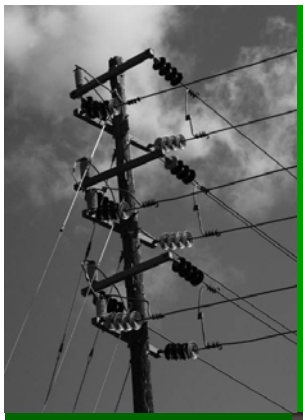
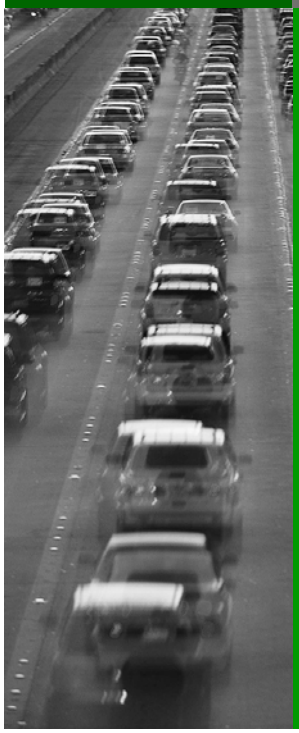


POWERED BY ENERGY EFFICIENCY— FUELED BY ENERGY CONSERVATION

COG 2006 Energy Strategic Plan

[Full Report]



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APPENDICES

EXECUTIVE SUMMARY: REDUCING ENERGY DEPENDENCE IN THE NEW ENERGY ERA

As the leadership of the Metropolitan Washington Council of Governments (MWCOG) plans for the Region's energy future in the "New Energy Era" which is defined by rising global demand, tight global energy supplies, and high global energy prices -- the proposed goals for the Region are as follows:

- To Reduce Energy Dependence for:
    - Sustained Economic Growth
    - Enhanced Energy Affordability
    - Increased Energy Security & Stability
    - Improved Environmental Quality

These regional goals can be met:

- By developing policies and adopting best practices that significantly increase the energy efficiency of:
    - Vehicles
    - Appliances
    - Buildings
- By diversifying the Region's energy sources to include an increased use of "green energy" and renewables; and
- By raising awareness of energy users so that they can make wise energy choices by creating a "culture of conservation".

While most of the recommendations in this Regional Plan focus on "demand" – Vehicles, Appliances, Buildings and Behavior, the Region can begin to influence "supply" by actively promoting the purchase of "green power" and the shift to alternative fuels where possible.

1. Transition to a New Energy Era: Recommendations

Recommendation 1.1	Develop a data and information collection and analysis system that will provide an understanding of the energy, economic, and social implications for the MWCOG Region.
Recommendation 1.2	Insure that existing polices related to the energy efficiency of vehicles, appliances, and buildings meet or exceed federal standards.
Recommendation 1.3	Coordinate state and local energy education programs to insure that a regional message is developed as well as the state and local messages.
Recommendation 1.4	Adopt a set of goals, objectives and best practices that will promote energy independence for the MWCOG Region.

2. Regional Energy Policy & Planning: Recommendations

Recommendation 2.1	Develop specific targets for the Region to reduce energy consumption and reduce energy dependence.
Recommendation 2.2	Review and update the "Metropolitan Washington Gas Supply Emergency Alert Plan" July 1985 (Review Completed January 1988) and the "Metropolitan Washington Power Emergency Alert Plan" July 1985 (Revised February 1988).
Recommendation 2.3	Review and update the "Washington Metropolitan Area Tri-State Energy Emergency Coordination Agreement" dated March 21, 1979.
Recommendation 2.4	Compile a list of performance contracts used by MWCOG jurisdictions and share best practices.
Recommendation 2.5	Compile a list of aggregation agreements used by MWCOG jurisdictions and other groups in the Region and share best practices.

Recommendation 2.6	Monitor the regulations of the Energy Policy Act of 2005 to maximize the benefits of the Act to the Region.

3. Tri-State Energy Trends: Recommendations

Recommendation 3.1	Develop targets to reduce the rate of growth in the consumption of non-renewable energy, while continuing desired rates of economic growth as measured by rates of growth of population and employment.
Recommendation 3.2	Set a regional goal to increase the share of regional energy provided from alternative and renewable resources.
Recommendation 3.3	Monitor the regulations of the Energy Policy Act of 2005 to maximize the benefits of the Act for the Region.

4. Motor Fuel Trends: Recommendations

Recommendation 4.1	To reduce the growth in motor fuel consumed while simultaneously reviewing the economic and environmental impacts of:
	a. Higher gasoline prices.
	b. Increased education to remind drivers to approach the use of their vehicles more wisely.
	c. Continued promotion of the use of public transportation.
	d. Increased average miles per gallon of cars and trucks.
	e. A change in the way motor fuels are taxed.

5. Household Fuel Trends: Recommendations

Recommendation 5.1	Develop a data collection framework to provide current data on household energy consumption, expenditures and prices.
Recommendation 5.2	Increase promotion of options and incentives that residential consumers have in making housing and appliance energy choices.

Recommendation 5.3	Develop a monitoring system to assess the direct and indirect effects of high energy prices for households.

6. Regional Energy Data Approach to Policymaking: Recommendations

Recommendation 6.1	Institute a process that will allow the Region to monitor its energy prices, consumption and expenditure data as a basis for regional energy planning to reduce energy dependency on non-renewable resources and strengthening the competitiveness of the regional economy.
Recommendation 6.2	Develop a region-wide monitoring system that addresses how the Region is adjusting to the new energy era. This monitoring system would:
	a. Identify policy gaps that might exist and suggest policies that might need to be developed to adjust the transition process. b. Assess and guide the economic and social adjustment processes that households, businesses, and governments will have to make in this era of relatively expensive energy.
Recommendation 6.3	Create a working group among energy suppliers to develop at the regional level a system of reporting similar to the system used by the Energy Information Agency. Such a system would be region-specific and updated frequently.
Recommendation 6.4	Develop an executive level scorecard for MWCOG that keeps policymakers apprised at how the Region is managing in the new energy era.

7. Best Practices: Recommendations

Recommendation 7.1	Implement at the regional level best practices in energy efficiency and conservation.

Table ES-1 Appliances: Best Management Practices
Energy Efficient Appliances
Best Management Practices in Promoting Energy Efficient Appliances: 1. Set regional energy efficiency standards for appliances at or above federal standards 2. Advocate for increased appliance energy efficiency standards 3. Promote "Energy Star" appliances 4. Provide incentives to purchase energy efficient appliances

Table ES-2 Vehicles: Best Management Practices
Energy Efficient Vehicles Best Management Practices
Best Management Practices in Promoting Energy Efficient Vehicles: 1. Advocate for increased automobile fuel efficiency standards 2. Promote the purchase & use of energy efficient vehicles 3. Promote government purchase of energy efficient vehicles 4. Provide incentives to purchase energy efficient appliances

Table ES-3 Buildings: Best Management Practices
Non-Residential Sector: Building Best Management Practices
Best Management Practices in Promoting Energy Efficient Buildings: 1. Insure that building and conservations codes reflect the latest advancements in building energy efficiency 2. Promote & adopt LEED standards for renovation and new construction 3. Promote incentives for business and households to use the most energy efficient buildings and practices when renovating or building new

Table ES-4 Energy Behavior: Best Management Practices
Best Management Practices in Promoting Wise Energy Choices: 1. Promote a "culture of conservation" through energy awareness programs and messages 2. Reassess energy taxes to insure they are promoting wise energy choice

Table ES-5 Energy Sources: Best Management Practices
Best Management Practices in Promoting a Variety of Energy Sources: 1. Use fuel purchasing agreements to access "Green" energy 2. Adopt a "Solar Roof" goal for the Region 3. Promote the expansion of co-generation of energy

8. Summary/List of Frameworks: Recommendations

Recommendation 8.1	Develop at the jurisdictional level systems for collecting and reporting energy consumption, expenditure and savings data.

For easy reference, section 8 of the report pulls together the various policy frameworks used throughout the report.

