REPORT OF THE

STATE CORPORATION COMMISSION

REVIEWING THE EXISTING CONSERVATION PROGRAMS

OF EACH VIRGINIA ELECTRIC AND GAS UTILITY

TO

THE GOVERNOR

AND

THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 6

COMMONWEALTH OF VIRGINIA
RICHMOND
1984

PRESTON C. SHANNON
CHAIRMAN
THOMAS P. HARWOOD, JR.
COMMISSIONER
JUNIE L. BRADSHAW
COMMISSIONER

COMMONWEALTH OF VIRGINIA

PATRICIA G. MURRAY
ASSISTANT TO THE COMMISSIONER
BOX 1197
RICHMOND, VIRGINIA 23209
(804) 786-7141

STATE CORPORATION COMMISSION

November 22, 1983

TO: The Honorable Charles S. Robb
Governor of Virginia

and

The General Assembly of Virginia

The report contained herein is in response to House Joint Resolution No. 32 of the 1982 Session of the General Assembly of Virginia.

The Resolution directed the State Corporation Commission to review the existing conservation programs, as well as potential conservation programs, of each Virginia electric and gas utility. An interim report was made in December of 1982.

This is the final report to be submitted and it has been prepared by the Commission's Division of Energy Regulation.

Respectfully submitted,

Preston C. Shannon, Chairman

Thomas P. Harwood, Jr., Commissioner

Junie L. Bradshaw, Commissioner

TABLE OF CONTENTS

HOUSE JOINT RESOLUTION NO. 32

Requesting the State Corporation Commission to review utility conservation programs.

Agreed to by the House of Delegates, February 5, 1982
Agreed to by the Senate, February 23, 1982

WHEREAS, the State Division of Energy estimates that 700,000 residential units in the Commonwealth have no storm windows, 300,000 have no attic insulation, and 600,000 have no floor or wall insulation; and

WHEREAS, approximately one-third of all residential units in the Commonwealth are heated by electricity, one-third by heating oil, and one-third by natural gas; and

WHEREAS, electricity is used to cool about one-half of all residential units in the Commonwealth and

WHEREAS, an estimated 600 million to one billion kilowatt hours of electricity could be saved annually if all electrically heated and cooled residential units in the Commonwealth were adequately insulated and equipped with storm windows; and

WHEREAS, insulation programs would also result in savings of natural gas and heating oil by Virginians using them; and

WHEREAS, the Appalachian Power Company, with the approval of the State Corporation Commission, instituted an insulation and weatherization loan program for its residential customers in 1977; and

WHEREAS, approximately 1500 of the Appalachian Power Company's customers have participated in this program, which allows them to borrow up to $750 at eight percent interest; and

WHEREAS, the Virginia Electric & Power Company has stated that it is continuing to examine conservation programs, including the financing of conservation improvements, as a means of reducing growth in demand for electricity; and

WHEREAS, the State Corporation Commission has approved certain types of conservation programs for several public utilities in the Commonwealth; and

WHEREAS, the State Corporation Commission feels that such programs have been beneficial and that such programs should be initiated and expanded whenever they will serve the public interest; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, that the State Corporation Commission is encouraged to review the operations of each electric and gas utility operating within the Commonwealth with regard to existing or potential conservation programs; and, be it

RESOLVED FURTHER, That the Commission is requested to make to the Governor and General Assembly an interim report on the progress of such programs no later than December 1, 1982, and a final report no later than December 1, 1983, on the progress of such programs.

EXECUTIVE SUMMARY

Introduction

Senate Joint Resolution No. 155, adopted during the 1981 session of the General Assembly, requested that the Virginia Coal and Energy Commission conduct a study relative to the role of electric and natural gas utilities in promoting conservation in the Commonwealth. This task was subsequently assigned to its "Energy Preparedness Subcommittee". Based on the Subcommittee's findings the Coal and Energy Commission reported to the General Assembly during the 1982 session that additional study relative to the utilities' role in conservation efforts was warranted. The General Assembly in February, 1982, in the form of House Joint Resolution No. 32, requested that the Virginia State Corporation Commission review utility conservation programs. In December, 1982, an interim report[1] was submitted to the General Assembly by the State Corporation Commission. That report detailed the efforts of gas and electric utilities in promoting energy conservation among Virginia consumers. This final report summarizes the current status of the conservation efforts by the utilities.

Concurrent with the State's efforts in the area of Energy Conservation, the Federal Government (Department of Energy, Office of Conservation and Renewable Energy) has moved to require certain large gas and electric utilities to provide specific residential consumer services relating to energy conservation. The DOE proposed a Residential Conservation Service plan to be implemented by State regulatory agencies as Part I, Title II of the National Energy Conservation Policy Act, as amended by Subtitle B of Title V of the Energy Security Act.

For those states which elected to participate, the NECPA required substantial and detailed state activity. For those states which chose not to participate or whose RCS plans were not approved by the DOE, a Federal Standby Plan was proposed. Hearings were held and the final Rules and Regulations for the Residential Conservation Services Federal Standby Plan were published in the Federal Register (Vol. 48, No. 188, Pages 44146 - 44162, September 27, 1983) to become effective October 27, 1983.

Virginia elected not to participate in the RCS program. Eleven Virginia utilities fall under jurisdiction of DOE for implementing the Federal Standby Plan as "Covered Utilities". The following utilities under the Commission's jurisdiction are subject to the Federal Standby Plan: Appalachian Power Company, Delmarva Power and Light Company, Old Dominion Power Company, The Potomac Edison Company, Potomac Electric Power Company, Virginia Electric and Power Company, Northern Virginia Electric Cooperative, Washington Gas Light Company, Columbia Gas of Virginia and Virginia Natural Gas. These utilities will be notified by order of the Assistant Secretary of the Office of Conservation and Renewable Energy if they are required to implement the RCS Federal Standby Plan. If so ordered, the utilities will report to and be monitored by the DOE for these activities.

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1) Commonwealth of Virginia, House Document No. 8, "Report of the State Corporation Commission to the Governor and the General Assembly of Virginia on Utility Conservation Programs". 1983, Richmond, VA

Discussion

The interim report made to the General Assembly in December 1982 described and categorized the conservation programs being pursued by the gas and electric utilities serving Virginia residents. Each of the programs were placed in one of the following nine groups:

Customer Information
Energy Audits
Direct Load Control
Weatherization and/or Equipment Financing
Time of Use Rates (TOU)
Interruptible Rates
Cooperative Advertising
Add-on Heat Pump
Research Studies and Programs

Operative programs for each utility are indicated by category on the chart attached to this summary. The next section of this report provides details of current programs of the electric and gas utilities. At the end of that section, a "Program Categories Summary" is included. The Appendix to this report details the utilities and provides information relative to the number of customers served, customer mix, and the average cost of providing service to those customers. For the investor-owned electric and gas utilities, maps are presented depicting the service areas of those companies. Additionally, for the electric generating utilities, information relative to fuel used for generation is presented together with the relative fuel expenses by fuel type.

The following definitions were used for each category to assist in the grouping of conservation programs.

o Customer Information - Includes all forms of information relative to conservation and/or the efficient use of energy as well as the potential for both in terms of reduced utility bills. Customer information includes, but is not limited to, the following: distribution of brochures and newsletters, mailing of bill stuffers, publishing advertisements, radio or television broadcasting, participation in workshops, distribution of educational materials to schools, providing specific information upon request, etc.

o Energy Audits (Residential, Commercial and Industrial) - Energy audits typically refer to an on-premise inspection of a customer's residence or business by the utility to determine what, if any, cost effective measures should be implemented to effect reduced consumption and an attendant reduction in utility bills.

o Direct Load Control - Refers to the use by a utility of electronic or radio signals to physically remove certain appliances from the system during peak periods to accomplish a reduced load. Typically, electric hot water heaters, heat pumps and central air conditioning units are primary candidates for such direct load control.

o Weatherization and/or Equipment Financing - In such a loan financing program, utilities generally make available to their customers a specified sum of money at a designated interest rate and loan period. This money is to be used for a specific purpose such as insulation and weatherization and/or the installation of energy efficient equipment.

o Time-of-Use Rates (TOU) - Daily or seasonal time-of-use rates refer to Commission approved rate schedules, the charges of which are intended to reflect whether energy is used during the on-peak vs. the off-peak period or season. These charges are reflective of the fact that, depending upon the time of day or season of the year during which a customer imposes load upon the utility, the cost associated with providing service varies. TOU rates are generally designed to encourage off-peak usage when lower production cost base loaded capacity is available.

o Interruptible Rates - Such rates are typically offered to large industrial customers. They generally have a provision whereby service is provided at a lower cost than otherwise would be the case. The utility can, however, upon relatively short notice, discontinue service to such customers during peak periods or in the event of an unexpected loss of capacity.

o Cooperative Advertising - An advertising program wherein the utility shares, with the equipment manufacturer or dealer, the expense of advertising energy efficient equipment.

o Add-On Heat Pump - The Add-On Heat Pump innovation combines a fossil fuel furnace with an electric heat pump. In such installations, the heat pump operates when temperatures are moderate but is turned off at temperatures between 30°F. and 35°F. when the fossil fuel furnace begins operation and fulfills the heating requirements of the building.

o Research Studies and Programs - Refers to a broad range of research activities relative to promoting energy efficiency and/or conservation.

As is shown by the chart attached to this summary, the major emphasis of the implementation of conservation measures has been directed towards the larger Virginia jurisdictional utilities. This is appropriate in that such programs will have a greater impact because of the large customer base. As such programs are proven to be cost effective they can be implemented as appropriate for the smaller utilities.

