace units are fueled by oil or gas (Figure 4). Hot water heating systems, again most often fueled by oil or gas, account for over one-fifth of all primary space heating systems. Wood or coal-fired stoves are the principal space heating source in about 17 percent of all rural dwelling units in the NMPC service territory. Electric baseboard heat is not a common primary space heating system.

Approximately 67 percent of all rural households use supplemental space heating fuels (Figure 5). Wood, oil and electric were the most frequently reported supplemental space heating fuels, with an incidence of 27, 17 and 16 percent, respectively.

In contrast with space heating fuels, electricity is the predominant fuel for hot water heating and cooking (Figures 6 and 7). Approximately 65 percent of all respondents use electric hot water heaters. Electricity was used for cooking in 68 percent of the households, compared to 31 percent for bottled gas and natural gas combined.

Data on types and frequency of household electric appliances were also obtained from the survey. Frost-free refrigerators, clothes washers, electric dryers, and microwave ovens

Figure 2. Type of Housing Stock for Rural NMPC Customers

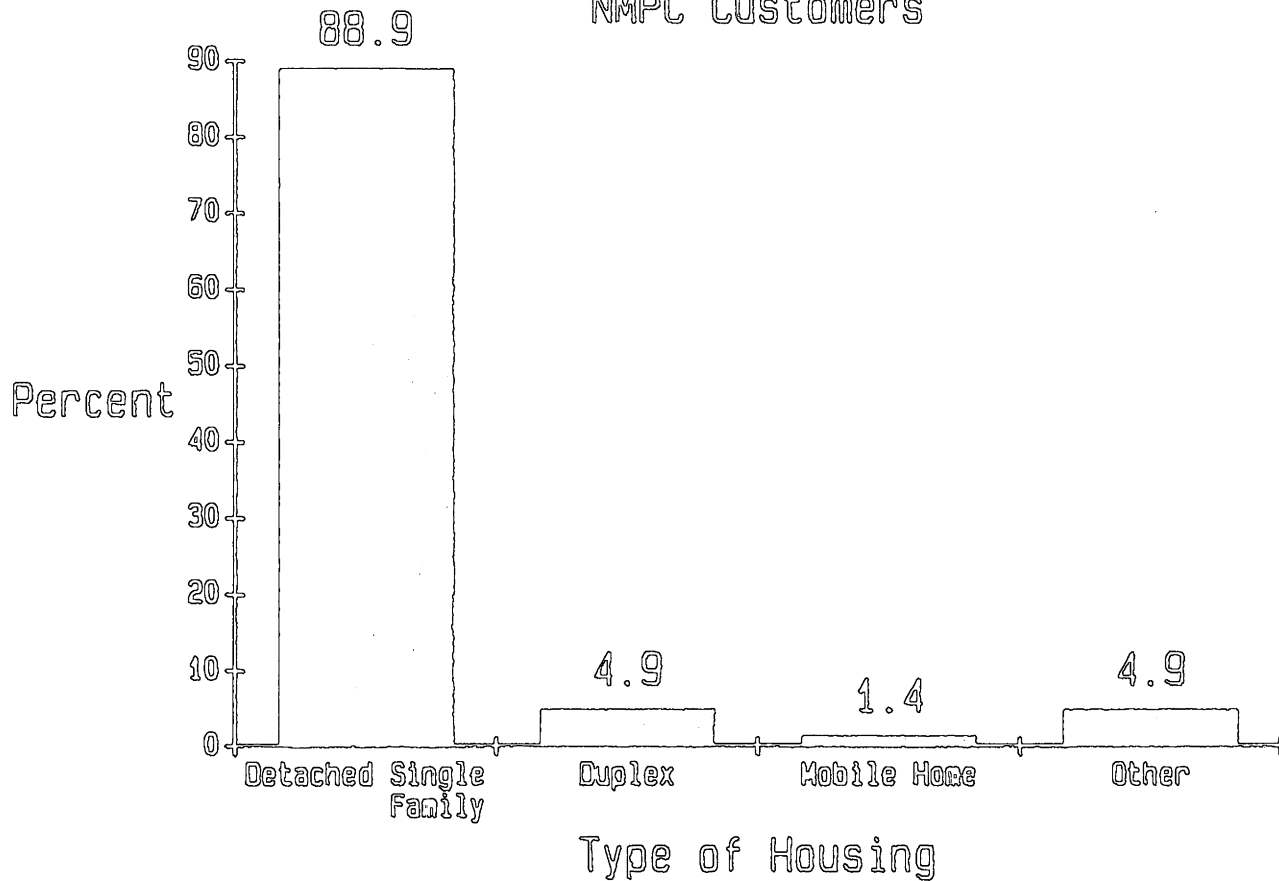


Figure 3. Age of Housing Stock for Rural NMPC Customers

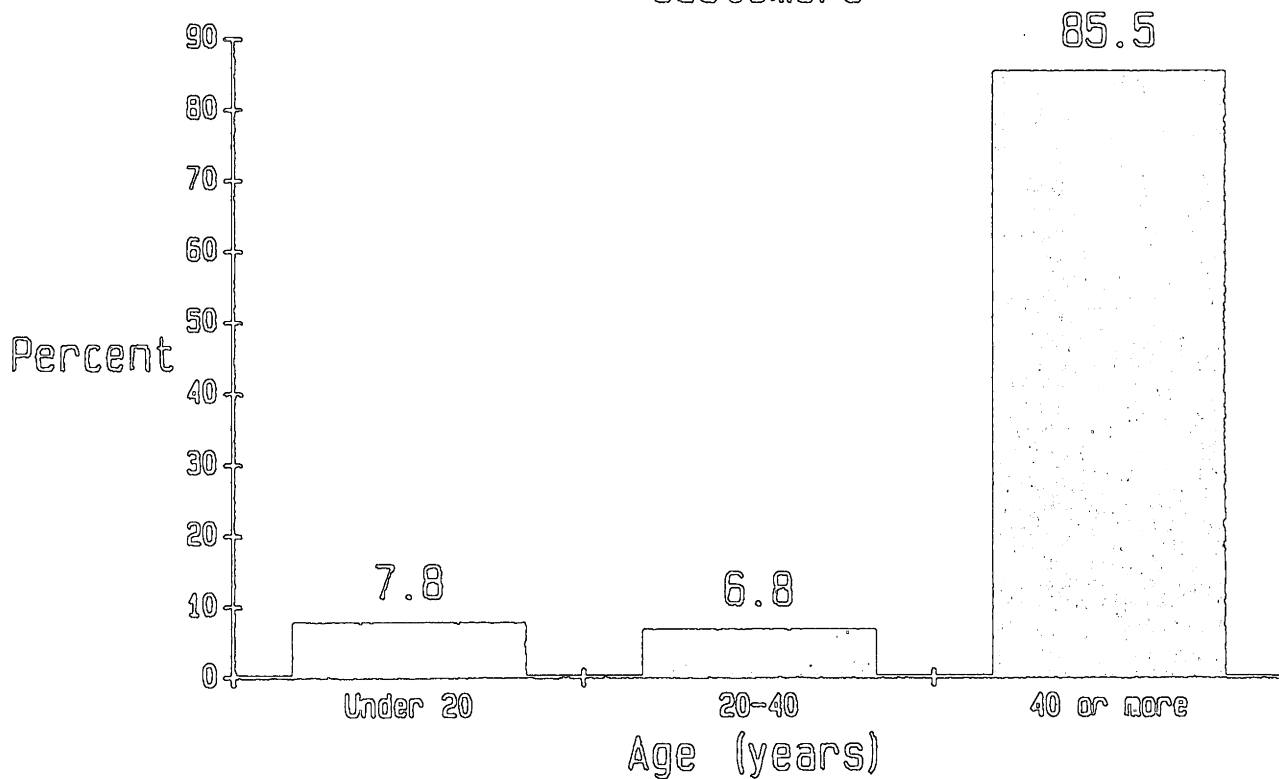


Figure 4. Type of Primary Space Heating System for Rural NMPC Customers

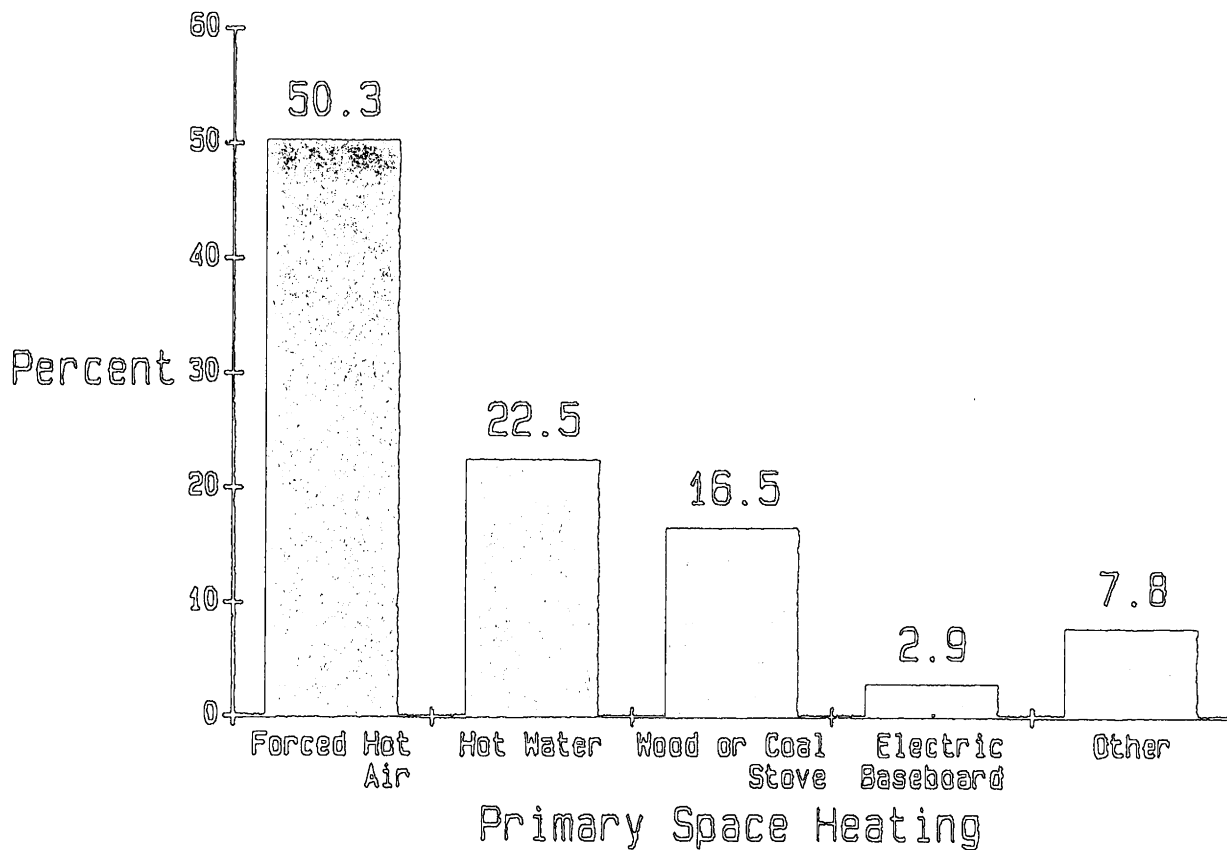


Figure 5. Supplemental Fuels Used for Space Heating for Rural NMPC Customers

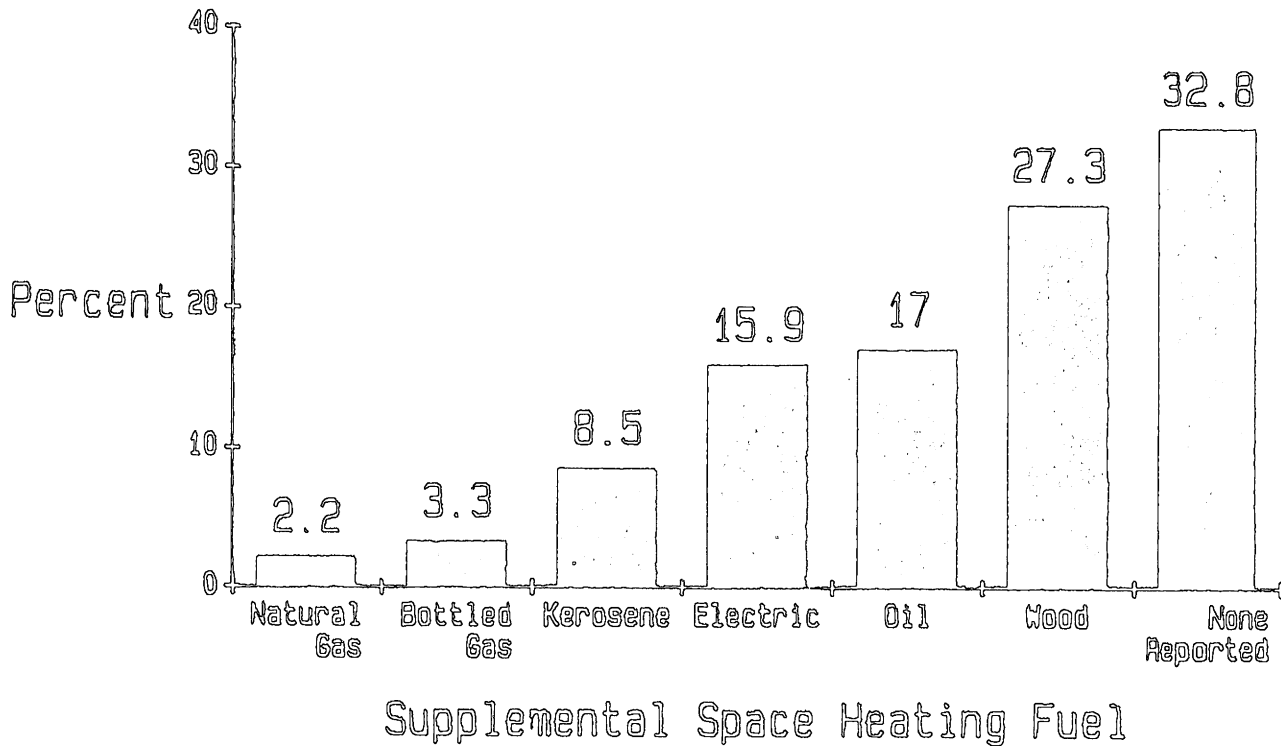


Figure 6. Fuels Used to Heat Hot Water by Rural NMPC Customers

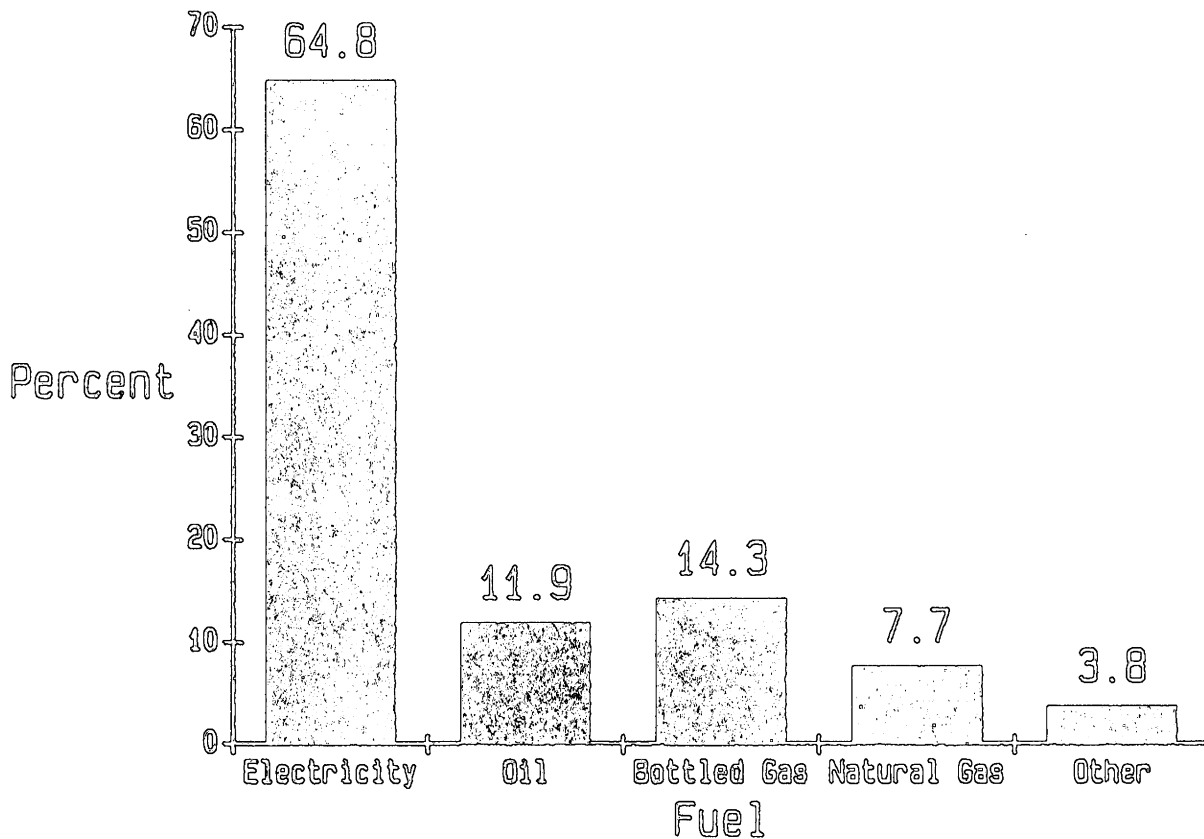
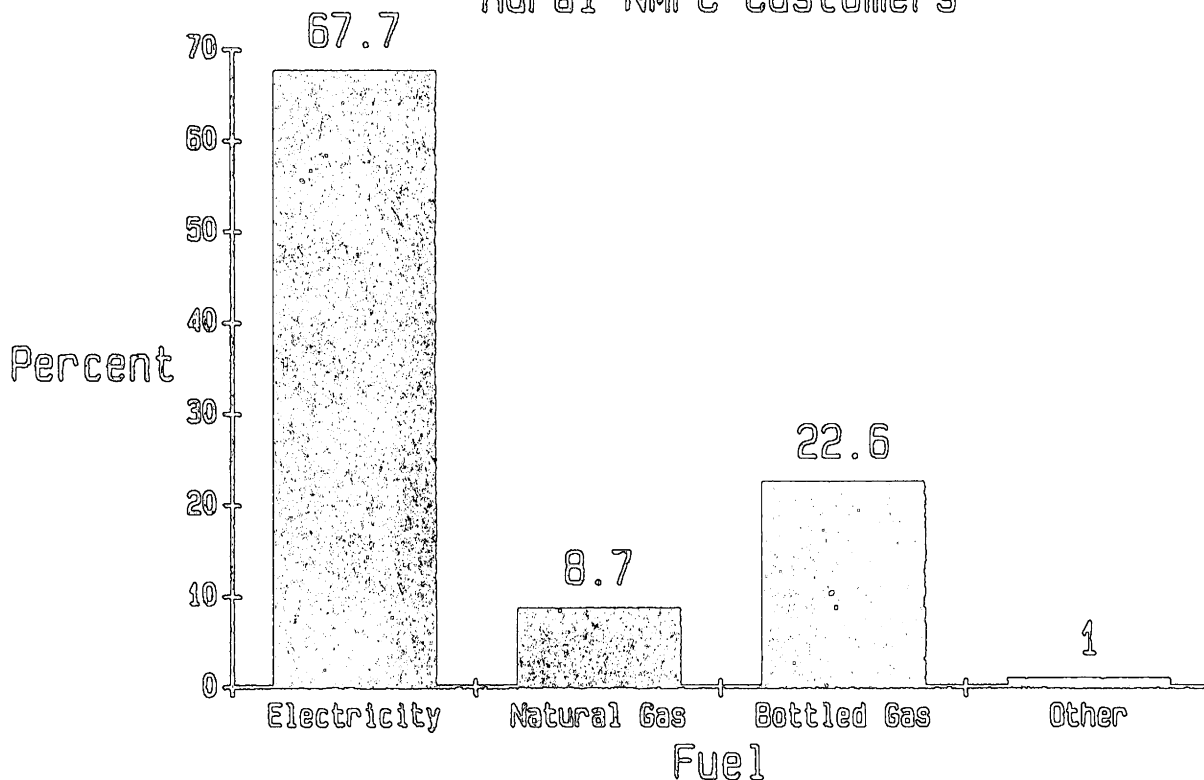


Figure 7. Distribution of Cooking Fuels Used by Rural NMPC Customers



were each reported by more than 70 percent of the respondents (Figure 8). Dishwashers and manual defrost refrigerators were reported by 42 and 44 percent, respectively. Other electric appliances, such as color televisions, water pumps, portable fans, and VCRs were reported by a majority of rural NMPC customers (Figure 9). In contrast, personal computers, attic fans and dehumidifiers are present in only a small fraction of rural households.

Hot water heaters were the most frequent 1987 major appliance purchase by rural NMPC customers (Figure 10). Purchases of combination refrigerator-freezers and separate freezers were reported by 7 and 6 percent, respectively, of all respondents. Air conditioners were purchased by 2 percent of rural NMPC customers during 1987.

Energy conservation measures are often used in rural New York households. Over 70 percent of all respondents reported that ceiling insulation, wall insulation and storm windows were installed in their homes (Figure 11). In contrast, clock thermostats (for hot water heaters) and subfloor insulation were reported by 7.1 and 12.5 percent, respectively, of the rural NMPC customers. Low-flow showerheads were reported in 25 percent of the homes.