List of Frameworks

1. New Energy Era Defined
2. Multi-Prong Approach to Energy Efficiency & Conservation
3. Major Energy Challenges
4. Proposed Regional Energy Goals & Objectives
5. MWCOG Policy Framework
6. Gasoline Policy Discussion Framework
7. Range of Possible Effects of Rising Gasoline Prices
8. Heating/Cooling Fuel Policy Discussion Framework
9. Energy Information System Framework
10. Energy Transition Scorecard Outline Framework

1. TRANSITION TO A NEW ENERGY ERA

This section of the Regional Energy Plan provides the context on why as policymakers and consumers we need to intensify our focus on increasing energy efficiency and promoting energy conservation. Thus, with rising global demand, tight energy supplies, high energy prices, and the prospects of increasing costs to access traditional energy sources, policymakers should make energy efficiency and energy conservation a priority as we transition into a new energy era.

Findings & Recommendations

A New Energy Environment

1. The world has moved from an era of relatively adequate supply and low energy prices to an era of tight supplies and high energy prices.

Table 1.1: A New Energy Era Defined

A New Energy Era Defined	
Rising global demand	World demand for energy is growing at a rate of 2% per year.
Tight energy supplies	The large economies of the world are beginning to compete more openly to ensure energy is available to meet economic growth goals.
High energy prices	High and volatile energy prices are the result of the global demand-supply relationship, and high energy prices are necessary to expand energy supplies.
"Peak Oil Debate"	Worldwide discussion, debate and analysis is underway as to whether, the world will reach its highest capacity to produce oil starting 20 years from now. Evidence is being gathered to both prove and disprove whether the world is about to enter into a period of "peak oil". Regardless of how the debate is resolved, new sources of oil will require increasingly expensive investments and thus higher prices to sustain those

	investments.

2. Today's energy consumptions levels and patterns were shaped in the previous era. It will take time to adjust those patterns because of the difficulty in shifting the demand for energy in the short run.

3. Given the low responsiveness of the demand for energy to increased prices, the effect of rising energy prices will show up first in non-direct energy consumption. For example, to get help from the market in reducing gasoline consumption could require a level of energy prices that may adversely affect the whole regional economy.

4. The natural slowness of the adjustment process creates many of the hardships associated with the transition to a new energy era. This adjustment process needs to be monitored and guided in order to mitigate its effect.

Recommendation: 1.1	Develop a data and information collection and analysis system that will provide an understanding of the energy economic and social implications for the MWCOG region.

Findings: Vehicles, Appliances, Buildings, and Behavior

5. Whether the major issue is one of price, demand, or supply, how the region manages its transition to the new energy era will require careful monitoring and creative policymaking. There will need to be a combination of the improvements in the efficiency of the vehicles we drive, the appliances we use, the buildings that we occupy (work, workshop, live, shop and relax and work out) along with improvements in our energy choices and behaviors.

Table 1.2: A Multi-Prong Approach to Energy Efficiency & Conservation

A Multi-Prong Approach to Energy Efficiency & Conservation		
Areas	**Importance in Energy Savings**	**Best Practices**
Fuel Efficiency Standards	Motor fuel comprises 61% of the petroleum consumed in the District; 54% of the petroleum consumed in Maryland; and 52% of the petroleum consumed in Virginia.	Fuel efficiency standards that meet or exceed the federal standards.
Appliance Efficiency Standards	The two biggest contributors to global warming are power plants and automobiles. Electricity comprises 61% of the energy needs of the District; 11% of Maryland, and 14% of Virginia. For the Tri-State Region, almost 26% of the region's energy comes from electricity.	Appliance Efficiency Standards that meet or exceed the federal standards.
Building Efficiency	In the United States, buildings account for: • 36% of total energy use; • 65% of electricity consumption; • 30% of greenhouse gas emissions; • 30% of raw materials use; • 30% of waste output; • 12% of potable water consumption. *Source: Vick, Robert, "A 'WHITE PAPER' Review Of GREEN BUILDING", Supply House Times, Oct 2005. (48)(8)*	Promote the use of LEED building and other Green Building practices.
Prices as a Conservation Incentive	Nationally, as the price of gasoline began to reach $3.00 a gallon and in many cases rise beyond that, there began to be some softening in demand, which suggests that high energy prices will promote energy conservation.	Explore proposals & recommendations to use tax policy to maintain energy prices at levels that encourage a reduction in demand.
Informed Energy Choices	Energy conservation leads to significant reductions in energy consumption.	Energy Education Programs that encourage consumers to make wise energy choices.

Recommendation 1.2	Insure that existing polices related to the energy efficiency of vehicles appliances and buildings meet or exceed federal standards.
Recommendation 1.3	Coordinate state and local energy education programs to insure that a regional message is developed in parallel with state and local messages to create a regional "culture of conservation".

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Findings: Evolution of a MWCOG Policy Framework

6. The entire MWCOG region has a policy framework in place that focuses on affecting energy behavior and choices, consumption levels/efficiency, types of energy/distribution, energy assistance, and emergency planning.

7. A key challenge facing policymakers is the combined direct and indirect effects of rising energy prices and tight energy supplies. Six actions are suggested as a comprehensive approach; they are the following:

    a. Sustaining economic development,
    b. Promoting energy security,
    c. Mitigating the effect of high energy prices on low and moderate income household,
    d. Maintaining a high level of quality public services,
    e. Continuing to promote improvements in air and water quality, and
    f. Guiding decisions where housing and job are located to promote efficient and effective uses of energy.

    Table 1.3: Areas & Challenges

Areas	Challenges
Economic Development	To keep dollars from flowing away from other regional consumption and services into energy and flowing out of the regional economy into the international economy
Energy Security	To reduce the effects of potential supply disruptions
Emergency Planning	To enhance "homeland security"
Economic Assistance	To assist low and moderate income households
Provision of Public Services	To maintain public service delivery while energy costs are rising and energy tax revenues may be falling
Environmental Quality	To improve the environment
Locational Decisions	To promote living and working locations and activity that are energy efficient; “Smart Growth”

8. With the transition to the new energy era, which has been defined by price inelastic energy consumption, relatively high energy prices and relatively tight energy supplies, policymakers are getting a crash course in market economics. The challenge is to shape responses in order to help transition towards a new energy era.

Regional Energy Goals and Objectives **Proposed Energy Goal**
Reducing Energy Dependence for
o Sustained Economic Growth o Enhanced Energy Affordability o Increased Energy Security & Stability o Improved Environmental Quality
Proposed Regional Energy Policy: Economic Objectives
o Insure adequate and reliable energy supply to support the region's economic growth and development o Minimize outflow of dollars from region's economy o Assist low and moderate income household to cope with the high cost of energy o Maintain public service delivery in an era of rising energy prices o Seek opportunities for aggregation of energy purchases o Support policies that result in cost-effective energy efficiency standards
Illustrative Policies/Best Practices to Support Economic Objectives
o Develop Tax and other incentives o Promote the adoption of appliance standards o Update Building Energy Efficiency Standards o Improve energy efficiency in Government Buildings o Expand state and local funds for Low Income Home Energy Assistance o Support Cost-Savings Through Aggregate Energy Purchases
Proposed Regional Energy Policy: Environmental Objectives
o Support implementation of energy technologies that are environmentally sound o Promote development and implementation of renewable energy sources o Promote development and implementation of alternatively, clean fueled vehicles o Promote and implement energy conservation practices to reduce energy consumption and limit environmental impacts of energy production and use

Regional Energy Goals and Objectives **Proposed Energy Goal** **CONTINUED**	
Illustrative Policies/Best Practices to Support Environmental Objectives	
o Publicize tax & non-tax incentives for hybrid fuel vehicles and other alternative fuel vehicles o Adopt at the regional level the state level mandates for the purchase of AFV's o Expand the purchase of renewable (green) energy through aggregation agreements o Expand regional wind energy purchase agreement o Incorporate ENERGY STAR equipment into COG's cooperative purchasing program o Encourage a regional agreement for LEED Standard for SIP credit	
Proposed Regional Energy Policy: Security and Stability Objectives	
o Protect critical and vital energy resources o Reduce dependence on foreign sources of oil/petroleum products o Reduce potential impacts of energy supply	
Illustrative Policies/Best Practices to Support Energy Security Objectives	
o Implement and regularly exercise and test regional emergency plans to mitigate the impacts of energy supply disruptions o Promote redundancy and reliability improvements in the region's energy infrastructure o Support diversification of regional energy portfolio o Reduce potential impacts of energy supply disruptions o Ensure the coordination among groups involved in energy emergency planning and preparedness	
Recommendation: 1-4	Adopt a set of goals, objectives and best practices that will promote energy independence for the MWCOG region.