Conclusions

Currently energy conservation efforts are becoming more widespread both because of energy supplying utilities' efforts in consumer education and because of the monetary constraints caused by high energy prices currently facing most consumers.

The continued emphasis on the need for energy conservation by both utilities and other public and private entities should provide greater continuity in energy supply and demand as utilities and the consumers search for cost effective energy sources.

While conservation efforts may temporarily defer new plant construction, even the most concerted efforts will not permanently eliminate that need. If, as economic forecasters expect, the growth in electrical energy continues to parallel the growth in gross national product, conservation and load management efforts will only succeed in smoothing the growth, not eliminating it. Energy supplying utilities will eventually face the need to construct new generating capacity or find new energy sources to meet the demand.

The selection of specific conservation methods by both utilities and consumers should continue to be based on the individual assesment of needs and the circumstances relating to that special environment. Because of differences in service areas, it is doubtful that any one strategy for conservation would be equally effective for all utilities. By providing support for a wide range of conservation methodologies, the State Corporation Commission can allow each utility to select those methodologies which best fit its load characteristics and consumer mix, and which provide the best balance between utility and consumer needs.

UTILITY CONSERVATION PROGRAMS

UTILITIES	Customer Information	Energy Audits Residential	Energy Audits Com & Ind	Direct Load Control	Weatherization and/or equip. Financing	TOU[1] Rates	Seasonal Rates	Interruptible Rates	Cooperative[2] Advertising	Add-On Heat Pump	Research Studies & Programs
I. Electric											
A. Privately Owned Companies											
Appalachian Power	X	X	X		X	X				X	X
Delmarva Power	X	X	X				X				
Old Dominion Power	X	X	X							X	
Potomac Edison Power	X	X	X							X	X
Potomac Electric Power	X	X	X	X		X	X	X			
Virginia Electric & Power	X	X	X	X		X	X			X	X
B. Consumer Owned Companies											
A & N	X	X								X	
B-A-R-C	X	X									
Central Virginia	X										
Community	X	X					X				X
Craig-Botetourt	X										
Mecklenburg	X	X	X								X
Northern Neck	X	X									
Powell Valley	X	X			X						
Prince George	X	X									
Rappahannock	X	X	X	X		X					
Shenandoah Valley	X	X	X	X							
Southside	X	X		X							
Northern Virginia	X	X	X	X			X				
II. Gas											
Columbia Gas	X	X	X						X		
Commonwealth Gas Services	X							X			
Commonwealth Public Service	X							X			
Lynchburg Gas	X										
Roanoke Gas	X	X			X						
Shenandoah Gas	X							X			
Southwestern Virginia Gas	X							X			
Suffolk Gas	X										
Tennessee-Virginia Energy	X										
United Cities Gas	X										
Virginia Natural Gas	X	X							X		
Washington Gas Light	X				X			X	X		

1. Appalachian Power Company has an active thermal storage program. The customers who volunteer to participate in this program are billed on TOU rates.
2. Advertisements promoting the use of high efficiency gas equipment in which the utility shares the expense of advertising with the equipment dealer, or building contractor.

UTILITY CONSERVATION PROGRAMS

I. ELECTRIC UTILITIES

A. PRIVATELY OWNED COMPANIES

1. APPALACHIAN POWER COMPANY (APCO)

Apco has implemented conservation programs in the following major areas: Information, Customer Assistance, Load Management and Residential Insulation Financing. In addition there are a number of research programs in which the Company is involved.

a. Information

In the area of Information the Company, beginning in 1978, has made available to its customers at no charge the following six booklets: Customer Handbook, Insulation, Home Energy Management, Home Survey, Electrical Thermal Storage and Add-On Heat Pump. The Company, through its monthly bill inserts, has also provided conservation information. Apco actively assists teachers of home economics, science and consumer classes by providing classroom materials and demonstrations on the wise use of energy. The Company upon request makes presentations or provides speakers on the efficient use of energy to elementary school groups, civic groups, senior citizen's organizations and youth groups. Apco provides training for "Extension Service Program Leaders" on conservation and weatherization. The Company participates in local community conservation activities by appearing on educational TV programs sponsored by the Extension Service and actively participates in 4-H programs. Finally, in the area of information the Company, through its advertising in a variety of media forms, has provided conservation information.

b. Customer Assistance

In the area of customer assistance, Apco provides cost data through three computer programs: SAVE (Save America's Valuable Energy) - provides customers with a personalized computer printout of electric cost for their homes; BEEP (Building Energy Estimating Program) - provides commercial and industrial customers comparative costs of operating various types of environmental and energy systems in their buildings and evaluates the economics of changes in building structures as they relate to building energy requirements and cost; and BOOP (Building, Owning and Operating Program) -provides a complete evaluation of alternative heating and/or cooling proposals taking into consideration life cycle costs.

In the Customer Assistance area, the Company has leased a mobile display unit (Energy Van) which provides information on, among other subjects, conservation. The van periodically visits cities and towns in the Company's service area.

Finally, in the area of customer assistance Apco responds to specific individual customer requests to provide information and technical assistance on energy management conservation. During 1982 Apco responded to 3731 consumer requests on insulation.

c. Load Management

The Company began a test program to study off-peak space and water heating in 1976. The results of the program indicated that off-peak heat storage for water heating and space heating could be beneficial to both the Company and the participating customers without any major change in customer lifestyle. Because of these results, the Company began its Electric Thermal Storage (ETS) Program with the approval by the SCC of a Time-of-Day Rate for billing ETS customers. The Company is actively encouraging the use of electric thermal storage in Virginia because its test program determined that ETS could be a cost effective load management tool.

Another program the Company is promoting relates to the Add-on Heat Pump. The heat pump is designed to handle heat load requirements during moderate temperatures when the heat pump is most efficient. During extreme temperatures the customer relies on an oil or gas furnace. Under present energy prices the Company reports the customer experiences a substantial reduction in his heating costs. Summer cooling is also provided by the heat pump with more efficient use of electricity than with conventional cooling systems.

The Company performed an appliance survey in late 1982 and early 1983. The results of the survey will be used for several purposes and is expected to be helpful in evaluating alternative residential load management strategies. A new load management program Add-on Resistance Heat (AORH) was added during 1983. Commercial accounts may find AORH economical if it aids in reducing their demand. AORH can be installed by placing electric resistance heating elements into existing ducts and applying the appropriate controls. The customers benefit from lower overall energy costs. The Company benefits from off-peak use in the same manner as described under the electric thermal storage (ETS) program.

d. Residential Insulation Financing

The Company, since 1977, has had a Residential Insulation Financing program which was initially approved by the SCC for 120 customers. In 1980 the SCC authorized the Company to offer financing, the total amount of which would not exceed $1,284,000. The Program is available to all Residential Customers and provides up to $750.00 per customer to be paid back by the end of three years. The loan carries an annual interest rate of 8%. As of September 30, 1982, 1596 loans had been made. The Company has made a review of the savings experienced by a limited number of these customers and reports that the operating savings experienced by these customers off-set the amount of the Apco loan in approximately 2.6 years.

e. Research Programs

The Company is conducting and/or participating with other companies of the AEP System in a number of research programs related to conservation. They include the following: Heat Pump Water Heating Tests; Heat Pump - Night Set-Back Test Program; Heat Pump "Seasonal Performance" Test Program; Test

Program (Utility Control of the Operation of Heating, Air Conditioning and Water Heating Units.); Solar Research Houses, Combination Heat Pump and ETS Unit; Project Aladdin (a cooperative venture with General Electric Company to field demonstrate G.E's AMRAC two way power line carrier communication, data acquisition and control system) and Residential Time-of-Day Rate Experiment Program.

Analysis and evaluation is underway for the Residential Time-of-Day experiment. Another report which is concluded indicates the implementation of a direct control residential load management program would not economically benefit either the AEP system or its customers. At the present time, it is less expensive for AEP to construct power supply facilities to meet anticipated electric loads than it is to implement direct control of residential water heaters, central space heaters, and central air conditioners to avoid these same loads.

2. DELMARVA POWER AND LIGHT COMPANY (Delmarva)

Delmarva's efforts regarding conservation within Virginia have been in the area of information. The Company has provided each school in the State with an Energy Education Resources Handbook which lists slides, tapes, brochures, speakers and films addressing a variety of subjects, including energy conservation. The Company has made available, at each of its District Offices, a number of pamphlets related to and addressing ways to conserve energy. In the past year Delmarva has conducted a variety of meetings and hosted workshops on numerous conservation topics. The Company has participated in local energy fairs such as the Eastern Shore Agri-Fair in Accomac, VA.

At the request of builders and individuals, the Company provides computerized heat loss/heat gain calculations for new homes utilizing efficient construction standards. As of August, 1983 Delmarva has conducted 68 residential, 24 commercial and 6 Super E+ heat loss/gain analysis for consumers in Virginia.

Finally the Company, along with realtors, builders and architects, has implemented The Super E+ Program. Homes constructed to meet the rigorous energy cost controlling standards specified in the program are awarded the Super E+ designation. There are now 15 Super E+ units (townhouses and single family) in various stages of completion. This translates into approximately 10% of all new housing in a given area.

3. OLD DOMINION POWER COMPANY (Old Dominion)

Old Dominion will, upon request, assist and make recommendations on how home owners or businesses can make more efficient use of electricity. Kentucky Utilities Company, the parent company, is in the process of developing a computerized Residential Conservation Service Program which will be offered to Old Dominion's residential customers as requested.

The Company in its utilization of mass media advertising communicates conservation measures to its customers.

The Company began in 1983 conducting a Heat Pump and Add-On Heat Pump promotional campaign. This campaign is promoting the use of Heat Pumps as an energy efficient electric heating system and Add-on heat pumps as an efficient alternative to straight central air-conditioning for customers faced with replacing failed or aging air-conditioning systems.