NMPC FARM CUSTOMERS

Electrical energy has become an important component of the technology used on farms to produce agricultural commodities. Changes in the size and structure of New York agriculture in recent decades have direct implications for farm

Figure 8. Percent of Homes With Selected Major Electric Appliances for Rural NMPC Customers

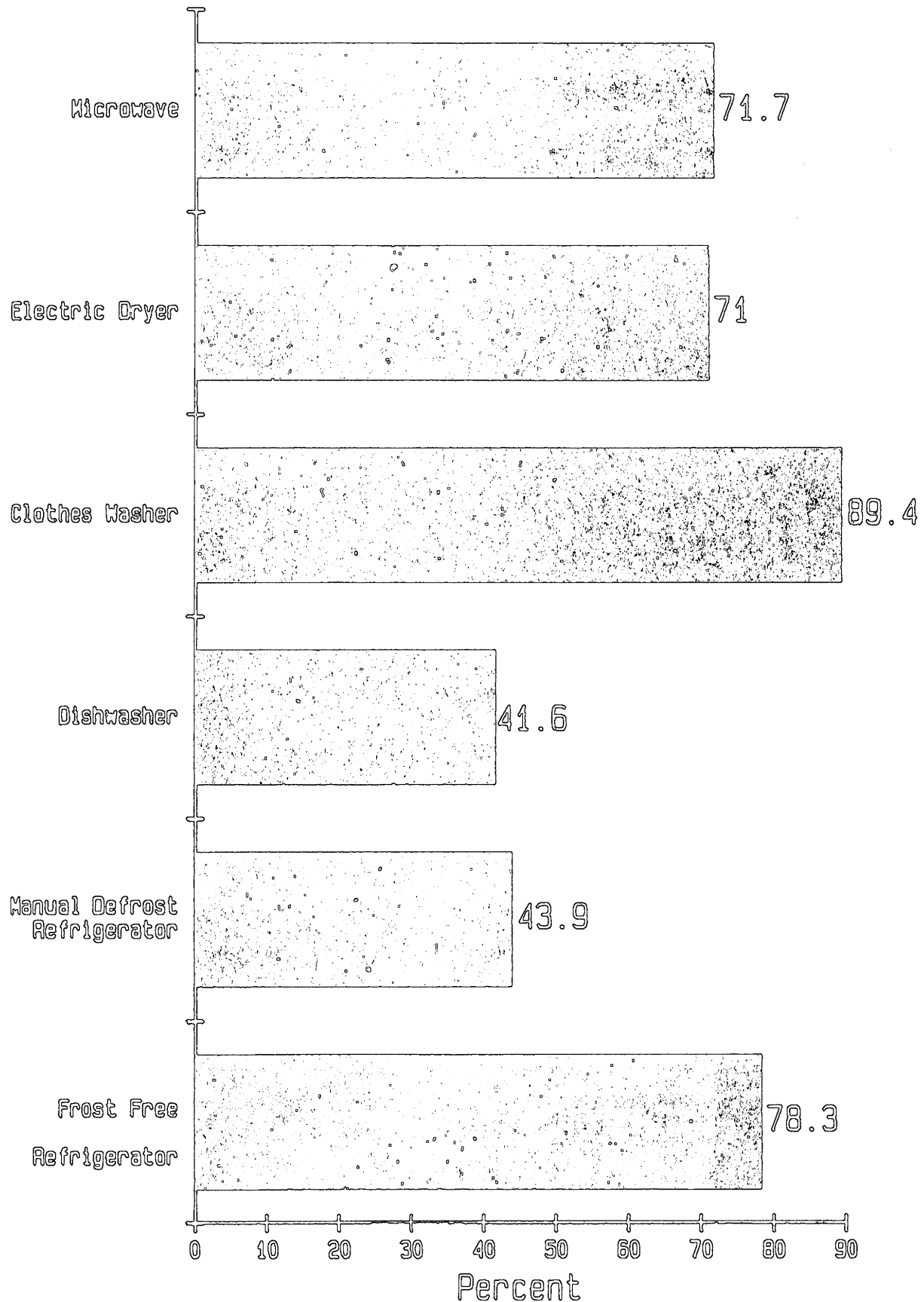


Figure 9. Percent of Homes With Other Electric Appliances for Rural NMPC Customers