Transition to a New Energy Era: Discussion

The New Energy Era

As recent energy news highlights, the Washington DC Metropolitan Region, like all regions around the world has entered a new energy era – an era defined by high energy prices, rising global demand, and tight energy supplies. Whether the major issue is one of price, demand, or supply, how the region manages its transition, the new energy era will require a lot of monitoring and creative policymaking.

If the region is not able to achieve significant improvements in energy efficiency and reductions in energy consumption, increasing portions of the region's spending will go towards energy and increasing amounts of money will flow out of the region. Ultimately, this will reduce the region's ability to continue its rate of growth.

While energy consumption is a smaller component of economic activity than it was 25 years ago, for almost 25 years, improved energy efficiency and relatively low energy prices have structured locational decisions. Going forward policy making regarding energy for living, working and governing is as crucial as it was 25 years ago. Today's consumption levels and patterns were established based on local, spending and investment decisions for the past 25 years when energy supplies were adequate and the cost of energy was relatively inexpensive and energy efficiency was improving compared to today.

Yet, there are several things that will worry policymakers as the region moves into this new energy era – ***sustaining economic development, promoting energy security, mitigating the effect of high energy prices on low and moderate income households, maintaining a high level of quality public services, continuing to promote improvements in air and water quality, and guiding decisions where housing and jobs are located to promote efficient and effective uses of energy***.

The basic policy framework focuses on the following ***(i) affecting energy behavior and choices, (ii) consumption levels and efficiency, (iii) types of energy and their distribution, (iv) energy assistance, and (v) emergency planning.***

Currently jurisdictions have laws, programs, and regulations that affect all these areas. And, the effects of these polices are evident in the energy efficiency and data. ***However, these gains were achieved in an era of relatively low and stable prices with relatively adequate supplies. These areas need to be viewed collectively to determine their adequacy in the new energy age.***

The Challenge: Transitioning to a New Energy Era

Currently, there is no sound methodologically in place to collect regional data on energy price, consumption, and expenditures for the Metropolitan Washington Council of Government's region. As a result, policymakers cannot assess the regional economic and social impacts of changes in energy prices, consumption, and expenditures for planning purposes.

Similar to other regions throughout the country, as MWCOG moves from an era of regulated and relatively inexpensive energy to an era in which energy is deregulated and relatively expensive, planners and policymakers are forced to grapple with the effects of these changes on the budgets of households, businesses and governments, and hence on regional economic activity.

For example, with increases in the prices of gasoline, we see households, businesses, and governments trying to adjust. Since there is a high price inelasticity of demand for gasoline, rapid price increases have not led to major reductions in miles driven. That suggests that non-gasoline consumption will go down. However, if we were to see significant reductions in gasoline consumption, then that will have an effect on the amount of tax revenue collected. This in turn, suggests that local governments could be faced with rising energy prices and declining revenues. Likewise, overall economic activity could be adversely affected.

The ability to assess and guide the economic and social adjustment processes that households, businesses, and governments must make in this era of relatively expensive energy, particularly in the area of transportation, will be a major challenge facing planners and policymakers.

The Nominal versus Real Price Conundrum

Current news articles highlight that, adjusted for inflation; today's price per gallon of gas (and energy prices in general) is still below the peak in 1981. This fact, while true, obscures the challenge of rising total expenditures on gasoline and the difficulty of people, governments, and businesses towards shifting to alternative-fueled forms of transportation.

1. For example, if the total miles driven are up and average miles per gallon are the same or higher, then total expenditures are up because people are driving more. Anecdotal reports suggest what really seems to motivate motorists is the cost of filling up a tank. Additionally, the cost of a fill up provides for an easier handle to register the effect of price increases. It is one thing to talk about $3.00 a gallon; and another to talk about $45.00 to fill up the gas tank. People have a real sense of what $45.00 will purchase compared to $3.00.

2. Also, having already made locational and consumption decisions, these decisions are hard for end users to reverse.

It is the natural slowness of the adjustment process that will create many of the hardships associated with this transition to a new energy era.

Direct Energy Consumption the Last Thing to Fall

Ironically, in the case of gasoline consumption, the last place we might see the effect of rising fuel prices will be in the reduction of miles driven, meaning that the effects of increases in the price of gasoline will appear elsewhere in the economy first.

Understanding how non-gasoline discretionary spending changes will be important for planners and policymakers.

Price Inelasticity: The High Costs of Adjustment

Until recently, one conclusion drawn from the data relating to the increase in gasoline price is that rising gasoline prices while, widely discussed, do not affect gasoline consumption. Therefore, the "market" and the "economy" appear to be managing price volatility well. And if the experience from other countries, like England, is indicative, gasoline prices may rise even higher before folks start to look seriously for alternatives.

In addition to behavior constraints, for individuals gasoline comprises only a small percentage of the total cost of operating a vehicle. For an example, a 100% increase in gasoline and motor oil prices may lead to just a 25% increase in the Total Cost of Operation (TCO). The question becomes what would someone have to spend in the form of new vehicle purchases to reduce his or her operating costs by 25%. Although the capital costs increase and the operating costs decrease it still may not be enough to offset the expenses of a new vehicle.

With the demand for gasoline being so price inelastic, it is going to take extremely high prices or something other than increased prices to change gasoline consumption patterns. If prices get to the point where they begin to reduce driving, then the whole regional economy will have some big challenges, with driving being among the least of its problems.

To get help from the market in reducing gasoline consumption will require a level of energy prices that may adversely affect the entire regional economy.

Energy and the Environment

One beneficial effect of the new energy area is the impact it could have on the environment. If increased prices leads to major reductions in energy consumed (for gasoline in particular), the impact will be an improvement in environmental quality since the generation of energy and gasoline-consumed are major contributors to the region's poor (albeit improving) air quality.

Regional Economic Competitiveness Effects

As a country, a region, and individuals, we seem to be stuck in a pattern of energy consumption that leaves us unnecessarily exposed to energy market and political forces. According to the "globalization" thesis "while the U.S. became focused on terrorism, the whole nature of globalization changed for both the terrorists and those fighting terrorism. And, the real threat to the Untied States is economic globalization, not terrorism. The way the United States, as a country, responds to globalization can both weaken the country's competitive advantage and feed the forces of terrorism". According to the "globalization thesis" the challenge is to increase energy and economic independence in an increasingly inter-related world.

Although the prices of energy in general and gasoline in particular have risen, the demand for energy has not fallen proportionally. Thus, the effect is the region currently is exporting more and more dollars from its economy. So, even if the regional economy seems to handle the price increases now, there may be some point at which a combination of a reduction in the consumption of substitute goods and the exporting of dollars begin to affect the rate of economic growth.

Ultimately, to enhance regional economic competitiveness will require continued increases in energy efficiency and overall reductions in energy consumption.

Rising Energy Prices & Supply

According to economic theory, rising energy prices will lead to an increase in the supply of energy. While rising prices may increase supply, such supply will require continued high prices to make the additional production profitable.

The real adjustment issue might not be a price adjustment, but an adjustment issue that relates to a "disruption" of supply.

"Peak Oil Debate"

There is an international debate regarding the rate at which the world's economies will run out of oil. One aspect of this debate is called the "Peak Oil Debate". According to one side of that debate, at some point the world will move beyond the halfway point using its oil reserves and production will have peak and then decline rapidly.

According to the U.S. Department of Energy,

> "Peak Oil is the simplest label for the problem of energy resource depletion, or more specifically, the peak in global oil production. Oil is a finite, non-renewable resource, one that has powered phenomenal economic and population growth over the last century and a half. The rate of oil 'production,' meaning extraction and refining (currently about 84 million barrels/day), has grown in most years over the last century, but once we go through the halfway point of all reserves, production becomes ever more likely to decline, hence 'peak'. Peak Oil means not 'running out of oil', but 'running out of cheap oil'. For societies leveraged on ever increasing amounts of cheap oil, the consequences may be dire. Without significant successful cultural reform, economic and social decline seems inevitable". http://www.energybulletin.net/primer.php (last visited March 28, 2006)

To emphasize the point that DOE makes -- Peak Oil means not 'running out of oil', but 'running out of cheap oil'. Although, technology advances will allow for additional sources of oil to be found, most likely the cost of finding and extracting the oil will intensify, resulting in higher energy prices needed to improve innovation and exploration.