4. THE POTOMAC EDISON COMPANY

The Potomac Edison Company, in 1982, initiated a ten year load management plan. The plan includes a number of activities and programs which involve the three major classes of customers: Residential, Commercial and Industrial.

a. Residential

The Company has begun an Energy Efficient Home Program for new electrically heated construction by:

(1) Promoting recommended energy efficient home thermal standards through media advertising and customer literature;

(2) Providing heat loss/gain calculations on new electrically heated homes;

(3) Promoting energy efficient home thermal treatment recommendations in builder home shows;

(4) Conducting training seminars on proper thermal treatment of a home in Vocational-Technical Schools;

(5) Continuing to educate builders on the energy efficient home thermal standards recommended by the Company through seminars, exhibitions, direct mailings and personal contact;

(6) Providing materials to builders to identify homes built in accordance with recommendations for the Energy Efficient Home and

(7) Promoting employee interest and the achievement by employees of recommended energy efficient thermal standards in their own homes.

The Company has a Residential Conservation Service Program (RCS). Under this program, the Company offers to perform an energy audit of each customer's residence. It is auditing each residence as requested and providing the results of the audit to the customer along with recommendations and estimates of cost to meet recommendations. It is also educating consumers on the benefits of the RCS program through group presentations and through participation in energy shows and/or programs.

The Company has a number of other conservation programs either being promoted or which will be promoted in 1984. These programs include efforts to promote:

(1) The use of high efficiency central air conditioning equipment;

(2) The installation of additional insulation by electric heat customers to meet today's recommended standards;

(3) The reduction of demand imposed by oversized central heating units by reducing the heating capacity to that required to meet the structural heat loss;

(4) The installation of thermal jackets for water heaters to reduce electric consumption;

(5) The installation of add-on heat pumps for oil and gas heating customers instead of total conversion to electric heat or replacement of central air conditioning units;

(6) The incorporation by builders of applicable passive solar measures in new homes and encouraging the orientation of homes for efficient energy utilization including the utilization of trees and shrubs to reduce heating and cooling loads;

(7) The installation of heat pump water heating and

(8) The manufacture and sale of energy efficient appliances.

b. Commercial

The Company has a number of programs to promote conservation among its existing and new commercial customers. They are as follows:

(1) Demand Reduction Program - Existing Customers - to reduce demand by: utilization of efficient lighting systems; improved use of thermal construction techniques; use of time clocks and demand control equipment and promoting waste heat utilization where applicable;

(2) Demand Reduction Program - New Customers - to reduce demand by all the methods listed in (1) above plus the promotion of the use of passive solar in building design;

(3) Heat Pump Water Heating Program to promote the use of Heat Pump Water Heaters;

(4) Add-on Heat Pump Program - to encourage add-on heat pumps where customers are converting from a fossil fuel system to electric heat;

(5) Street Lighting Program - to reduce demand by utilization of more efficient systems and moderization of existing systems.

c. Industrial

The Company has Load Control and Energy Conservation Programs for both existing and new customers the objectives of which are the same as those outlined in the Demand Reduction Programs under Commercial. In addition the Company will implement or has begun the following programs to promote conservation by Industrial Customers: Parallel Generation Program to identify potential generation projects and secure 10,000 kw of additional generating capability; Interruptible Rate Program to provide interruptible rates that would encourage customers to reduce load by 2,500 kw at times of system capacity shortages; Standby Generation Program to utilize standby generating units as a potential source of capacity; demand limiting with a reduction of 1,000 kw and a Wholesale Customer Program to encourage wholesale customers to adopt and promote energy management programs.

d. General Information

To complement its load management program, the Company also encourages energy conservation by: providing services to educational facilities including literature and films, furnishing conservation literature to the general public, providing speakers to give presentations on energy conservation and load management and providing conservation related films, programs and demonstations to adult groups.

At this time the Company has not completed the evaluation of the cost benefit studies to determine if these activities are cost justified, but advises that initial findings indicate each of these activities appears to be cost beneficial.

The Company, in conjunction with the other companies of the Allegheny Power System, is presently considering direct control of residential electric water heaters. Other activities under consideration include a research and development project involving two-way communications systems for direct control, remote meter reading and distribution automation and a load control demonstration project for data gathering to assess the benefits of direct load control.

5. POTOMAC ELECTRIC POWER COMPANY (Pepco)

a. Energy Audits

The Potomac Electric Power Company has had an audit program known as the "Waste Watchers Energy Audit Program" since 1978. This service is currently available to all residential customers who live in a one to four family dwelling. Beginning in January 1983, this service became available to all residential customers provided they receive an electric bill. This service costs the customer $15.00. The analysis performed determines which energy conservation and renewable resource measures, and what energy conservation practices are applicable to a customer's home. The report also provides the first year range of savings which can be expected from each recommendation, the installation cost of each recommendation and yearly maintenance cost if applicable.

In addition the company offers a Do-It-Yourself Waste Watchers Audit Program, also available since 1978, to residential customers who live in one to four family structures. The Company furnishes the customer with an audit questionnaire which is returned to the Company when completed. After processing, the Company furnishes the customer a report containing recommended conservation improvements, estimated energy savings and estimated installation costs.

Since the institution of this program 11,600 customers in all jurisdictions have taken part in it, including 73 Virginia customers.

b. Education, Advisory and Information Services

For the last three years, Pepco has been actively involved in numerous activities and programs to directly assist special groups of residential customers to conserve energy. The projects include: the providing of publications and workshop materials to social service agencies and community volunteers; the providing of workshops on energy conservation in multi-family buildings for landlords, tenants, and condominium associations and the providing of conservation information to customers through a number of brochures, fact sheets and bill-stuffers.

c. Load Control

Pepco conducted a residential experimental load management project from 1977-1980 wherein it cycled the use of central air conditioners and water heaters of 287 residential customers. As a result of this initial experiment, the Company began an expanded experimental Radio Load Control Program in 1981 with 700 residential customers and continued the program in 1982 with the addition of 50 District of Columbia customers. This experiment is continuing this year.

The Company also has a Commercial/Governmental Curtailable Load Experiment involving a sample of 31 customers with loads in excess of 500 kw. These customers agree to reduce load to a pre-established level upon request. Upon compliance the customer receives a rate discount; upon noncompliance, they are billed a rate penalty. This experimental program began in 1982; the rate is a filed tariff in Maryland and in the District of Columbia for experimental purposes.

Both of these load control studies have continued in 1983 in Maryland and the District of Columbia. These programs have not been conducted in Virginia because customer population is too small in Virginia to maintain statistical reliability. The Company intends to evaluate, based on the data to be received from those programs, specific load control programs as a part of the Company's energy supply planning process. Programs finally adopted will be incorporated into the annual peak demand and energy forecasts.

d. Time-of-Day and Seasonal Rate Pricing

Pepco has had seasonal cost differential rate schedules since 1970. Currently such rates are in effect for the following schedules: Residential, General Service, Temporary, Heat Service, and Cogeneration - Small Power Producers.

The Company, for 270 of its largest commercial customers in the District of Columbia, has had time-of-day schedules in effect since June, 1980. In October 1982, the Maryland Public Service Commission approved a time-of-day rate program for Pepco's largest commercial and residential customers in that State. A proposal to extend time-of-day rates to Pepco's largest residential customers in the District of Columbia has been approved by the D.C. Public Service Commission, and will involve about 800 customers.

Pepco's programs extend time-of-day rates to customers on a demonstration basis for one year. After the initial year, the time-of-day rates are billed to the eligible customers on a mandatory basis. Time-of-day rates are originally applied to the customers who have the largest use because of the potential of such application for a positive cost benefit. These rates will be extended to smaller users over time as justified by cost/benefit analyses. Volunteers outside of the field of eligibility are not accepted into the Pepco time-of-day rate program. Participation is mandatory for eligible customers. The Company has not yet evaluated the cost effectiveness of its time-of-day rates since the program has not provided the necessary data to make such an evaluation.

e. Commercial Energy Management Program

This program is designed to increase customer awareness of how their use of electricity can be controlled with emphasis placed on times of peak electrical requirements. Pepco's qualified personnel assist the customer in understanding how the electric rates are applied and the individualized and combined impact that the cost components have on his total bill. This provides the customer with a basis to determine cost effectiveness of conservation measures appropriate to his operation. The primary conservation activity in this program involves walk-through audits of customer facilities by engineers and technical specialists to identify potential energy saving through modifications to operation, controls, and equipment maintenance procedures. A written report is given to the customer advising of potential modifications and, where possible, potential estimated energy savings are included. Where detailed designs and cost estimates are necessary, the customer is referred to a consulting engineer or a mechanical contractor.

Pepco is in the process of designing an automated energy audit which will provide more detailed information, including the suggested modification, estimated fixed costs, energy savings and payback periods.

6. VIRGINIA ELECTRIC AND POWER COMPANY (Vepco)

a. Residential Energy Audits

Vepco offers an energy audit to all of its residential customers except those located in buildings which utilize central heating and/or cooling systems or buildings containing more than four residential units. These exceptions will become eligible when the Commercial and Apartment Conservation Service Programs, authorized by the Energy Security Act, become effective. This is expected to be in 1984.

This program provides the residential customer with a walk-through evaluation of his home and a detailed computer analysis of the conservation measures which are recommended. This program was initiated in Virginia, West Virginia and North Carolina in 1981. A total of 4176 audits have been conducted. Of this total, 3907 have been performed in Virginia.