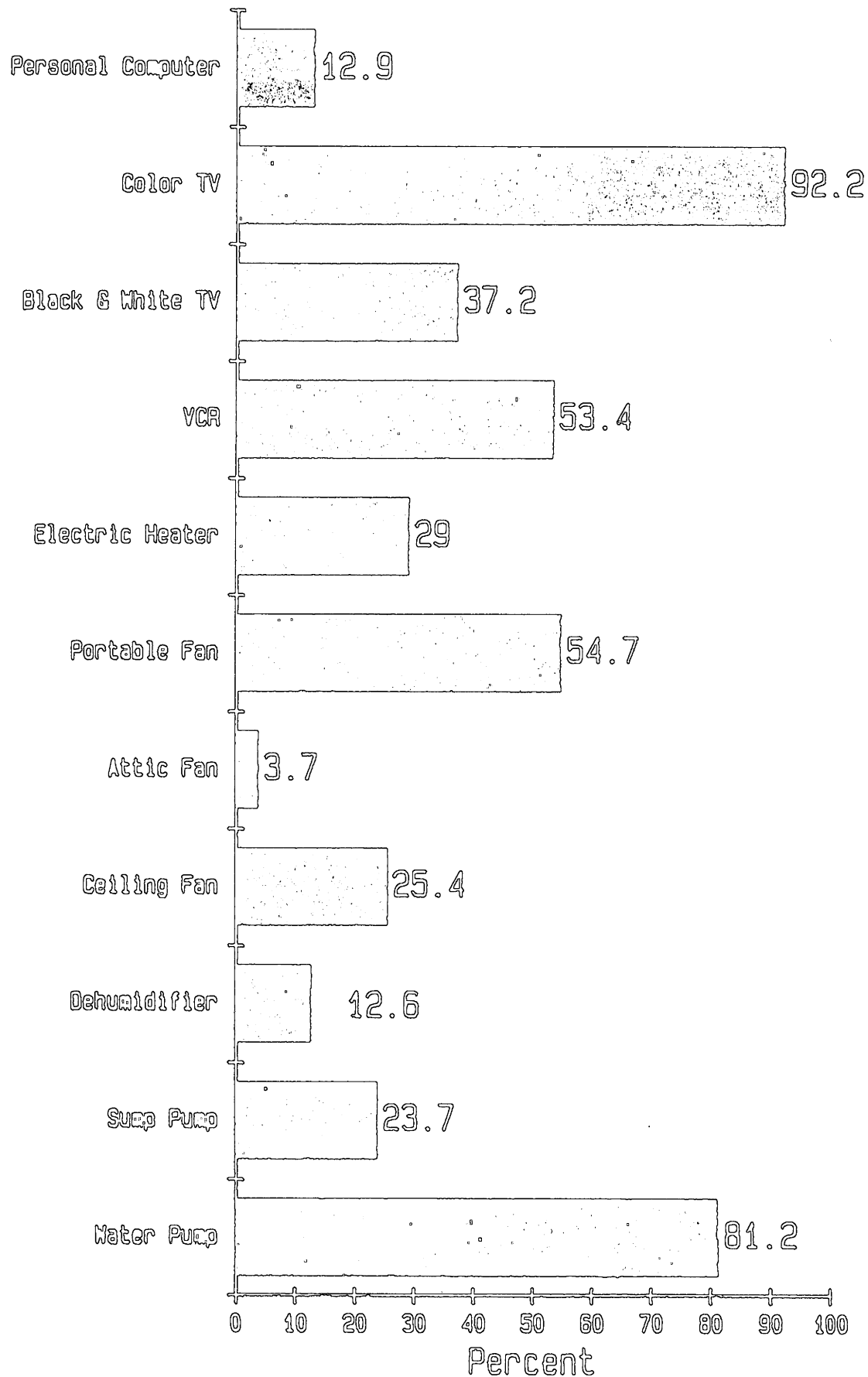


Figure 10. Major Electric Appliance Purchases
in 1987 by Rural NMPC Customers

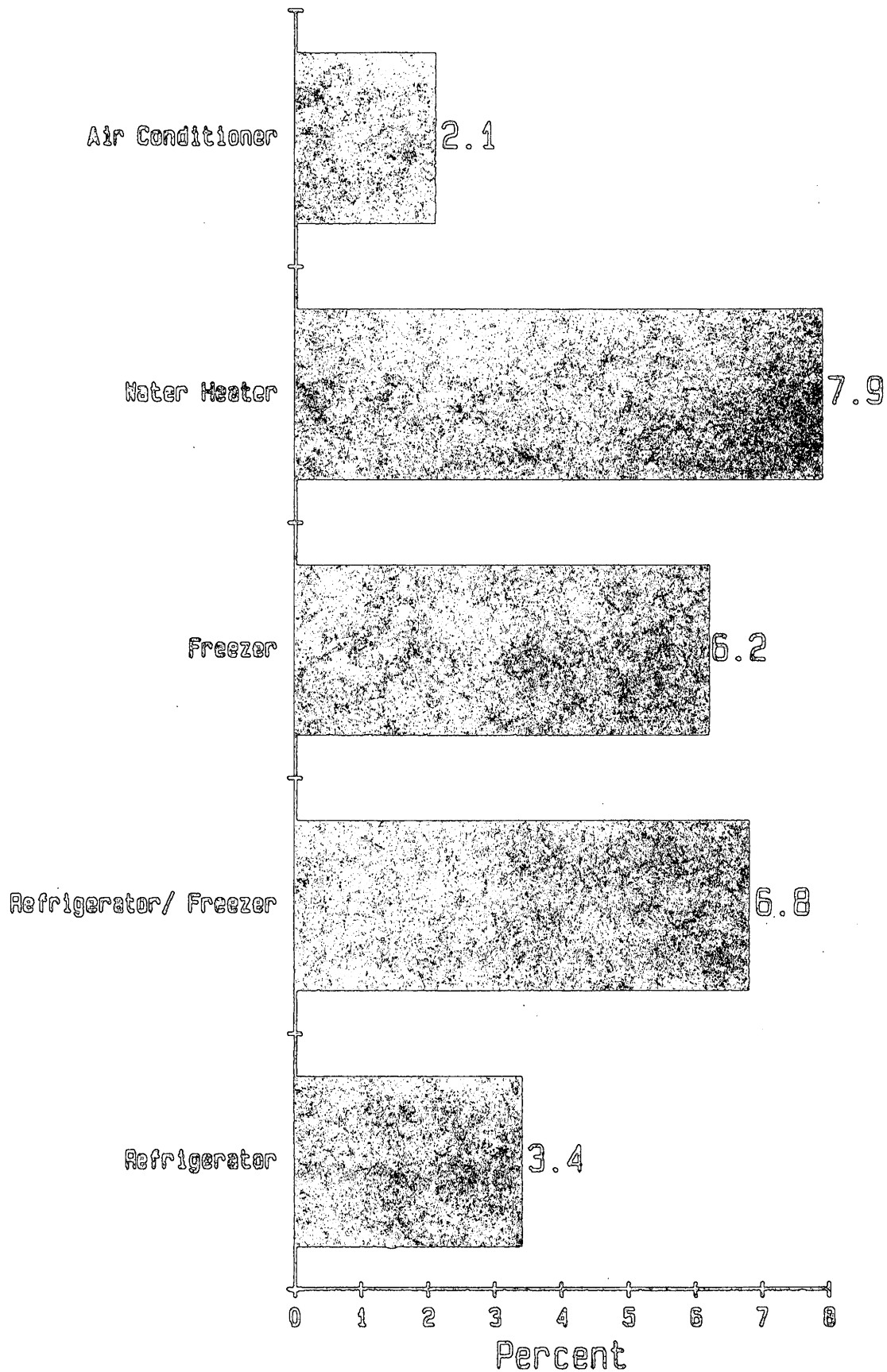
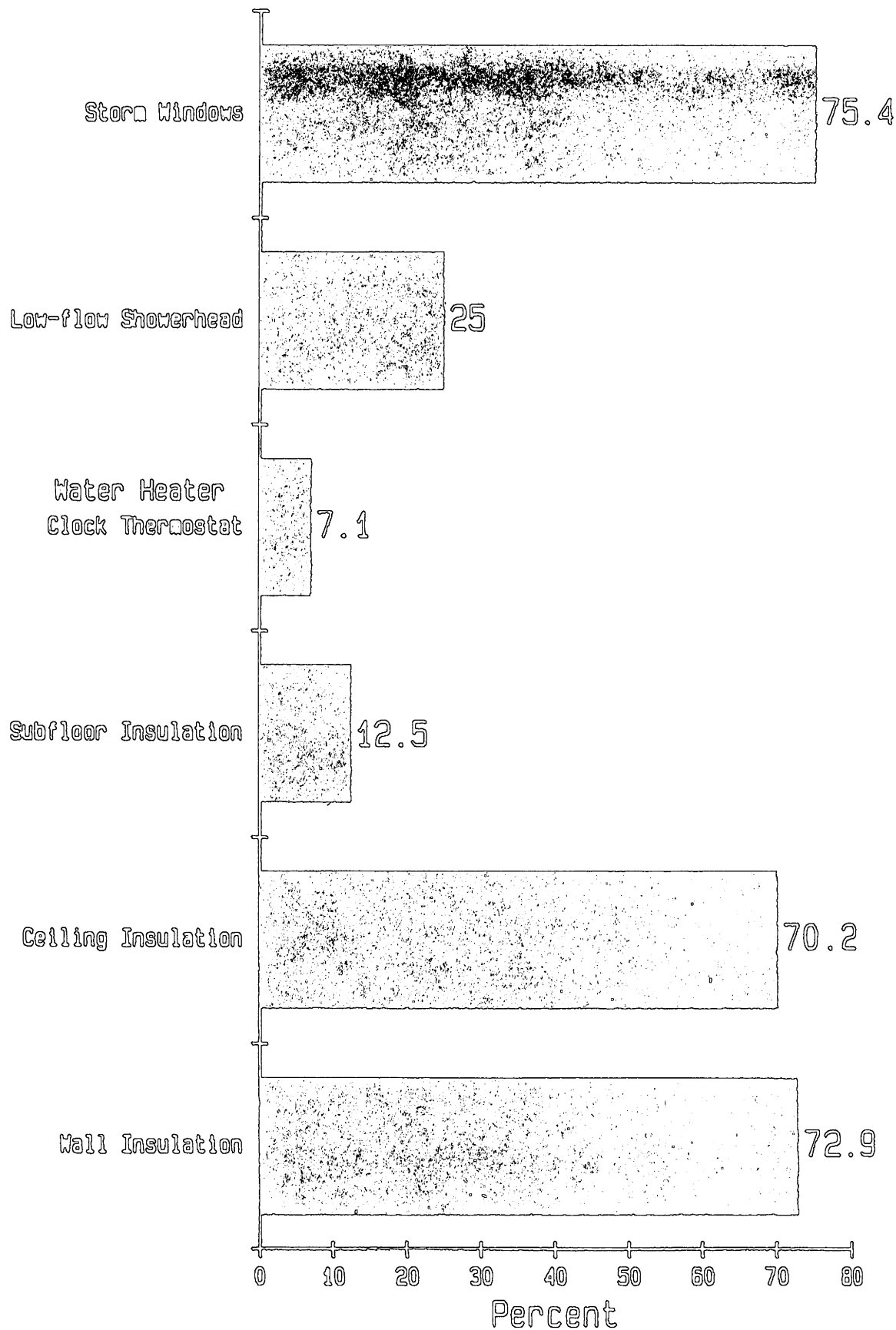


Figure 11. Utilization of Selected Energy Conservation Measures by Rural NMPC Customers



electrical use. Evolving technologies and changing commodity prices make future adjustments likely.