Summary

The DC Metropolitan Region faces potentially adverse effects of worldwide changes in energy prices, demand, and supply which may negatively influence the regional economy as a whole. These effects will put strains on government, business and household budgets, forcing decision makers to choose how to increase energy efficiency, improve energy conservation, and manage rising energy prices. To the extent that positive, pro-active actions can be taken, the regional economy will be in an improved position to reduce the outflow of energy dollars from the regional economy, improve air quality, and to manage the transition to the new energy era.

2. ENERGY POLICY AND PLANNING IN THE REGION 1979-2005: FINDINGS, RECOMMENDATIONS & DISCUSSIONS

This section of the Regional Energy Plan outlines the energy policy, planning, and program framework that have evolved at the state level including the MWCOG level. As the information below illustrates, a policy framework exists at the federal, state, and jurisdictional levels. The challenge will be to become even more aggressive in shaping future efforts to improve energy efficiency and conservation.

Findings: Tri-State--Energy Policies & Plans

1. The basic MWCOG policy framework focuses on affecting energy behavior and choices, consumption levels and efficiency, types of energy and their distribution, energy assistance, and emergency planning.

   Table 2.1: Area & Policy Actions

Area	Policy Actions
Behavior	Guiding energy consumption choices
Consumption Levels	Reducing demand
Consumption Efficiency	Improving efficiency
Source Variety	Promoting a variety of sources and of distribution networks
Assistance	Mitigating the effect of high prices on low and moderate income households
Contingency Planning	Managing crises

   Compiled By: Jerome S. Paige & Associates

2. Currently, the Region already has policies in each of these areas (Federal, State and Jurisdictional levels). Although, these policies and programs have to be compiled by each jurisdiction and an assessment must be made to determine how the policies contribute to reaching the regional goal.

3. Past and existing energy policies and practices have made the Region increasingly energy efficient, but efforts need to be increased and coordinated through an overall policy framework that recognizes a multi-pronged approach.

4. These gains were achieved in an era of relatively adequate supplies accompanied by low and stable prices. These areas need to be viewed collectively to determine their adequacy in the new energy age.

5. Municipal aggregation programs are increasing throughout the Region; consistent with the recommendations of a 1997 report, these agreements have lead to an increase in renewable energy used throughout the Region.

6. The number of performance contracting programs continues to expand, which are in line with the recommendations of a 1997 report and these agreements are leading to increased energy savings in the Region.

7. While there are a number of efforts at the state and regional levels, the MWCOG Region does not have an explicit, aggressive energy efficiency goal to focus such efforts.

Recommendation: 2.1	Develop specific targets for the Region to reduce energy consumption and energy dependence.
Recommendation: 2.2	Review and update the "Metropolitan Washington Gas Supply Emergency Alert Plan" July 1985 (Review Completed January 1988) and the "Metropolitan Washington Power Emergency Alert Plan" July 1985 (Revised February 1988)
Recommendation: 2.3	Review and update the "Washington Metropolitan Area Tri-State Energy Emergency Coordination Agreement" dated March 21, 1979.
Recommendation: 2.5	Compile a list of aggregation agreements used by MWCOG jurisdictions and other groups in the Region and share best practices.

Findings: Federal Energy Policy Act 2005

The Energy Policy Act of 2005 provides tax credits to expand the supply of alternative and renewable resources.

Recommendation: 2.6	Monitor the regulations of the Energy Policy Act of 2005 to maximize the benefits of the Act to the Region.

Energy Policy and Planning In The Region 1979-2005: Discussion

The purpose of this section is to provide an overview of the energy policies and plans pursued by the Metropolitan Washington Council of Governments, the District of Columbia, Maryland, Virginia and selected local jurisdictions. As our overview suggests, the MWCOG area has the elements of a regional energy plan in place. However, as we will note, these policy and planning efforts could be enhanced by adopting a framework for regional energy data collection. Additionally, setting regional targets for the reduction in energy consumption may provide an entrée for greater energy sources.

MWCOG: Policies & Plans 1979-2004

Based on discussions with the staff of the Metropolitan Washington Council of Governments (MWCOG), several documents provided background for the current regional energy plan. Those documents included the following:

Table 2-2: Major Energy Related Policy & Planning Documents

TABLE 2-2 Major Energy Related Policy & Planning Documents Metropolitan Washington Council of Governments 1979-2004	
1979	"Washington Metropolitan Area Tri-State Energy Emergency Coordination Agreement" March 21, 1979
1979	"Metropolitan Washington, Energy Conservation and Management Plan", Approve May 16, 1979
1981	"Emergency Energy Conservation Act", Final Report, November 1981
1982	"Energy Consumption in Metropolitan Washington 1980; Findings Report" (August 1982), Metropolitan Washington Council of Governments. (REC 1980)
1988	"Metropolitan Washington Gas Supply Emergency Alert Plan" July 1985 (Review Completed January 1988)
1988	"Metropolitan Washington Power Emergency Alert Plan" July 1985 (Revised February 1988)
1997	"Strategic Energy Assessment; Metropolitan Council of Governments", R.W. Beck (October 1997) (RSEA 1997)
2004	"Regional Air Quality Plan", Metropolitan Washington Air Quality Plan,

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Washington Metropolitan Area Tri-State Energy Emergency Coordination Agreement March 21, 1979

A major goal of Washington Metropolitan Area Tri-State Energy Emergency Coordination Agreement is to achieve consistency throughout the Metropolitan Washington Area in energy conservation and resource management measures. The District of Columbia, Maryland, and Virginia entered into an energy emergency coordination agreement for several reasons:

1. Because shortages of energy supplies reaching the Washington metropolitan area require interstate coordination of conservation and contingency planning, the Agreement recognizes the Washington, D.C. Standard Metropolitan Statistical Area as a unified energy consuming and economic unit.

2. Because the local governments participating in the Metropolitan Washington Council of Governments (MWCOG) are coordinating their policies and programs in cooperation with the states and the District of Columbia, the Agreement ensures that compatible energy conservation emergency plans are formulated within the interstate metropolitan area; and

3. Because of the importance of consulting with local governments prior to actions being taken is recognized by all parties, and in order to achieve consistency of actions among the parties, the Agreement calls for the sharing of information among the affected jurisdictions and the dissemination of information to the public.

Energy Conservation and Management Plan, 1979

This plan was prepared by the local jurisdictions. It was designed to

1. Conserve energy resources commensurate with shortfalls reasonably anticipated under current and expected international petroleum developments, and to

2. Provide necessary levels of transportation services and related community assistance so that disruptions to lifestyles and the Region's economy will be minimized.

The Thirteen elements of the plan included:

Expanded Ridesharing

1. Expand formal ridesharing programs
2. Establish ridesharing "staging areas" and additional fringe parking areas
3. Promote combined home-based auto trips for non-work travel

Transit Related Activities

4. Provide for increased mass transit use by initiating Sunday Metrorail operation, building a fleet of reserve Metrobuses and preparing a bus deployment program
5. Increase supply and use of commuter rail and private bus service
6. Give preference to car/van pools at fringe parking lots

Work Related Activities

7. Encourage compliance with building temperature adjustment programs of federal and state governments
8. Expand use of staggered flex-time working hours where appropriate
9. Invoke commercial parking rates for government and private sector employees
10. Improve public sector energy efficiency through control over building and vehicle fleet operations

Community Assistance and Information Activities

11. Establish citizen information capability with respect to hours of service station operation
12. Promote consistent area-wide approach to motor fuel sales restrictions programs
13. Utilize state fuel "set-aside" programs to maintain essential governmental, transportation and community assistance services.

Regional Energy Consumption - 1980

The 1980 report provided estimates of energy consumption in several sectors:

1. Residential
2. Transportation
3. State and Local Government
4. Hospitals
5. Commercial/Industrial/Federal Sector
6. Steam and Electric Utilities.

This report contained seven key findings that related to:

1. Total energy consumption
2. The total, per household and per person, costs of energy
3. The value of lost purchasing power to Region due to energy purchases
4. The ranking of the primary fuels
5. The principal end use of energy
6. The comparison of the Washington Region's per household and per capita consumption to New York City and to the United States
7. The relative dependency of the Region on various types of fuel

The eight regions that were part of the 1980 study were the following:

1. District of Columbia
2. Montgomery County
3. Prince George's County
4. Arlington
5. Alexandria
6. Fairfax County
7. Loudoun County
8. Prince William.