Vepco plans to offer its Residential Conservation Program as federally mandated until January 1, 1985. If federal rulings are not renewed it is possible that Vepco will continue the program to meet national and local energy usage curtailment requirements prevailing at that time and as a service to its customers.

b. Direct Control Water Heater and Air Conditioner Program

(1) Water Heater - In June 1977, Vepco received the approval of the State Corporation Commission to study the control of electric water heaters in its service area. Since 1978, pilot projects have been conducted in five localities and about 3000 customers have participated in this program. Three different control technologies have been utilized. Ripple Control was evaluated in Fredericksburg, Va. and in Roanoke Rapids, N.C.; Radio Control was evaluated in South Boston, Va. while Power Line Carrier Control was utilized in Hopewell and Williamsburg, Virginia.

These pilot projects demonstrated that residential electric water heaters can successfully be remotely controlled; capacity requirements can be reduced; the control technologies used are effective communication techniques for remote load control; and customer acceptance was good. A major conclusion drawn was that in 1996, winter and summer peaks could be reduced by 238 Mw and 104 Mw, respectively.

Based on these conclusions, Vepco adopted a goal to control 25% of residential electric water heaters by 1990. The first phase of the expansion of this program was initiated in June 1982 when the program was offered to customers in the Tidewater cities of Virginia and in Ahoskie and Williamston, North Carolina.

By December 31, 1982, more than 15,000 devices had been installed in the Tidewater area and 2160 had been installed in North Carolina. The 1983 goal calls for an additional 30,000 installations in Virginia and 585 in North Carolina.

(2) Air Conditioners

The North Carolina Utilities Commission, in May 1982, ordered that a test program be conducted in Roanoke Rapids to control air conditioners of approximately 200 residential

customers for at least one year. The Company solicited volunteers first from among customers who were already participating in the water heater control program. In 1983, 167 volunteers participated in the program.

c. Commercial, Industrial and Governmental Audits

Vepco began, in 1978, to offer walk-through inspections, upon request, of customers' establishments to identify modifications that would reduce consumption, demand and ultimately electric bills. The Company has conducted 1,402 such audits resulting in a load reduction of 15,516 Kw in the summer peak and 123,089 Kw in the winter.

d. Energy Saver Home Program

Beginning in June 1982, Vepco implemented an Energy Saver Home Program in its Eastern Division. This program was expanded in September 1982 to include the Company's total service area. The program specifies thermal standards and heat pump and central cooling unit efficiency standards. The program is promoted through contacts with builders and developers of single family homes; the Company supplies information kits, home site signs, promotional aids and sales brochures. In addition, the Company participates in local consumer shows, promotes the program in its newspaper advertisements, and provides speakers on the program as requested.

Each home constructed and equipped to meet the standards of this program is identified by a brass plate with a registered serial number which is attached to the circuit panel in the home.

The Company's goal in adopting this program is to reduce residential electric demand and improve customer relations. Vepco projects a reduction in demand of 40 Mw through 1990 as a result of this program. In 1983, Energy Saver Homes will comprise 10% of the new single-family detached homes in the Vepco service area. The program has been expanded to include townhouses.

e. Add-on Heat Pump Program

The Company continued in 1983 with the development of an Add-On Heat Pump Program. It is an effort to promote the installation of a Heat Pump when an existing oil or gas customer is planning to install central air conditioning or to replace a failed central cooling unit. This offers the customer an alternative to removing a working oil or gas furnace because of high operating costs. Many customers would probably choose to install a standard heat pump, but if they chose an add on heat pump, it would reduce the escalation of winter system peak. The heat pump, in lieu of the conventional air conditioner for central cooling, would also reduce the growth in summer peak. Vepco believes the heat pump will have no adverse effects on the system winter peak. In addition to actively promoting dual-fuel heat pumps in the retro-fit market by sending spring and fall bill stuffers and working with installing dealers, development of the new home market was tested through promotion of installing propane back-up systems. This test was used to determine both builder and consumer response.

The Company, in order to promote this program, held meetings for manufacturers and dealers to provide details of the program and to advise of the Company's efforts to increase customer awareness of the add-on heat pump. Vepco's program recommends: a specific efficiency rating for the add-on heat pump, reliability of operation standards, dealer servicing availability recommendations and manufacturers' extended service agreement availability recommendations.

The Company has undertaken the promotion of this program through advertising, bill stuffers, brochures, speakers, contacts with dealers and homeowners, and displays at home shows.

The Add-On Heat Pump Program in North Carolina offers a reduced rate for space heating for compressor usage for the months of November through March. Equipment must have an 8.0 Energy Efficiency Rating or a high temperature coefficient of performance (C.V.P.) rating of at least 2.60 at 47°F. In order to qualify for the rate, the customer must install a separate meter for compressor usage and also not have any supplemental electric heat in his residence.

f. Time-of-Usage Rates

In June 1977 Vepco, with the approval of this Commission, instituted two pilot programs to evaluate Residential Time-of-Usage (TOU) rates. One plan solicited 1000 customers to volunteer to be billed on the TOU rate. The other plan was to install meters on customers whose usage in any summer month exceeded 3500 kWh, send them a comparative bill on TOU rates for at least a year, and bill them under the traditional residential schedule during the first year. This plan involved 10,876 customers. After evaluation of the effect of the plan, if the benefits exceeded the cost, the intent was to bill these customers on the TOU rates and to extend TOU rates to other groups of customers.

These programs were initiated because it was anticipated that time differentiated pricing would encourage customers to shift their consumption and load to off-peak periods when the price is lower. Such a shift would reduce the growth in peak demand.

The Commission has decided that the mandatory program not be instituted because the cost effectiveness of the rates has not been proven. The Commission approved the expansion of the volunteer TOU rate program to increase customer awareness and understanding of the potential benefits of TOU rates. Vepco will be seeking additional volunteers in the near future.

As of June 1983, 383 of the original customers in the volunteer program and 2371 customers in the mandatory study program have volunteered for TOU rates. The remainder of the customers in the mandatory program will be encouraged to volunteer when the issuing of comparative bills is discontinued.

In June 1977, with Commission approval, the Company implemented a Voluntary Clock Controlled Water Heating Program that offered a reduced rate for off-peak water heating. Vepco now has 545 residential customers on the

Off-Peak Time Controlled Water Heating Rate. The Company plans to expand this number in the near future and make it available to customers who install storage space conditioning systems.

In May 1978, at Vepco's request, this Commission approved a TOU rate for Churches, Synagogues and Charitable Institutions. Currently there are 10 customers billed under that rate.

The Company, in conjunction with an Alternative Energy Study it is conducting, is in the process of soliciting responses from large industrial customers to evaluate the potential of interruptible rates. If the evaluation of these responses indicates the need and potential for such a rate, Vepco will introduce an interruptible tariff for customers agreeing to curtail their load during peak demand periods.

The Company also has an active time-of-usage program in its North Carolina service territory, and is now testing two different rate forms in that area.

B. CONSUMER OWNED ELECTRIC COOPERATIVES

1. A & N ELECTRIC COOPERATIVE

A&N has an Energy Audit Program which is divided into two types. Whenever the Cooperative receives a bill complaint, the technician handling the complaint, in addition to testing the consumer's meter, offers to make a walk through audit of the customer's home. If requested to make such an audit, he checks and makes recommendations on the following: thermal insulation, ventilation and moisture control, air infiltration, heating and/or cooling systems, appliances, plumbing system, water heater, lighting etc.

The other type of audit is at the request of the consumer and the pertinent data collected is analyzed through use of a computer model. The information produced helps the consumer decide what modifications should be implemented.

In 1981, a total of 242 audits of both types were completed. In 1982, 132 audits were performed for members. The savings could range from 0% to 75% for consumers provided the energy conservation recommendations were followed. The Cooperative estimates that this converts to an annual energy saving of about 15% or $300.00 per member for a total of $39,600 for all members who received audits.

The Cooperative is actively promoting the use of energy efficient heat pumps including the Add-on heat pump and water-to-air heat pumps, and is exploring the possibility of becoming associated with a program to encourage construction of energy efficient housing.

The Cooperative believes the high capacity cost in wholesale rates may necessitate consideration of direct load control systems in the future.

2. B-A-R-C ELECTRIC COOPERATIVE

BARC makes a number of brochures concerning energy conservation available to its members. Upon request, the Cooperative provides on-premises assistance and advice to its members concerning ways to use energy efficiently.

The Cooperative works with approximately 100 members each year regarding heating systems, insulation recommendations, electrical systems and improvements to reduce high usage. The Cooperative will also make energy audits, if requested, by a simple walk-through survey from which recommendations to improve efficiency can be made to a complete heat loss-heat gain summary.

The Cooperative works closely with electrical and insulation contractors in its service area to keep them aware of the insulation standards recommended in the Cooperative's service area.

3. CENTRAL VIRGINIA ELECTRIC COOPERATIVE

Central Virginia Electric Cooperative (CVEC) promotes conservation in the following ways: distribution of literature, annual letter to members advising of the free statewide energy audit program, speeches before various organizations and explanations of the operation of appliances to reduce high consumption.

Technical assistance is offered to all consumers including heat loss calculations on new and modified electrical systems. The Cooperative advises its large power consumers on how to improve power factor and thereby achieve reduced demand charges.

CVEC participates with other organizations to encourage energy conservation including various associations of electric cooperatives. In addition, it is a member of the 4-H Electric Energy Program and the Virginia Farm and Home Electrification Council.

4. COMMUNITY ELECTRIC COOPERATIVE

The Cooperative provides informational service to its membership relative to conservation. These include articles in Rural Living Magazine, newspaper advertising, exhibits and handout booklets.

The Cooperative provides consultation services in the following areas to its members: computerized energy audits, on-site energy audits; building design recommendations; heating and cooling systems; insulation standards; financing from the FHA and local bank, special government grants and/or loans, efficiencies of various motors and major appliances and how to reduce excessive energy consumption.