Approximately 39 percent of the rural NMPC customers contracted in this survey conduct farming operations. Because electric-powered equipment and facilities are an integral part of commercial agriculture, rural customers who conduct farming operations often have substantially larger electric power requirements. The bulk of all rural residential customers in the NMPC service territory consume less than 20,000 kwh of electricity during a calendar year (Figure 12). On the other hand, 50 percent of those rural customers jointly metered and billed for farm and residence electric power use 20,000 kwh or less each year. At the other extreme, some large farm businesses are also billed for both residence and farm electric power use. In the NMPC service territory, more than 30 percent of those rural customers who conduct farm operations use 40,000 kwh or more per calendar year. Farms in the NMPC service territory range in size from part-time operations to those which generate more than \$1 million in annual gross receipts from sales of agricultural commodities. The largest 12 percent of the farms (those with over \$250,000 in gross receipts) account for 50 percent of the gross receipts (Figure 13). In contrast, the 38 percent of the farms with less than \$40,000 in gross receipts account for 3 percent of the total gross receipts. The remaining 50 percent are medium-size farms (those with \$40,000-\$249,999 of gross receipts), which account for 46 percent of the gross receipts. The medium-size

Figure 12. Distribution of Farm and Residential Customers by Electricity Consumed for Rural NMPC Customers

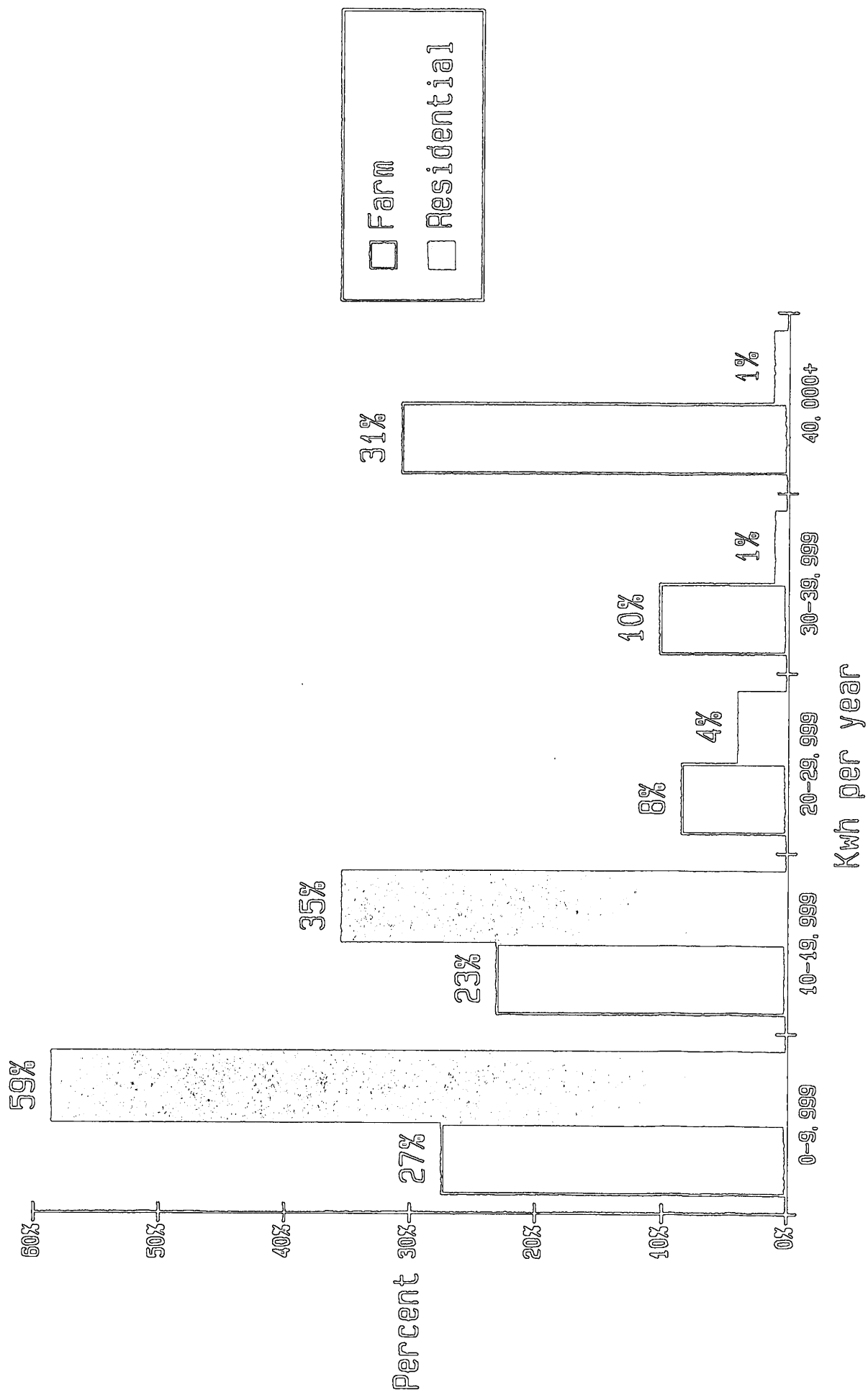
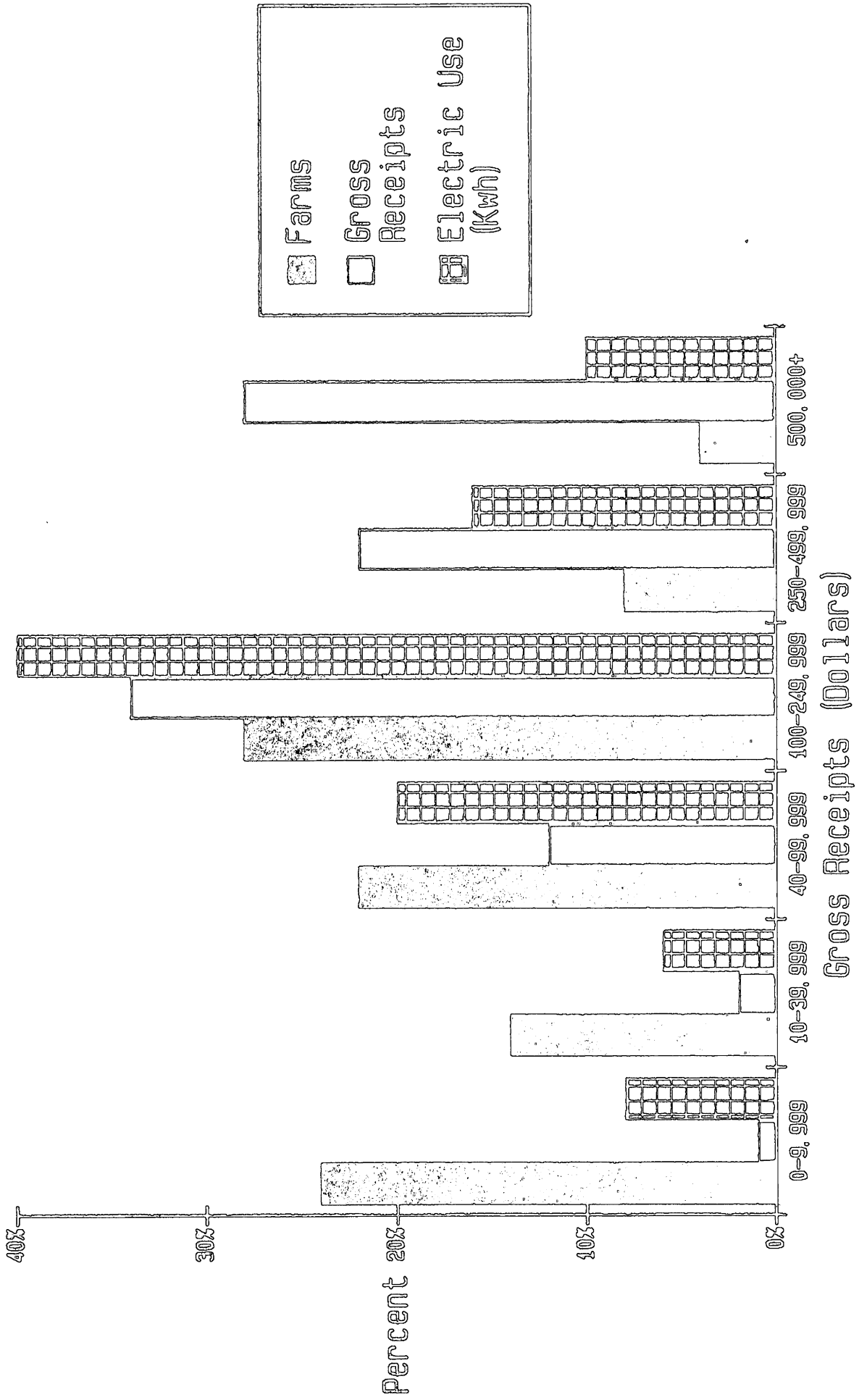