Although, there were more than eight jurisdictions in MWCOG in 1980, this is not reflected by the 1980 report due to the methodology for reporting the data. For example, the Cities of Gaithersburg, Rockville, and Takoma Park are all accounted for in the Montgomery County total. In all, there were 16 jurisdictions in 1980. Currently, the MWCOG region includes 19 jurisdictions. Over the 26-year period since 1980, there has been significant growth in population, households, employment, geography and economic activity which further justifies a review in the energy policy, planning, and programs slated for MWCOG.

After the current consultants reviewed the methodology in the 1980 report and discussed it with analysts at the Energy Information Agency (EIA), it was determined that the methodology could not be replicated. The 1980 report can be credited with beginning a needed discussion of methodology that is now continued in this report. While the 1980 report was useful at the time, we explored an alternative methodology that will be discussed in another section of this report.

Emergency Energy Conservation Act, November 1981

The final report for this project provided recommendations to the Chief Executives of the District, Maryland, and Virginia to assist in coping with a motor fuel shortfall of 20 percent for six months in the Washington Area. These include:

1. Minimum Purchase & Odd-Even Gasoline Purchase Plan
2. Priority Gasoline Assistance for Vanpools
3. Flag System
4. Gasoline Assurance for Public Use Vehicles
5. Public Education Program, inclusive of:
    a. Staggered Retail Service Station Operating Hours
    b. Travel Advisory Services
    c. Trip Consolidation
    d. Telephone Hotlines
    e. Encouragement of Alternatives to Travel
    f. Voluntary Emergency Building Temperature Restrictions

6. Work Schedule Alteration
7. Mandatory Employer Ridesharing
8. Expansion of Computerized Ridesharing Programs
9. Utilization of Reserve Bus Fleet
10. Facilitate Bicycle Use
11. Reduced Public Vehicle Use
12. Enforce/Reduce Speed Limits
13. Compressed Work Week
14. Automobile Rapid Transit/Organize Vanpools from Staging Areas
15. Eliminate Barriers to Improved Transit Service.

Source: Beck, "Emergency Energy Conversation Act, November 1981

Regional Strategic Energy Assessment - 1997

In 1997, MWCOG commissioned a study looking at the strategic options for the Region pre-regulation and post-deregulation. The report focused primarily on electricity options and also contained an appendix that illustrated similarities for natural gas.

The report "Strategic Energy Assessment; Metropolitan Council of Governments" (October 1997) (RSEA 1997) defined opportunities for reducing energy costs needed to identify next steps and develop a strategy designed to position MWCOG for deregulation of the electric utility industry. The report presented the findings under two broad headings:

1. **Pre-Deregulation Review and Analysis**
   This report reviewed advantages and disadvantages, including risks associated with these options:

   1. Self-generation
   2. Merchant plant development
   3. Creation of municipal utility to serve the entire jurisdictional area of some or all of MWCOG Members
      a. Creation of a limited municipal utility ("mini-muni') to serve
         i. Members' facility loads only
         ii. Certain concentrated loads only
   4. Streetlight ownership only (Note: it is not necessary to own a municipal utility in order to own streetlights)
   5. Direct access options
   6. Negotiation or partnership with current providers.

2. **Post-Deregulation Review and Analysis**

      a. For MWCOG Members' municipal electric loads only
      b. For selected strategic loads of MWCOG members
      c. With MWCOG or its members bidding out load aggregation services;

d. With MWCOG and/or its members participating in a regional utility authority
e. With MWCOG and PJM Interconnection (www.pjm.com/indes.jsp)
f. With MWCOG and area Public Service Commissions or other regulatory bodies.

This report resulted in two major results; (i) the expansion in the number of performance contracting and (ii) municipal aggregation programs for the Region.

Energy performance contracting became the focus of the implementation of the Beck study recommendations. At that time, the project manager -- after consultation with a Chevron-Texaco consultant -- thought that aggregation would be too difficult to implement. So the consultant offered energy performance contracting instead. However, as reviewed above, individual jurisdictions did pursue municipal aggregation programs.

Performance Contracting

The MWCOG Energy Service Performance Contracting Program began in 2000. The program provides participating governments and organizations the opportunity to use a self-funding method of upgrading equipment and facilities that requires no initial capital outlay. The customer is guaranteed that the cost of energy efficient improvements will be paid from energy savings achieved. To date, ten partnerships have been explored, with five projects having been carried out. We believe that there is enormous potential for local governments to take much greater advantage of this program. For example, the District of Columbia's initial participation involved several projects. One project involves a detailed building audit of the facilities at 441 Fourth Street N.W. (One Judiciary Square), and then the design of a cost-effective energy conservation program using MWCOG's energy performance contract approach. The potential reduction in energy and operating expense could range from 15 to 30 percent of the existing utility bill.

Greening Initiatives

Over the years, MWCOG has endorsed and/or been involved in several other greening initiatives. Some are specific to energy savings while others are broader and more environmental focused. Below are selected initiatives:

- *Green Lights:* In 1993, the MWCOG Board passed a resolution joining the EPA Green Lights Program. At the time, the US EPA Green Lights Program was a voluntary program that encouraged the widespread use; of energy-efficient lighting. Green Lights participants realized an average return of 25 percent, with average savings in lighting electricity bills of 50 percent or more.

- *Energy Star:* In 2004, the MWCOG Board passed a resolution joining the Energy Star Program sponsored by DOE and EPA. Like Green Lights, Energy Star is a voluntary program jointly managed by the US Energy and Environmental

Protection Agency designed to help businesses, government agencies, and individuals protect the environment through superior energy efficiency.

- *Green Building:* The rapidly evolving "Green Building" approach to design and construction has provided real examples of how to implement positive environmental change.

- *Regional Agriculture and its Connection to Green Infrastructure:* Agricultural land is an integral part of green infrastructure. Farmland encompasses wetlands, meadows, pastureland, woodland and other wildlife habitat that supports native species, provides ecosystem services such as water filtration and carbon sequestration, and adds to human enjoyment of the countryside. Given that population growth projections will add an additional 2 million residents to the Region in the next 25 years, the challenge to local, state and regional planning agencies will be to help agriculture and other "green and open space" lands compete for their place in the changing landscape.

  This initiative seeks to provide information on the current and historical state of agriculture in the Washington Metropolitan Area, and to create a regional agriculture network to link farmers, consumers and policymakers. The basic information available includes gross statistics on agriculture, information about actions that can be taken to support local agriculture and database listings of local farmer's markets, pick-your-own farms and vineyards.

Homeland Security

The Post 9/11 focus on homeland security has highlighted the importance of the continuation of energy supply in the time of emergencies as well as protecting energy generation and distribution facilities. Prior to the creation of federal and local homeland security agencies, Energy Policy Advisory Committee (EPAC) promoted the need for state and regional energy plans, updating contingency and emergency planning, energy representation in jurisdictional emergency centers, inclusion of energy in the Federal Emergency Plan as a separate Emergency Support Function, the protection of critical assets and the inclusion of energy in the regional planning exercises.

State & Local Jurisdictions: Polices and Plans

According to information provided by staff, MWCOG has not completed a comprehensive energy consumption and expenditure assessment since 1982 and that report was based on 1980 data. For the past 26 years, MWCOG has not assessed the economic and/or social effects of energy prices, consumption and expenditures in the Region.

However, during the last two decades, state, county and city governments have put ongoing energy policies and programs in place. Looking back over the array of polices, programs, and recommendations, many are being practiced in one form or another.

TABLE 2.3: Table 2-3 Energy Policy & Planning Virginia, District of Columbia, Maryland

TABLE 2-3 Energy Policy & Planning Virginia, District of Columbia, Maryland	
2001	"The Virginia Energy Plan" December 2001
	Source: http://www.mme.state.va.us/de/chap2b.html
2002	"Comprehensive Energy Plan 2003-2007", DC Energy Office, DC Government, 2002. (CEP III)
	Source: http://www.dcenergy.org/
2003-2004	"2003 Annual Report", "2004 Annual Report, and "Energy Solutions for Local Governments" Maryland Energy Administration.
	Source: http://www.energy.state.md.us/

The EERE State Activities and Partnerships web site links to the Department of Energy's Office as it relates to Energy Efficiency and Renewable Energy (EERE) partnerships with and projects in the states. http://www.eere.energy.gov/states/

The Database of State Incentives for Renewable Energy (DSIRE) is a comprehensive source of information on state, local, utility, and selected federal incentives that promote renewable energy. http://www.dsireusa.org/

A combination of the websites from the states, the EERE State Activities & Partnerships web site, and the Database of State Incentives for Renewable Energy provide an array of energy efficiency plans, policies, and projects.