The Cooperative is initiating a study of potential costs and benefits of a Supervisory Control and Data Acquisition System and load management. In the interim any new facilities constructed by the Cooperative will be designed to accommodate such systems.

5. CRAIG-BOTETOURT ELECTRIC COOPERATIVE

The Cooperative has not adopted any formal conservation program. It has presented conservation topics to Civic Groups when requested. Rural Living Magazine, which frequently includes articles on conservation measures and recommendations, is mailed to the Cooperative's consumers monthly.

6. MECKLENBURG ELECTRIC COOPERATVE

The Cooperative has designated the time equivalent of one and one-half staff members to performing energy audits, providing engineering assistance and developing and distributing information on energy conservation to both residential and commercial consumers.

The Cooperative has been performing approximately 200 energy audits and personal contacts annually.

The Cooperative has completed a feasibility study to consider a direct load management program. This program will be presented to the Board of Directors and if approved, installation of equipment to control water heaters will begin in Mid-1984.

7. NORTHERN NECK ELECTRIC COOPERATIVE

Northern Neck Electric Cooperative promotes the conservation and efficient use of energy through information in the Cooperatives' Monthly Newsletter and through consumer contacts. The information provided covers the following areas: energy efficient appliances, recommended conservation measures, weatherization of existing homes and specifications for the installation of insulation, and storm doors and windows for new homes.

In 1981, Cooperative personnel made 4,167 individual contacts. In 1982, there were 4,662 contacts and in 1983, there have been 3,699 to date.

The Cooperative plans to continue to expand its efforts to meet consumers' requests.

8. NORTHERN VIRGINIA ELECTRIC COOPERATIVE

The Cooperative, as a part of its Energy Use and Conservation Program, offers walk through home energy audits for residential consumers. From 1979 through 1982, Cooperative personnel completed 1855 audits. In 1982, energy audits were offered to commercial and industrial consumers. A total of 30 commercial audits were performed.

Individual recommendations are made on heating and cooling unit sizing, proper insulation, proper ventilating and energy efficient design including solar. Such assistance includes heat gain/loss calculations.

Education and information relative to conservation and the efficient use of energy is provided through: the monthly Rural Living magazine; programs to various community groups; bi-weekly advertisments in each of four local newspapers; the issuance of an Energy Packet to new applicants for service; the providing of a film on conservation at Community meetings and a booth at the Prince William County Fair at which efficient energy equipment is demonstrated and energy conservation literature is distributed. The Cooperative along with the Cities of Manassas and Manassas Park designed and conducted training seminars on practical remedies for decreasing energy consumption. This program was initiated to train volunteers to teach energy workshops for local residents.

Northern Virginia also participates with other organizations; such as: the Loudoun County Energy Fair; The Defense Department Energy Fair; the State Association; the VPI Extension Service and The Virginia Farm and Home Electrification Council to promote energy conservation through meetings, demonstations and fairs.

Northern Virginia began a Load Management Program in 1979 which utilizes radio control to reduce the loads water heaters and air conditioners contribute during periods of peak load. As of July, 1983, the Cooperative had 3,190 water heater and 3,730 air conditioner direct control units. At that time the estimated demand under control was 186,000 kw and the estimated demand reduction during peak periods was 13,000 kw or 14.3% of peak demand. The consumers participating in this program are volunteers; no pecuniary incentive is offered.

9. POWELL VALLEY ELECTRIC COOPERATIVE

The Tennessee Valley Authority (TVA) began to offer a conservation program to its Distributors several years ago. TVA furnishes the cash resources and the distribution utility (in this case Powell Valley) distributes the cash. The program offers financing to consumers for insulation, storm windows and doors, wood stoves and heat pumps. The program, as revised in October 1982, authorized Powell Valley to offer up to $5,000 per dwelling. The first $1200 is interest free and the remaining $3800 is at an interest rate based on the cost of money to TVA. The program, as revised, offers financing for insulation, storm doors and windows, wood stoves, heat pumps, heat pump water heaters and Solar Water Heaters.

Power Valley signed its first contract with TVA to make this financing program available to its consumers on July 1, 1977. TVA provides two full time employees to make audits and recommendations for Powell Valley consumers in the Virginia and Tennessee service areas of the Cooperative. Through August, 1983, the Cooperative has made 1,045 loans, estimates a savings of 3,432,181 kWh and a reduction in consumer charges of at least $161,313.

As of August 1983, TVA estimates annual savings to its entire system to be 1.22 billion kwh and a reduction in peak of 478 megawatts. Savings will continue to accumulate as a result of the improvements made to make consumers' homes more energy efficient.

10. PRINCE GEORGE ELECTRIC COOPERATIVE

The Prince George Electric Cooperative is promoting energy conservation among its consumers by: the use of the State Association newsletter to inform consumers of the availability of the Cooperative to assist in any way possible and to inform of conservation measures; providing pamphlets and brochures on energy conservation; advising clubs and civic organizations of the films available on energy conservation and the display of posters on conservation at the Cooperative Office.

The Cooperative offers technical assistance as follows: planning and installing new and upgraded services and equipment; cost calculations on insulation requirements; efficient heating, cooling and proper ventilation equipment; reducing excessive consumption and Energy Audits. The Energy Audits are offered through VPI and the State Energy Office and by qualified staff members

on walk-through surveys of homes.

The Cooperative also advises its consumers where financial assistance can be obtained to make energy saving improvements.

11. RAPPAHANNOCK ELECTRIC COOPERATIVE

The Cooperative has an operating pilot load management program which controls the operation of electric water heaters during peak periods. This program is offered on a voluntary basis and the participants receive no monetary incentive. At the present time, 1289 consumers are participating. The object is to reduce the Cooperative's demand costs as billed by its wholesale supplier of power. This program is presently reducing the system demand by 0.8 to 1.0 kw per switch per month. The Cooperative plans to seek approval to expand this program to 6000 water heater switches over the next four years.

The Cooperative's Large Power Rate Schedule offers a reduction in demand charges during off-peak times for consumers with demands of 1000 kw or more. The Cooperative's wholesale demand charges are also less during off peak periods.

Since January 1980, the Cooperative has offered energy audits at no charge to all classes of customers as requested. An audit provides advice and recommendations on more efficient use of electricity and other fuels. In 1982 the Cooperative completed 440 audits. In addition, specific advice on conservation, wiring, cooling and heating was given to another 537 members.

12. SHENANDOAH VALLEY ELECTRIC COOPERATIVE

Shenandoah Valley offers a two-part home energy audit program including: (1) visual examination of the home, and (2) complete analysis heat estimate. The visual analysis is made to determine what action can be taken to make more efficient use of energy and reduce consumption. The Heat Loss Estimate is a computer analysis and informs the consumer of the proper heating units to be installed.

The Cooperative furnishes Rural Living magazine to its consumers monthly. The magazine, in the course of a year, includes a wide variety of articles concerning energy conservation. Upon request, the Cooperative will make presentations concerning efficient use of electricity in the home, farm and office to various civic, school, and professional groups.

The Cooperative has a voluntary load management program aimed at the control of water heaters. No monetary incentive is offered. The program was initiated in October 1980 as a means to help reduce demand during peak periods. As of August 1983, 4129 water heaters were subject to radio control. During that time the estimated demand under control was 56,000 kw and the estimated demand reduction during peak periods was 5000 kw or 9% of peak demand. It is estimated that presently the Cooperative saves $90 per switch annually.

13. SOUTHSIDE ELECTRIC COOPERATIVE

The Cooperative has provided information on energy conservation through Rural Living Magazine to all of its consumers and through radio spots broadcasted in its service area.

Southside has established a resource library of films, slide presentations and literature on energy conservation management. In 1981 it made 31 presentations, using resources from its library, to various civic and local associations. The Company participates in seminars and workshops on energy conservation conducted in its service area.

The Cooperative works with local contractor and builder associations with regard to the use of energy-efficient equipment and appliances and the proper insulation in buildings.

The Cooperative has offered energy audits and heat gain/heat loss calculations. It is active in the energy audit program of the Virginia Energy Office in supplying the questionnaire to consumers and in interpreting the results of the audits when they are returned from V.P.I.

In addition, the Cooperative has a load management program in which the electric water heaters of 100 volunteers are radio controlled. These 100 consumers also agreed to the installation of demand meters on their services as did another 100 consumers for the collection of demand data. The Cooperative is in the process of evaluating the data collected in this program.

The Cooperative applied to the State Corporation Commission for approval to implement an Energy Resources Conservation Loan Program to assist consumers in dealing with the high cost of energy. This program is expected to be approved.

14. TRI-COUNTY ELECTRIC COOPERATIVE

Effective January 1, 1983, the Tri County Electric Cooperative and the Prince William Electric Cooperative were merged to form the Northern Virginia Electric Cooperative. See page 15 of this report.

15. PRINCE WILLIAM ELECTRIC COOPERATIVE

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II. GAS UTILITIES

1. COLUMBIA GAS OF VIRGINIA, INC.

Columbia Gas (CVA) has a number of programs to promote conservation. These programs include (1) media advertising (newspaper, radio and television); (2) distribution of numerous brochures; (3) providing speakers as requested; (4) bill inserts; (5) audio-visual presentations to builders, heating contractors and equipment dealers on high efficiency gas equipment; (6) money for dealers for cooperative advertising to promote the use of high efficiency gas equipment and (7) encouraging builders of homes to install high efficiency gas equipment.

The Company is active in the promotion of the conversion of non-gas heated homes to gas heat which the Company considers to be more efficient and economical to operate than oil or electric heating units.