Figure 13. Distribution of Farms, Gross Agricultural Receipts, and Electric Use by Farm Size for NMPC Farm Customers



farms consumed 60 percent of the total electricity, as compared to 14 and 26 percent for the small and large farms, respectively.

Not unlike New York State as a whole, dairy farms dominate agriculture in the NMPC service territory. Farms with milk production as the dominant enterprise account for 43 percent of the farms, 54 percent of the gross receipts and 63 percent of the electricity use (Figure 14). Farms classified as miscellaneous, because less than 50 percent of total gross receipts are realized from a single farm enterprise, account for 34 percent of the farms surveyed. All other farm types account for less than 8 percent of total farms, gross receipts and electrical use.

Farm electrical equipment and energy conservation measures are summarized in Figures 15-17. Augers/elevators and silo unloaders are the most common electric-powered crop and feed handling equipment on farms (Figure 15). Other crop and feed handling equipment which are directly related to the management of livestock enterprises are present on 3 to 11 percent of all farms. A small fraction of all producers use electricity to dry grain or forage crops. More general equipment such as water pumps, air compressors and electric welders were reported on 73, 67 and 64 percent of the farms, respectively (Figure 16). Ventilation fans were reported on 62 percent of total farms.

Selected farm electrical energy conservation measures were also reported in the survey. Efficient lighting and heat

recovery systems were the most frequently reported conservation measures, occurring on 21 and 18 percent of the farms, respectively (Figure 17). Milk precoolers (9 percent) and high-efficiency ventilation fans (8 percent) occurred less frequently.

Figure 14. Distribution of Farms, Gross Agricultural Receipts, and Electric Use by Dominant Farm Enterprise for NMPC Farm Customers

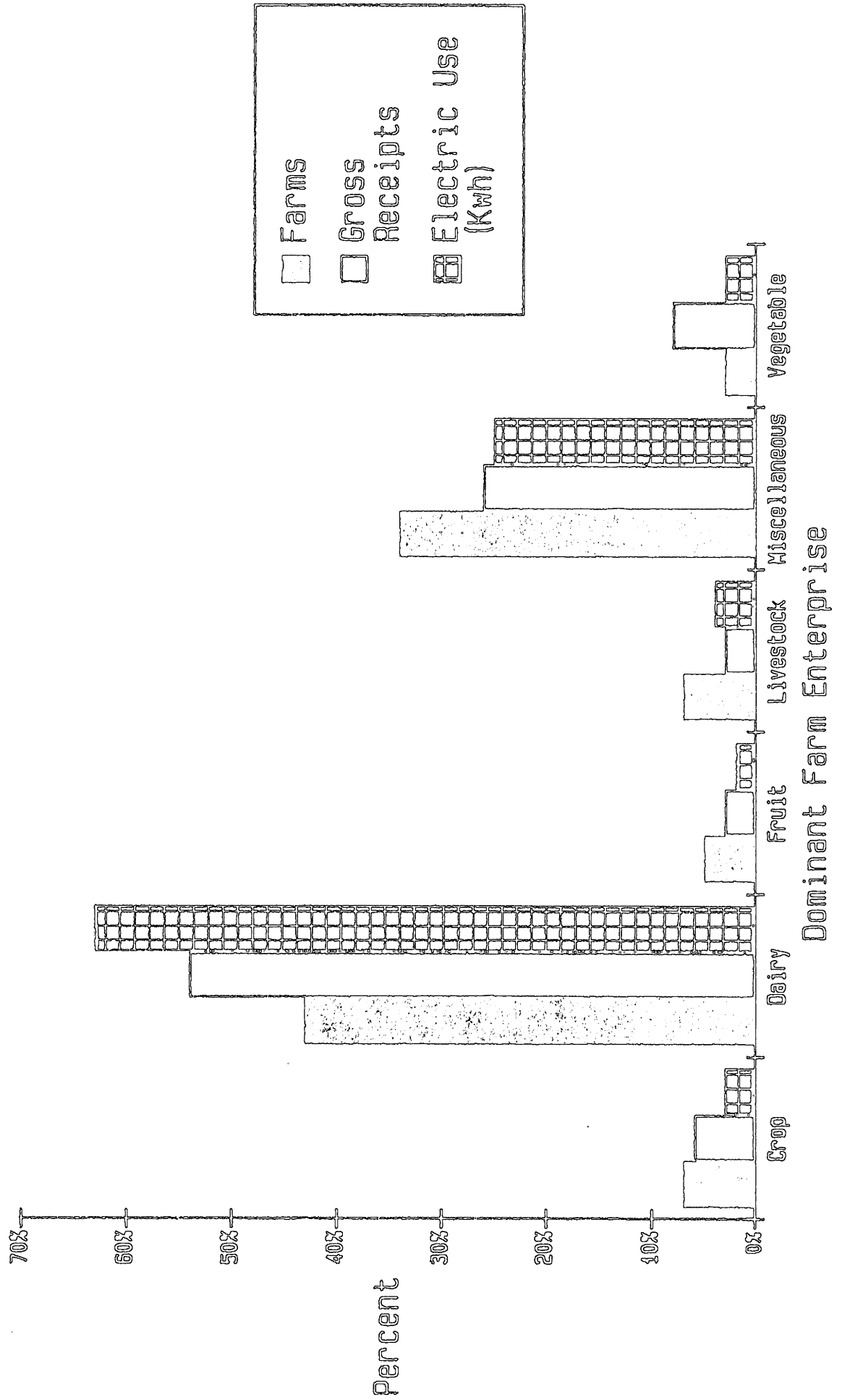


Figure 15. Frequency of Electric Crop and Feed Handling Equipment
for NMPC Farm Customers