The Virginia Energy Plan

This plan is comprised of goals, objectives and strategies.

Table 2.4: Virginia Goals 1 & 2

Goal 1: Operate Virginia State Government as a Model of Energy Efficiency	
Objective 1.1.0	To reduce energy costs and consumption in state-owned facilities
Objective 1.2.0	To implement programs and procedures that ensure the efficient use of energy in state government operations
Objective 1.3.0	To increase energy efficiency and diversity in state government transportation
Goal 2: Ensure Sustainable Use of Energy in Virginia	
Objective 2.1.0	To encourage economic development by advance energy technologies and use of Virginia's indigenous energy resources
Objective 2.2.0	To implement energy efficiency projects that enhance environment and economic development
Objective 2.3.0	To increase energy efficiency and diversity of transportation in Virginia
Objective 2.5.0	To provide energy education and outreach to Virginians to increase their ability to make informed energy choices

The Virginia Department of Mines, Energy and Minerals provide a guide to energy programs in the State. The web address is http://www.mme.state.va.us/De/default.htm. See APPEN_2.A for a list of the energy programs for Virginia.

The U.S Department of Energy provides a guide to state energy programs. See http://www.eere.energy.gov/states/. See APPEN_2.B for a list of the energy programs for Virginia.

District of Columbia Comprehensive Energy III (CEP III)

While MWCOG has not completed a profile of energy consumption since 1980, the District of Columbia released its comprehensive energy plan in 2002. Looking back over a 26-year period, the District's Comprehensive Energy Plan, 2002-2007 (CEP III) reported:

> Economic indicators point toward significant achievement in maintaining energy efficiency in the District:
>
> - DC produced more goods and services with decreasing energy
> - DC employed more workers with declining per-employee energy cost
> - DC's overall energy expenditures remained relatively flat for the last ten years
> - DC's total energy expenditures increased less than the rate of inflation

DC tended to follow or do better than national trends. If the Region's energy experience has been similar to DC, we would expect to find a Region that is increasingly energy efficient.

While the CEP III outlined very positive energy trends, it also highlighted significant challenges to sustaining those trends. Regionally those challenges include the role of energy consumption and expenditures and the competitive advantage of the Region. Since globally the economic competitive race is being run within regions, the degree of energy dependency/independency of the MWCOG Region, the energy security of the Region, and the effects of energy on budgets – household, government, and businesses may be strained and the trends could become less favorable over time.

District of Columbia Energy Office (DCEO)

The government of the District of Columbia has an initiative to Green the Government.

<u>Conservation</u>

The DCEO assists District residents in the form of conservation and weatherization programs, based on a survey that will determine if a structure qualifies. These programs include:

- Residential Conservation Assistance Programs
- Weatherization Assistance Program (WAP)
- Weatherization Plus and Low-Income Appliance
- Weatherization Rehab
- Alternative Fuels Transportation
- Home Energy Rating Program
- Energy Loan Promotion Program
- Institutional Energy Efficiency Grants
- Small Business Energy Efficiency Programs
- State Heating and Oil Propane Program
- Building Code

Education

The DCEO is devoted to educating the public about energy issues including conservation and efficiency, as well as instructing students on energy issues within the schools.

- State Energy Program
- Energy Hotline
- Energy Patrol
- Energy Conservation Workshops
- Teacher Training Programs
- Energy Curriculum
- Energy Efficiency Evaluation Program
- Interactive Website Program

Regulatory/ Legislation

The DCEO is very active in legislation dealing with energy issues.

- DC Municipal Aggregation Program (MAP)
- Rate Case Intervention
- Utility Rate Restructuring
- Administration of the Reliable Energy Trust Fund
- Administration of the Gas Trust Fund
- Gas Station Advisory Board
- Residential Energy Assistance Challenge (REACH)

Energy Assistance Programs

The DCEO is also active in assisting residents with their energy and utility bills.

- Low Income Home Energy Assistance Program (LIHEAP), LIHEAP Expansion
- Utility Discount Programs, Residential Assistance Discount (RAD) Expansions, RAD Arrearages
- Residential Essential Service
- Economy II
- Economy II Re-Certification
- DC Water and Sewer Authority (WASA)

Sustainable Solutions

The DCEO is a proponent of more environmentally friendly energy uses and is a forerunner in exploring and implementing environmentally sound energy uses and standards.

- Greening the Government Steering Committee
- Energy Star Products Purchasing Program
- Energy Star Appliance Rebate Program
- Green DC Week

- Renewable Portfolio Standard
- Renewable Energy Demonstration Project
- Removal of Green House Gas Initiative
- Green Faith Non-Profit Initiative

Planning and Evaluation

- Emergency Response Planning (ESF12)

The DC Energy Department http://www.dcenergy.org/ provides programs to promote energy efficiency in the District of Columbia. See APPEN_2.C for a list of energy programs for the District of Columbia.

The U.S Department of Energy provides a guide to state energy programs. See http://www.eere.energy.gov/states/ which provides a list of the energy programs for the District of Columbia. See APPEN_2.D for the District of Columbia Incentives for Renewable Energy.

State of Maryland: Annual Reports & Guides

The Maryland Energy Administration (MEA) promotes and manages energy savings initiatives for State operations and MEA participates with statewide efforts to promote energy efficiency in local governments, private business, and residences. MEA operates six program areas – residential, commercial, state/local government, industrial, transportation and renewable energy.

The Maryland Energy Administration published a brochure, "Energy Solutions for Local Governments" that covers:

1. Community Energy Loan Program (CELP)
2. Solar Energy
3. Wind Energy
4. Local Renewable Energy Project Technical Support
5. Rebuild America/Energy Smart Schools
6. Energy Performance Contracting
7. Green Building Program
8. Alternative Fuel Vehicles.

The Maryland Energy Administration http://www.energy.state.md.us/ provides programs to promote energy efficiency in Maryland. The US Department of Energy provides a guide to state energy programs.

See http://www.eere.energy.gov/states/. See APPEN_2.E for a list of the energy programs for Maryland.

The Tri-State Area

The Database of State Incentives for Renewable Energy (DSIRE), http://www.dsireusa.org/, links to programs related to green power, solar, and wind in the District of Columbia, Maryland and Virginia.

In addition to the state efforts, several of the MWCOG jurisdictions have energy policies and programs. For example, Montgomery County operates its energy programs through the Department of Environmental Protection (http://www.montgomerycountymd.gov/deptmpl.asp?url=/Content/dep/index.asp)

Chapter 18A of the County Code addresses Energy Policy, and requires that the County Executive report to the County Council each year about the continuing appropriateness of the Energy Policy adopted in 1995. The code also calls for the development of an annual energy work program, and the establishment of long-range goals to accomplish policy objectives.

The table in APPEN_2.F references a source for the U.S. Department of the Energy's Efficiency and Renewable Energy Programs and Activities by state.

Summary

This section outlined the energy policy, planning and program framework that has evolved at both the state and MWCOG level. As the information illustrates there are plans, policies, and programs in place to increase energy efficiency, promote energy conservation, and improve air quality. As the MWCOG region moves into this new energy era, policymakers will need to become even more aggressive in their approach if the effects of rising and volatile energy prices on public, business, and household budgets are to be mitigated.

3. TRI-STATE ENERGY TRENDS, 1997-2001

This section of the Regional Energy Plan, suggests that the Tri-State Area – the District of Columbia, Maryland and Virginia -- has been become more energy efficient. Over time, the Tri-State Area has been able to enjoy rates of economic growth while using less and less energy. While the economy seems to be able to absorb increases in energy expenditures, the MWCOG Region needs a system to monitor the ways in which increasing energy expenditures may adversely affect the economy. The Tri-State Area uses very few "green" or non-renewable energy sources. While the Tri-State data suggests some broad areas on which to focus, the region could benefit from MWCOG-specific energy data.

Findings: Tri-State--Energy Trends

1. The U.S. Energy Information Agency provides one of the major sources of data on energy prices, consumption and expenditures. EIA provides that data at the federal and the state level, with the District of Columbia as a state for the purposes of data collection, reporting and analysis. However, no sound methodology exists for reporting data at the sub-state level.