Columbia Gas also has a program of surveying (energy audits) its customers' buildings to determine how the customer can make more efficient use of gas or what conservation measures the customer can take to reduce gas consumption. These audits are available for residential, commercial and industrial customers.

Since January 1, 1983 CVA has performed the following energy audits: 50 residential, 307 commercial food service, 40 industrial plant, 8 equipment efficiency analyses for industries, and 2 boiler efficiency analyses. They have conducted meetings for: 50 heating dealers, 6 appliance dealers (total of 125 people), and 3 service clubs (total of 100 people). They have participated in 3 home shows and 1 restaurant show promoting energy conserving gas equipment and have provided energy conservation literature to 2000 walk-in customers.

The results of these conservation promoting activities have been observed reductions of 19.7% in residential heating usage and 8.1% in commercial heating usage in the 12 month period ending October, 1982 over the corresponding 12 months in 1972-1973. The total amount of natural gas saved over the entire ten year period (1972-1982) has been 1.3 billion cubic feet.

CVA is working with a manufacturer to market a high efficiency combination heating/water heating unit for residential and small commercial applications. This unit was developed by Columbia Gas System Service Corporation Research Department. It is expected to be on the market within four years.

The Company is projecting an additional 12.6% residential and 4% commercial conservation of natural gas due both to the continuation of the conservation programs described and to the rising energy prices in general.

2. COMMONWEALTH GAS SERVICES, INC.

Commonwealth Gas Services provides an assortment of literature on ways to conserve gas and reduce monthly bills. The Company also encourages its customers to take advantage of the free Home Energy Audit offered by the Virginia Energy Office. Since January, 1983, Commonwealth Gas has provided

52,000 items of information to customers concerning the Virginia Office of Energy and Emergency Services participated in 2 trade shows promoting energy conservation, and provided speakers to civic and community functions. The Company has not quantified the savings related to these activities.

The Company offers an interruptible rate schedule.

3. COMMONWEALTH PUBLIC SERVICE CORPORATION

Commonwealth Public Service does not routinely offer energy audits; however, the Company will visit a customer's home or business to make recommendations on ways to conserve gas including insulation, storm windows, etc.

The Company will also, upon request, check and adjust a customer's furnace and will advise the customer of any problem that could cause excess consumption and what repairs should be made.

The Company offers interruptible rates to Commercial and Industrial Customers who install stand-by firing capabilities.

4. LYNCHBURG GAS COMPANY

The Company promotes conservation by providing information on saving energy in its limited advertising program which includes newspapers, television and radio.

Yearly, the Company mails a safety notice to its customers which also includes information on conservation techniques.

This year, the Company worked with a local service agency to provide information on conservation methods which Service Agency is using to assist its clients.

5. ROANOKE GAS COMPANY

The Company implemented a Residential Energy Management Program in 1978. This program was set up to provide energy audits for residential customers to help them conserve gas and ultimately reduce bills. As of July 1982, 302 audits had been completed. When the program was initiated, bill stuffers and a packet of energy conservation information and educational material were distributed to all customers.

In the summer of 1982 the Company made an aggressive effort to encourage the adoption of conservation measures by individuals in the lower income segment of its residential customer base. Nine hundred personalized letters were mailed seeking appointments to schedule a visit to the customer's home to make an energy counseling inspection. The result of this effort was the inspection of 177 homes.

The program was expanded to include middle income, younger families during the period August 1982 thru April 1983. During this period, 4905 letters were mailed to selected customers encouraging them to have an energy audit performed. The Company received 383 requests for audits were received. Due to the poor response (less than 10%) the audits will continue to be offered under the old program without aggressive action by the Company.

6. SHENANDOAH GAS COMPANY

The Company has no formal conservation program. When requested, the Company assists its customers with advice and recommendations on insulation, weatherization and the use of more fuel efficient gas heating equipment.

In addition, the Company makes periodic mailings to its customers advising of various conservation measures that can be undertaken. Interruptible rates are offered by the Company.

7. SOUTHWESTERN VIRGINIA GAS COMPANY

Southwestern Virginia Gas Company does not have a formal conservation program. They have encouraged their customers, through bill stuffers, to lower thermostat settings and are preparing to mail out information on the automatic set-back thermostat.

The Company offers interruptible rates.

8. SUFFOLK GAS CORPORATION

The Company provides conservation information through newspaper advertisments on energy saving appliances and equipment. The Company plans to make available to its customers booklets on home improvements and other ideas to conserve energy.

9. TENNESSEE-VIRGINIA ENERGY CORPORATION

Although the Company has no formal conservation program, it does offer advice and information to its customers regarding the efficient utilization of gas appliances, home energy conservation methods, insulation, and heating efficient equipment.

10. UNITED CITIES GAS COMPANY

The Company makes available to its customers booklets and brochures on conservation including proper insulation, weather stripping, etc.

United Cities Gas offers management personnel as speakers for various civic and community groups to provide information on the efficient use of energy and new energy saving concepts and ideas.

The Company consults with its Commercial and Industrial customers on a continuing basis on ways to use gas more efficiently in their operations.

The Company promotes set-back temperature control devices, high efficient energy appliances and sectionalized heating units.

The Company promotes the conversion of non-gas heating equipment to gas heating equipment which the Company considers to be more efficient and economical to operate than non-gas heating equipment.

11. VIRGINIA NATURAL GAS COMPANY (VNG)

Virginia Natural Gas Company is a division of the Virginia Electric and Power Company. The Company offers residential energy audits to its customers as does Vepco. A discussion of the Vepco Residential Energy Audit Program is contained in this report under Virginia Electric and Power Company. Of the 3297 audits performed in Virginia, 507 were customers whose primary energy source for heating was gas.

Virginia Natural Gas Company is currently studying various conservation methods and programs it hopes to initiate in the near future. The Company has since 1982 encouraged builders to install high efficiency gas equipment and in 1983 began participating in cooperative advertising efforts with builders. In August 1983, VNG sponsored the installation of modern high efficiency gas space and water heaters and appliances in several homes in Tidewater Builders Associations Homerama, a showcase for modern concepts in new home construction. Due to the success of this effort a similar one is scheduled for the Peninsula Parade of Homes for this Fall.

The Company provides interruptible rates for commercial and industrial customers and has actively pursued programs to convert oil users to natural gas. For 1983 thus far, the Company estimates that 5,000 barrels of oil have been displaced on an annual basis.

12. WASHINGTON GAS LIGHT COMPANY

a. Information

The Company actively promotes conservation by making available conservation related information to its customers. In the fall of 1981, the Company opened an Energy Aid Center in the lobby of its Washington Office. The Center features exhibits, videotapes and literature on heating, water heating, insulation, caulking and weatherstripping. A representative of the Company is present at the center and counsels consumers. The center is now publicized through the media, community contacts, and flyers. When it opened, it received major T.V., radio and newspaper coverage. Over 6,000 people a month visit the Center. Approximately 10% are from Virginia.

Washington Gas Light provides literature, audiovisual presentations and educational information to consumers and educators relative to conservation. Six of the last twelve bill inserts sent to customers included conservation messages. The Company sent a catalogue of available educational materials for classroom use to 10,000 educators in its service area.

The Company's news media relations office periodically issues press releases on matters concerning conservation. A number of the Company's news media staff members have made guest appearances on radio and television to discuss conservation topics.

The Company's volunteer employee speakers present programs to community groups and agencies on conservation topics. The Company also offers workshops to provide conservation information to members of organizations such as: The Arlington Chapter of the American Red Cross; Virginia Office of Consumer Affairs; and the Fairfax Department of Social Service.

In response to local community requests, the Company has initiated a Community Energy Grants program. Grants and technical assistance are being provided to four community based organizations in Northern Virginia to implement conservation education programs.

b. Cooperative Advertising

Washington Gas Light sponsors cooperative advertising for qualified gas contractors. Many of the ads promote high efficiency gas equipment. Over 200 dealers participate in the Company's Qualified Gas Contractor Program. Customers may finance their purchases over five years and make payments through payment of their gas bills.

c. Energy Conservation Systems

Energy Conservation Systems is a non-utility operation of Washigton Gas Light Company which sells and installs energy conservation products such as: insulation, thermal windows and doors, thermal wall systems, thermal roof and ventilation systems. Current gas customers may receive financing for up to seven years and make payments on their gas bills. Non-gas customers are also offered financing and are billed separately.

d. Interruptible Service

The Company provides interruptible service to large commercial and industrial users. Many of these customers have the capability to switch to alternate fuels during interruptions in gas service.

PROGRAM CATAGORIES SUMMARY

Among the 31* gas and electric utilities, the distribution of conservation programs is as follows. The numbers in parentheses after the category are the number of participating utilities by type: E = electric, G = gas.

Customer Information (31)

All of the utilities provide consumer energy conservation information to their customers. This information is provided in the form of flyers, bill inserts, pamphlets and brochures available on request. The information available ranges from such basic information as how to read the meter to information on new conservation techniques such as passive space and water heating and solar homes.

Most of the utilities will provide upon request speeches for community organizations, civic organizations and schools to discuss the need for energy conservation and to address approaches which may be taken by the consumer to conserve energy.

Energy Audits - Residential (17-E, 3-G)

The 20 companies which provide residential energy audits did not uniformly retain actual data concerning the number of audits performed. It is difficult to determine the depth of penetration of this conservation aid in the residential group. The audit merely provides information and there are no formal follow-ups to determine the use of the conservation methods recommended. The actual energy conservation accomplished through this service cannot be adequately measured at this time.

The efforts of one utility in aggressively pursuing the use of energy audits through direct contact and appointment scheduling was somewhat successful in lower income/older family homes. The higher income group generally resisted what was seen as utility intrusion into personal lifestyles.