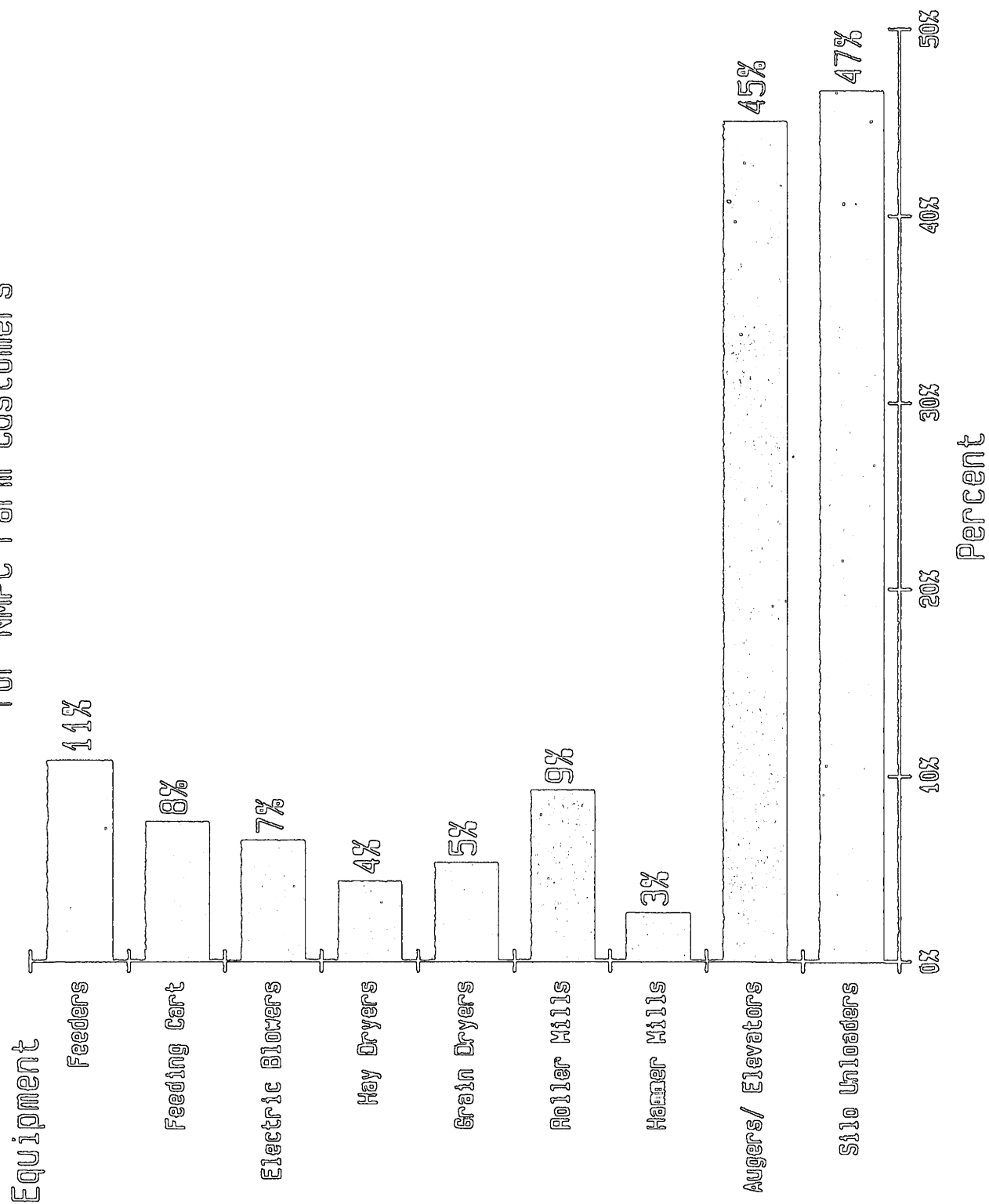


Figure 16. Miscellaneous Electric Equipment for NMPC Farm Customers

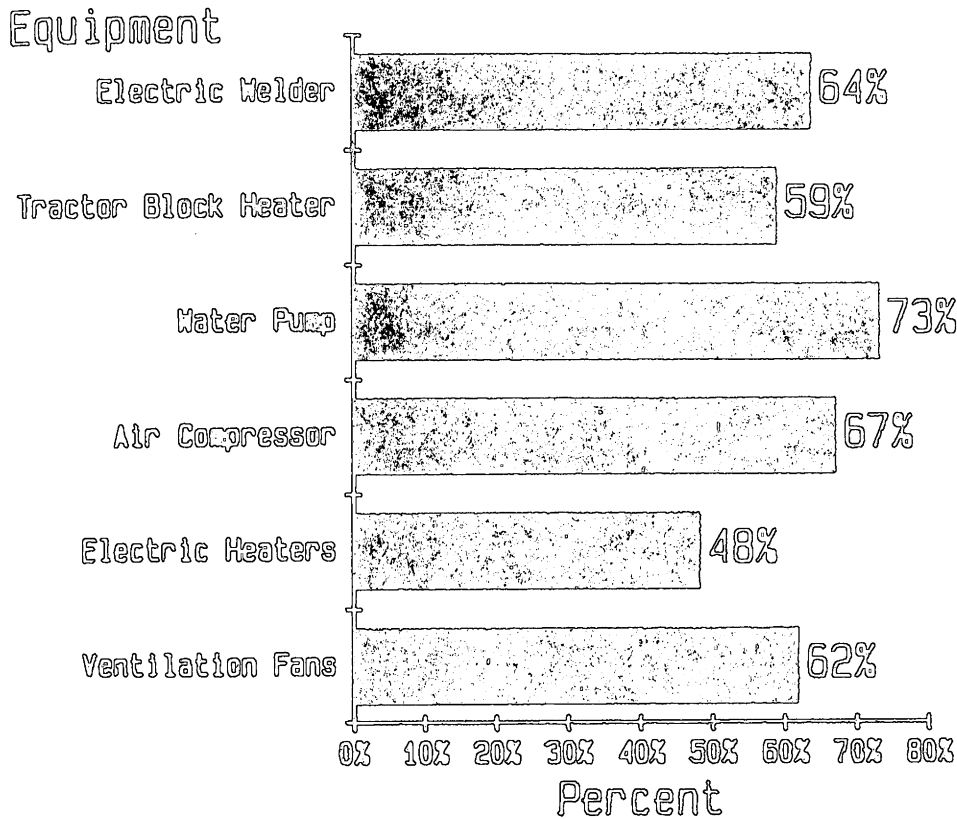


Figure 17. Electric Energy Conservation Measures Used by NMPC Farm Customers