2. State trends can be compared, but sub-state (e.g. the Metropolitan Council of Government's region) cannot be analyzed using the EIA data.

3. Over the period 1997 to 2001, for the District, Maryland and Virginia, economic activity, as measured by the growth in the gross state product (a U.S. Department of Commerce measure of the amount of goods and services produced in a state), grew at faster rates than the growth in energy consumption.

4. With economic activity increasing at a faster rate than energy consumption, the Tri-State Area's energy efficiency is improving. It is taking less and less energy to produce one dollar's worth of economic activity. This in an outcome measure that indicates the combined effects of energy decision, policies, and regulations are working for the Tri-State Area.

5. Top fuels: The District of Columbia derives 61 percent of its energy from electricity; Maryland gets 40 percent of its energy from petroleum; and Virginia's top fuel is petroleum also (39 percent).

6. In 2001, the year of the most recent data, the use of renewable and alternative energy sources were reported at below one percent.

7. Due primarily to their geography and economies, Maryland and Virginia are more dependent on petroleum than the District. About 40 percent of Maryland's energy and 39 percent of Virginia's energy comes from petroleum. And just over 50 percent of the petroleum is used for gasoline. In contrast, the District derives 12 percent of its energy from petroleum and 61 percent of that is comprised of motor gasoline.

Recommendations

Recommendation: 3.1	Develop a target to reduce the rate of growth in non-renewable energy use while continuing the same rates of economic growth as measured growth in population and employment.
Recommendation: 3.2	Set a regional goal to increase the share of regional energy that is provided from alternative and renewable resources.

Tri-State Energy Trends: Discussion

Tri-State Energy Consumption, Expenditures, Prices & Economic Activity

The Energy Information Agency data is not reported at the sub-state level and no current methodology exists to extract sub-state data. Nonetheless, the data provided suggest several useful trends for the Tri-State Area of the District of Columbia, Maryland, and Virginia.

As Table 3-1 illustrates, the Tri-State Area has been able to sustain rates of economic growth that are significantly higher than the rate of growth of energy expenditures. The period 1997-2001 is used for allow for the compatibility of data.

Table 3.1: Tri-State Gross State Product, Energy Consumption, Energy Prices, and CPI-U (Inflation)

TABLE 3-1 Tri-State Gross State Product, Energy Consumption, Energy Prices, and CPI-U (Inflation)				
	Gross State Product Total Energy Consumption		Energy Prices	CPI-U (Inflation)
	Average Annual Percent Change			
	1997-2001			
District of Columbia	6.67%	1.59%	3.88%	2.07%
State of Maryland	4.97%	0.65%	6.25%	2.07%
State of Virginia	7.26%	0.87%	3.38%	2.07%

Source: Energy Information Agency

Table 3-2 provides a year-by-year change in the Gross State Product (GSP) for each of the states and a combined total for all the states. As the data illustrates, the GSP for the Tri-State Area has been growing at a healthy rate, above 6 percent per year.

Table 3.2: Tri-State Trends - Gross State Product

TABLE 3-2 Tri-State Trends Gross State Product Million $ 1997-2001						
	1997	1998	1999	2000	2001	Average Annual Change
District of Columbia	50,368.0	51,792.0	56,082.0	58,425.0	63,223.0	
Maryland	154,139.0	161,739.0	171,046.0	179,978.0	192,425.0	
Virginia	211,921.0	226,291.0	241,909.0	260,257.0	277,214.0	
Total	416,428.0	439,822.0	469,037.0	498,660.0	532,862.0	
Annual % Change		5.62%	6.64%	6.32%	6.86%	6.36%

Source: U.S Department of Commerce

Table 3-3 presents the total energy consumption for the Tri-State Area, and as the data highlights, the average rates of growth in energy consumption are much lower than the average rates of growth in economic activity. For the five-year period the average annual increase in energy consumption was less than one percent (0.85 percent), while the average annual percentage change in the GSP was 6.36 percent.

Table 3.3: Tri-State Trends- Energy Consumption

TABLE 3-3 Tri-State Trends Energy Consumption Trillion Btu's 1997-2001						
	1997	1998	1999	2000	2001	Average Annual Change
District of Columbia	182.7	181.3	181.1	186.5	168.2	
Maryland	1,376.0	1,377.6	1,415.1	1,433.6	1,420.4	
Virginia	2,217.6	2,251.9	2,298.1	2,386.3	2,314.6	
Total	3,776.3	3,810.8	3,894.3	4,006.4	3,903.2	
Annual % Change		0.91%	2.19%	2.88%	-2.58%	0.85%

Source: Energy Information Agency

Table 3-4 provides a measure of "efficiency". With the rate of economic activity growing faster than the rate of energy consumption, in the Tri-State Area, it takes less and less energy to produce a hundred dollars' worth of economic activity.

Table 3.4: Combined Gross State Product Energy Consumption

TABLE 3-4 Combined Gross State Product/Energy Consumption 1997-2001				
1997	1998	1999	2000	2001
$110.27	$115.41	$120.44	$124.47	$136.52

Compiled By: Jerome S. Paige & Associates

As Table 3-5 indicates, the average annual increase in energy prices in each of the states (4.67 percent, District of Columbia; 3.93 percent, Maryland; and 4.51 percent, Virginia) is higher than the rate of prices in general as measured by the CPI-U (Table 3-1).

Table 3.5: Tri-State Trends Energy Prices

TABLE 3-5 Tri-State Trends Energy Prices $per Million Btu's 1997-2001						
	1997	1998	1999	2000	2001	Average Annual Change
District of Columbia	13.03	12.86	13.23	14.86	15.57	4.67%
Maryland	10.46	10.12	10.46	12.11	12.09	3.93%
Virginia	9.16	8.36	8.72	10.47	10.72	4.51%

Source: Energy Information Agency

Table 3-6 shows that for the five-year period, energy expenditures have increased at an average rate of 5.01 percent. Keep in mind that for the *area* this was a period of "restructuring" of public utilities and as deregulation evolves price trends may change.

Table 3.6: Tri-State Trends Energy Expenditures

TABLE 3-6 Tri-State Trends Energy Expenditures Million $ 1997-2001						
	1997	1998	1999	2000	2001	Average Annual Change
District of Columbia	1,347.8	1,285.2	1,309.9	1,533.9	1,479.3	
Maryland	9,650.2	9,208.3	9,814.1	11,581.7	11,455.5	
Virginia	13,529.7	12,413.1	13,191.4	16,505.9	16,290.2	
Total	24,527.7	22,906.6	24,315.4	29,621.5	29,225.0	
Annual % Change		-6.61%	6.15%	21.82%	-1.34%	5.01%

Source: Energy Information Agency

As Table 3-7 highlights, energy expenditures as a percentage of Gross State Product ranged between 5 percent and 6 percent during the five-year period. This suggests that despite the increase in the energy expenditures, the Tri-State Area's economy was not adversely affected. As will be noted in other sections of this Regional Plan, one of the recommendations is to develop an "energy scorecard" to monitor the effect of energy consumption, expenditures, and prices on the MWCOG's Regional Economy.

Table 3.7: Energy Expenditures/Gross State Product

TABLE 3-7 Energy Expenditures/Gross State Product 1997-2001				
1997	1998	1999	2000	2001
5.89%	5.21%	5.18%	5.94%	5.48%

Compiled By: Jerome S. Paige & Associates

Tri-State Energy Fuel Type and End Use

EIA defines and collects data on several primary fuels—electricity, natural gas, petroleum, wood and others – by price, consumption, and expenditure. For the Tri-State Area, petroleum is the primary fuel type.

Table 3.8: Energy Consumption by Fuel Type, 2001

TABLE 3-8 Energy Consumption by Fuel Type 2001 Million BTU's					
Fuel Type	**District of Columbia**	**Maryland**	**Virginia**	**Total**	**Percentage**
Coal	0.70	317.20	482.40	800.30	20.50%
Natural Gas	30.60	191.40	246.70	468.70	12.01%
Petroleum	**33.50**	**568.10**	**911.20**	**1512.80**	**38.76%**
Nuclear Electric Power	0.00	142.70	269.10	411.80	10.55%
Hydro Electric Power	0.00	12.00	-12.50	-0.50	-0.01%
Wind & Waste	1.10	28.00	93.20	122.30	3.13%
Other	0.00	0.30	0.60	0.90	0.02%
Electricity: Net Interstate Flows of Electricity/Losses	102.30	160.50	323.90	586.70	15.03%
Total	168.20	1420.20	2314.60	3903.00	
Total Electricity					25.57%

Source: Energy Information Agency

The Tri-State data also suggests where policymakers in various jurisdictions will have to focus their energy policy efforts. Overall, the District and Maryland would have a primary focus on electricity conversely; Maryland and Virginia should focus on petroleum according to the data presented. This is not to suggest that the other fuels are unimportant, but if policymakers need to prioritize their efforts, the overall data suggests where to start.