Energy Audits - Commercial & Industrial (8-E, 1-G)

These audits, like those for residential consumers, provide information. The effect on energy consumption as a result of this effort cannot be measured at present.

Direct Load Control (6-E)

The use of direct load control for space heating air-conditioning and water heating has proved effective as a means of peak load reduction for four electric cooperatives and two electric generating companies. A third electric generating

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* Eastern Shore Gas Company is a propane company and was not included in the following summary.

company discontinued a direct load control test program after detailed analysis of the operational results showed that it was not cost beneficial to the company to use this method of energy conservation. Other Cooperatives are evaluating this program in view of reducing their demand peaks and thus the cost of purchased power to Cooperative members.

Weatherization and/or Equipment Financing (3-E, 2-G)

Residential Insulation financing by the utilities which use this conservation method has proved popular with their consumers. The electric utilities which offer these loans currently have 2641 such loans in effect. The utilities expect the consumer to experience total loan offset in about 2½ years due to reduction in energy costs.

Time-Of-Use Rates (4-E)

The Time-of-Use rates which are in effect are all related to direct control load management programs.

Seasonal Rates (5-E)

Seasonal rates are provided by three generating utilities and two Cooperatives to encourage reduction of electrical demand during summer months. The actual effect of these seasonal rates has not been quantified.

Interruptible Rates (1-E, 5-G)

The use of interruptible rates by electric utilities has not been as successful as their use by the gas utilities. The one electric utility that has an interruptible rate provides for a use curtailment rather than total shut-off of energy supply which is normal in the gas utility interruptible rates.

Most of the major electricity suppliers have at some time, had to request load/demand reduction on a voluntary basis from their consumers.

Cooperative Advertising (3-G)

The Cooperative advertising of both fuel and fuel-using equipment by suppliers of both is used by only two gas suppliers.

Add-On Heat Pump (5-E)

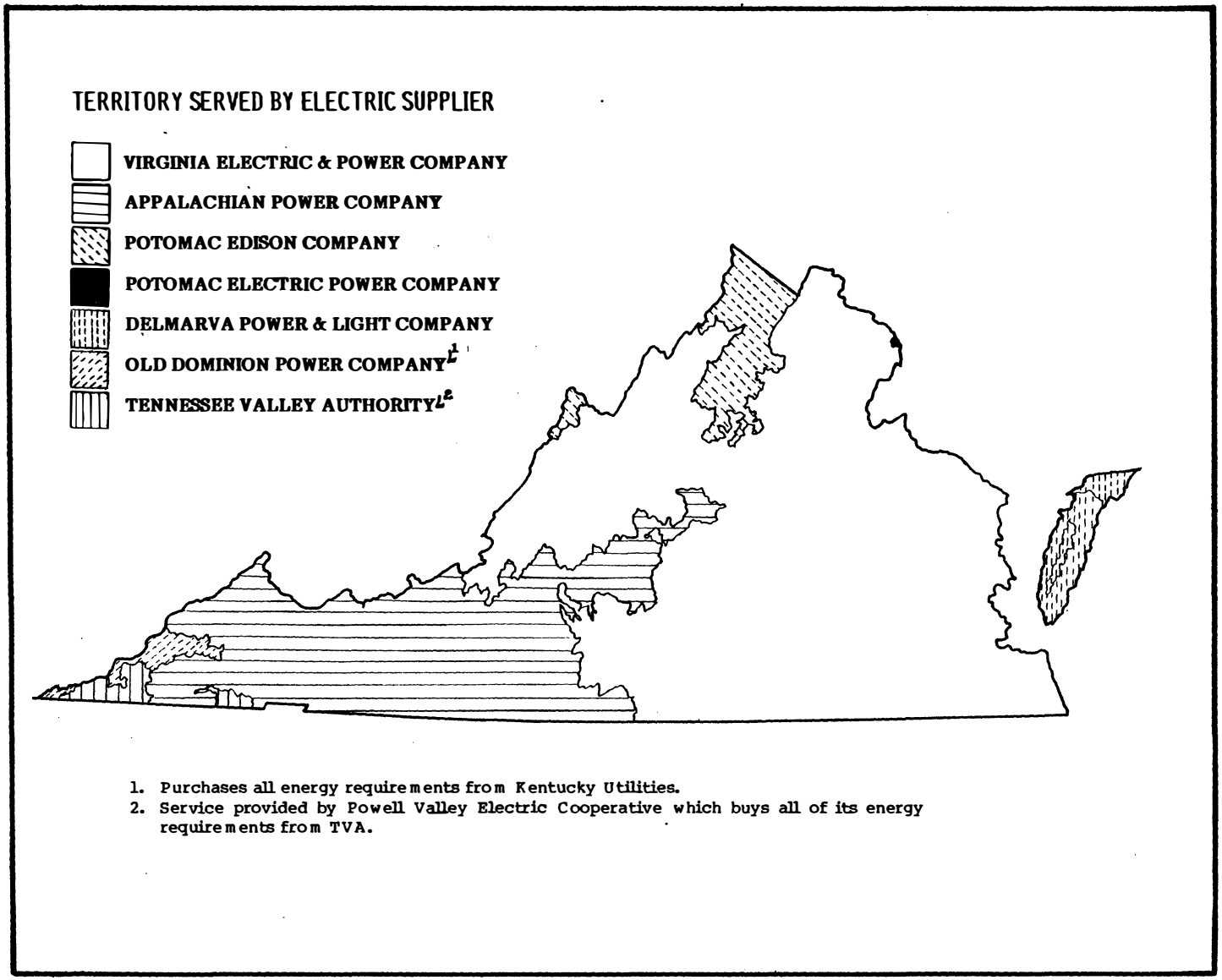
Add-on Heat Pumps are promoted by the electric utilities as a cost effective means of reducing overall energy costs when used in conjunction with fossil fuel furnaces. There is a problem when the fossil fuel furnace uses natural gas. Consumers in some areas of the state have found that after installing the more efficient add-on heat pump they may be subject to a monetary penalty from the gas supplier. This penalty is being considered because the gas retail supplier must bear the expense of contracting with his wholesale suppliers to provide capacity to meet

peak requirements on his system. It is possible that add-on heat pump consumers are contributing to the demand for gas during peak periods; but do not use their gas furnaces enough to provide the revenue to offset the retail gas company's capacity expenses.

Research Studies and Programs (5-E)

The studies currently underway in the three electric generating utilities and two electric cooperatives relate to reducing demand and/or smoothing peak loads through the reduction or shifting of demand and by increasing capabilities through alternate energy sources. Because the cost of constructing new capacity is high, the electric utilities are actively following and becoming involved in studies and tests of alternative energy sources including windmills, passive solar heating, battery storage devices, heat storage devices, and other new technologies.

APPENDIX


TERRITORY SERVED BY ELECTRIC SUPPLIER
VIRGINIA ELECTRIC & POWER COMPANY
APPALACHIAN POWER COMPANY
POTOMAC EDISON COMPANY
POTOMAC ELECTRIC POWER COMPANY
DELMARVA POWER & LIGHT COMPANY
OLD DOMINION POWER COMPANY[1]
TENNESSEE VALLEY AUTHORITY[2]
1. Purchases all energy requirements from Kentucky Utilities.
2. Service provided by Powell Valley Electric Cooperative which buys all of its energy requirements from TVA.

NATURAL GAS SERVICE AREAS IN VIRGINIA

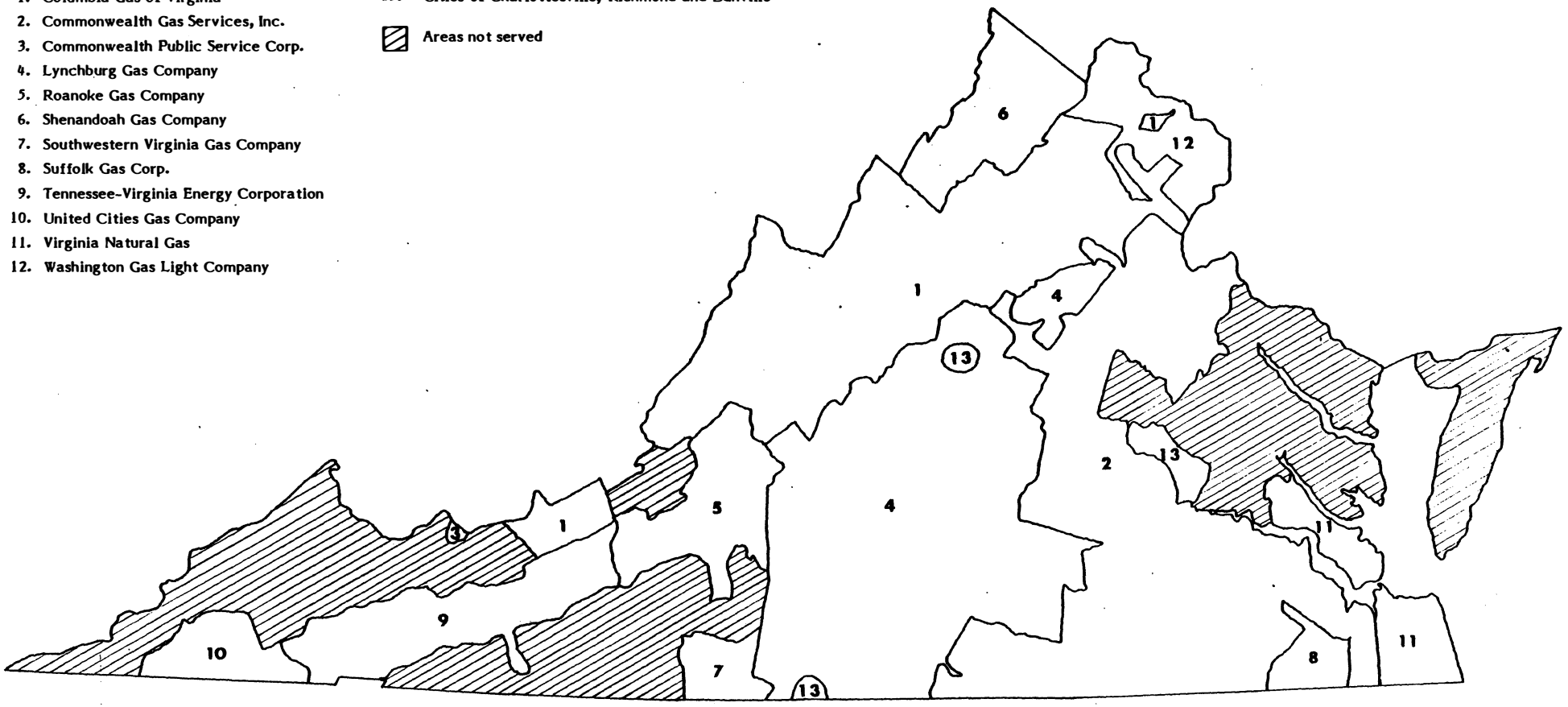
Certificated Companies:

1. Columbia Gas of Virginia
2. Commonwealth Gas Services, Inc.
3. Commonwealth Public Service Corp.
4. Lynchburg Gas Company
5. Roanoke Gas Company
6. Shenandoah Gas Company
7. Southwestern Virginia Gas Company
8. Suffolk Gas Corp.
9. Tennessee-Virginia Energy Corporation
10. United Cities Gas Company
11. Virginia Natural Gas
12. Washington Gas Light Company

Municipal Systems:

13. Cities of Charlottesville, Richmond and Danville

Areas not served



STATISTICAL SUMMARY OF ELECTRIC & GAS UTILITIES 1982

UTILITIES	RESIDENTIAL			COMM. & INDUSTRIAL			PUBLIC ST. & HWY. LIGHTING			OTHER PUBLIC AUTH.			TOTAL[1]		
	No. of Customers	MWH or MCF Sold	Cost ¢/kWh or ¢/CCF	No. of Customers	MWH or MCF Sold	Cost ¢/kWh or ¢/CCF	No. of Customers	MWH Sold	Cost ¢/kWh	No. of Customers	MWH or MCF Sold	Cost ¢/kWH or ¢/CCF	No. of Customers	MWH or MCF Sold	Cost ¢/kWh or ¢/CCF
I. ELECTRIC															
A. Privately Owned Companies															
Appalachian Power	320,564	3,464,095	5.6	35,704	5,302,399	4.6	671	32,444	5.3	3089	362,866	5.2	360,035	10,563,675	4.8
Delmarva Power	13,110	82,079	9.5	2,041	110,128	7.5	38	1,305	12.2	0	0	0	15,190	299,080	7.3
Old Dominion Power	22,022	283,643	5.0	2,792	322,369	4.9	15	2,500	3.6	414	31,523	3.2	25,243	640,035	4.9
Potomac Edison	48,048	488,607	5.9	7,604	598,891	4.8	43	3,769	10.6	0	0	0	55,698	1,172,638	5.2
Potomac Electric Power	2,516	8,789	8.2	554	419,717	5.8	9	1,561	8.6	2	20,095	6.1	3,081	450,162	5.9
Virginia Electric&Power	1,164,338	12,506,071	6.7	113,327	15,666,446	5.4	878	176,662	10.0	15,431	4,872,067	4.4	1,293,996	36,775,575	5.6
B. Consumer Owned Companies															
A & N	7,461	49,899	8.7	390	46,314	6.6	7	321	9.5	0	0	0	7,970	97,354	7.7
B-A-R-C	7,735	58,458	6.7	432	21,118	5.6	0	0	0	0	0	0	8,167	79,576	6.4
Central Virginia	16,312	152,903	6.1	749	70,649	6.1	0	0	0	56	167	8.3	17,117	223,718	6.1
Community	5,709	66,109	6.8	1,028	12,779	6.3	5	78	13.2	10	1,247	5.3	6,752	80,212	6.2
Craig-Botetourt	4,028	29,164	7.1	121	3,307	7.1	0	0	0	74	305	7.7	4,223	32,776	7.1
Mecklenburg	19,955	165,775	6.0	1,080	45,762	5.7	0	0	0	411	7,129	5.6	21,446	218,666	5.9
Northern Neck	9,830	80,111	7.1	611	14,017	7.2	11	13	10.7	78	935	7.0	10,530	95,076	7.1
Powell Valley	5,584	55,864	5.6	333	19,601	6.1	0	0	0	1	2,729	4.5	5,917	78,194	5.7
Prince George	4,791	56,937	6.4	487	8,708	6.5	0	0	0	0	0	0	5,278	66,387	6.4
Prince William	33,285	435,879	6.3	1,566	186,420	6.5	25	585	10.6	0	0	0	34,875	622,884	6.4
Rappahannock	36,937	382,799	6.7	2,246	658,423	4.2	0	0	0	779	11,599	6.5	39,962	1,052,861	5.1
Shenandoah Valley	18,181	185,390	6.1	1,664	71,075	5.4	0	0	0	0	0	0	19,845	256,466	5.9
Southside	27,712	269,071	6.6	749	55,665	5.4	0	0	0	353	6,101	5.9	28,814	330,838	6.4
Tri-County	4,206	49,324	7.5	79	19,193	5.8	1	91	9.7	0	0	0	4,105	68,609	7.0
II. GAS															
Columbia	34,757	3,673,227	51.2	4,458	10,788,083	46.4	0	0	0	0	0	0	39,215	14,461,310	47.6
Commonwealth Gas Serv.	46,831	4,091,144	58.4	3,963	7,467,038	49.6	0	0	0	1	527,510	46.1	50,795	12,085,692	52.4
Commonwealth Public Serv.	559	58,887	58.1	84	106,958	52.6	0	0	0	0	0	0	643	165,845	54.3
Lynchburg Gas	8,585	910,280	54.8	1,116	4,117,213	46.9	0	0	0	0	0	0	9,701	5,027,493	48.3
Roanoke Gas	26,609	3,367,029	56.5	2,633	3,878,794	47.5	0	0	0	0	0	0	32,242	7,245,821	51.7
Shenandoah Gas	2,865	278,192	60.4	701	1,721,485	51.9	0	0	0	0	0	0	3,566	1,957,402	53.0
Southwestern Gas	2,464	213,167	54.4	632	1,601,380	44.2	0	0	0	0	0	0	3,096	1,814,549	45.4
Suffolk Gas	1,680	134,450	61.3	292	415,711	55.2	0	0	0	0	0	0	1,972	550,161	56.7
Tennessee-Virginia	4,843	481,870	48.5	1,525	3,577,561	44.8	0	0	0	194	335,572	45.0	6,562	4,395,003	45.2
United Cities Gas	946	114,476	49.5	398	720,462	45.5	0	0	0	0	0	0	1,537	858,897	46.1
Virginia Natural Gas	111,555	7,901,638	62.5	9,248	10,907,849	51.1	0	0	0	0	0	0	120,803	18,809,487	55.9
Washington Gas Light	164,205	172,173,204	61.4	12,426	141,705,566	55.3	0	0	0	0	0	0	176,631	315,244,263	59.4

1. The totals in this column for Appalachian Power, Delmarva Power, Potomac Edison and Virginia Electric & Power include the number of customers and the megawatt-hour sales of the Resale Class.

VIRGINIA ELECTRIC UTILITIES

AVERAGE COST OF FUEL BURNED PER KWH (SALES)
(Va. Jurisdictional)

Company	1980 (¢/kWh)	1981 (¢/kWh)	1982 (¢/kWh)
Virginia Electric and Power	2.36	2.07	1.82
Appalachian Power	1.58	1.82	1.97
The Potomac Edison	1.38	1.53	1.65
Potomac Electric Power	1.88	2.37	2.27
Delmarva Power and Light	2.87	2.49	2.12

Note:

- Equation for calculations

$$\text{Average Cost of Fuel Burned per kWh Sale} = \frac{\text{Va. Jurisdictional Fuel Expenses}}{\text{Va. Jurisdictional Sales}}$$

- Data for calculations was obtained from Company's Fuel Hearing Reports.

VIRGINIA ELECTRIC UTILITIES

AVERAGE COST OF FUEL BURNED PER KWH (Net. Gen)
BY FUEL TYPE

TWELVE MONTHS ENDED 3-31-1983

Company	Nuclear (¢/kWh)	Coal (¢/kWh)	Heavy Oil (¢/kWh)	Light Oil (¢/kWh)	Natural Gas Steam[1] (¢/kWh)	Natural Gas C.T.[2] (¢/kWh)
Virginia Electric and Power	0.60	1.86	5.35	12.75*	4.97	7.74
Appalachian Power	---	1.93	---	---	---	---
The Potomac Edison	---	1.63	---	---	---	---
Potomac Electric	---	1.99	4.72	6.79	---	---
Delmarva Power and Light	0.71	2.29	4.98	7.26	4.41	---

Note:

1. Natural gas burned in fossil plants.

2. Natural gas burned in Combustion Turbines (C. T.'s)

- Equation for Calculation:

$$\text{Ave. Cost of Fuel Burned per kWh (net gen.) by Fuel Type} = \frac{\text{Fuel Expenses by Fuel Type}}{\text{Net Generation by Fuel Type}}$$

- Data for calculations was obtained from Company's Fuel Hearing Reports.

* Based solely on Light Oil used for combustion turbine generation.