Table 3.9: Energy Consumption by Fuel Type and Type, 2001

TABLE 3-9 Energy Consumption by Fuel Type, 2001 Percentages			
Fuel Type	**District of Columbia**	**Maryland**	**Virginia**
Coal	0%	22%	21%
Natural Gas	18%	13%	11%
Petroleum	20%	**40%**	**39%**
Nuclear Electric Power	0%	10%	12%
Hydro Electric Power	0%	1%	-1%
Wind & Waste	1%	2%	4%
Other	0%	0%	0%
Electricity: Net Interstate Flows of Electricity/Losses	**61%**	11%	14%

Source: Energy Information Agency

Table 3-10 provides a guide to the relative importance of the end use sectors. Whereas, the District would need primarily a commercial strategy, Maryland would need a strategy that focuses on three of the four end use sectors – transportation, residential, commercial. Virginia would need a strategy that addresses all four of the sectors.

Table 3.10: Tri-State Energy Consumption

TABLE 3-10 Tri-State Energy Consumption End Use, 2001 Trillion BTU's				
	District of Columbia	**Maryland**	**Virginia**	**Tri-State Total**
Residential	34.2	391.0	548.9	974.1
Commercial	104.0	372.3	533.8	1,010.1
Industrial	4.2	251.8	547.0	803.0
Transportation	25.8	405.2	684.9	1,115.9
	168.2	1,420.3	2,314.6	3,903.1
Percent				
Residential	20.3%	27.5%	23.7%	25.0%
Commercial	61.8%	26.2%	23.1%	25.9%
Industrial	2.5%	17.7%	23.6%	20.6%
Transportation	15.3%	28.5%	29.6%	28.6%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

Gasoline: One major concern is with the price and consumption of motor gasoline. In the District, 12 percent of its energy use is comprised of motor gasoline, with motor gasoline making up 61 percent of the District's petroleum consumption. In Maryland 22 percent of its energy use is comprised of motor gasoline; 54 percent of its petroleum use goes to motor gasoline. In Virginia, 20 percent of its total energy use is made up of motor gasoline, which comprises 52 percent of its total petroleum use. (See Table 3-11.)

Table 3.11: Petroleum and Gasoline (Motor Fuel) as Percentages of Energy Consumption, 2001

TABLE 3-11
Petroleum and Gasoline (Motor Fuel) as Percentages of Energy Consumption, 2001

	District of Columbia	**Maryland**	**Virginia**
Petroleum as Percent of Total Energy	20%	40%	39%
Gasoline as Percent of Total Energy	12%	22%	20%
Gasoline as Percent of Petroleum	61%	54%	52%

Compiled By: Jerome S. Paige & Associates

Heating Oil: Another major concern is with the price and consumption of heating oil (distillate fuel) as planners try to access the effects of rising petroleum prices on the costs of heating.

In the District, 6 percent of its energy use is comprised of distillate fuel, with distillate fuel making up 29 percent of the District's petroleum consumption. In Maryland 9 percent of its energy use is comprised on motor gasoline; 24 percent of its petroleum use goes distillate. In Virginia, 10 percent of its total energy use is made up of distillate fuel, which comprises 25 percent of its total petroleum use. (See Table 3-12.)

Table 3.12: Petroleum and Gasoline (Motor Fuel) as Percentages of Energy Consumption, 2001

TABLE 3-12
Distillate Fuel as Percentages of Energy Consumption, 2001

	District of Columbia	Maryland	Virginia
Distillate Fuel As A Percent of Total Energy	6%	9%	10%
As A Percent of Total Petroleum	29%	25%	25%

Compiled By: Jerome S. Paige & Associates

In the Tri-State Area, the Residential Sector used 15.9 percent of the distillate fuel and 35.4 percent of the natural gas. See Tables 3.13-3.14.

Table 3.13: Tri-State Distillate Fuel

TABLE 3-13
Tri-State
Distillate Fuel
by End Use Sector, 2001

All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
	Trillion BTUs			
Total Distillate Fuel	9.7	134.8	228.9	373.4
Residential Sector	1.2	27.9	30.2	59.3
Commercial Sector	3.2	14.6	17.2	35.0
Industrial Sector	0.2	13.6	29.7	43.5
Transportation Sector	4.8	72.9	143.4	221.1
Electric Power Sector	0.3	5.8	8.4	14.5
Total	9.7	134.8	228.9	373.4
Percent				
Residential Sector	12.4%	20.7%	13.2%	15.9%
Commercial Sector	33.0%	10.8%	7.5%	9.4%
Industrial Sector	2.1%	10.1%	13.0%	11.6%
Transportation Sector	49.5%	54.1%	62.6%	59.2%
Electric Power Sector	3.1%	4.3%	3.7%	3.9%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

For the Tri-State Area over 66 percent of the natural gas is consumed in the residential and the commercial sectors. (See Table 3-14.)

Table 3.14: Tri--State End Use Sector Natural Gas

TABLE 3-14 Tri-State End Use Sector Natural Gas By End Use Sector, 2001				
All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
Total Natural Gas		**Trillion BTUs**		
Residential Sector	13.3	79.8	72.9	166.0
Commercial Sector	17.0	62.0	62.1	141.1
Industrial Sector	0.0	28.4	69.4	97.8
Transportation Sector	0.0	3.1	8.1	11.2
Electric Power Sector	0.2	18.1	34.1	52.4
	30.5	191.4	246.6	468.5
Percent				
Residential Sector	43.6%	41.7%	29.6%	35.4%
Commercial Sector	55.7%	32.4%	25.2%	30.1%
Industrial Sector	0.0%	14.8%	28.1%	20.9%
Transportation Sector	0.0%	1.6%	3.3%	2.4%
Electric Power Sector	0.7%	9.5%	13.8%	11.2%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

Only 11.2% of natural gas electricity is consumed by the Electric Power Sector. (See Table 3-14.)

Table 3.15: Tri-State End Use Sector Electricity

TABLE 3-15 Tri-State End Use Sector Electricity 2001				
All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
Trillion BTUs				
Residential Sector	5.7	81.9	127.1	214.7
Commercial Sector	24.8	88.5	134.1	247.4
Industrial Sector	1.0	33.0	66.4	100.4
Transportation Sector	0.6	0.6	0.3	1.5
Electric Power Sector	0.3	160.5	265.0	425.8
Total	32.4	364.5	592.9	989.8
Percent				
Residential Sector	17.6%	22.5%	21.4%	21.7%
Commercial Sector	76.5%	24.3%	22.6%	25.0%
Industrial Sector	3.1%	9.1%	11.2%	10.1%
Transportation Sector	1.9%	0.2%	0.1%	0.2%
Electric Power Sector	0.9%	44.0%	44.7%	43.0%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

Summary

As the data reveals the Tri-State Area has become more energy efficient as it has been able to enjoy rates of economic growth while using less and less energy. While the economy seems able to absorb increases in energy expenditures, the MWCOG Region needs a system to monitor the ways in which increasing energy expenditures may adversely affect the economy. The data also reveals that the Tri-State Area uses very little "green" or non-renewable energy sources. While the Tri-State Area data suggests some broad areas on which to focus, the MWCOG Region could benefit from having MWCOG-specific energy data.

4. MOTOR FUEL CONSUMPTION, PRICE & EXPENDITURE TRENDS

This section of the Regional Energy Plan covers energy consumption and expenditures in the transportation sector of the Tri-State Area. Reducing energy consumption in transportation requires a combination of energy efficient motor vehicles, incentives to subsidize those choices, and high prices to discourage demand in order to achieve success. In addition there appears to be several major public finance issues related to the efficiency of the tax system; including ways to use the tax system in order to reduce demand and subsidize the transition to the New Energy Era.

Findings

1. Based on 2001 data over 50 percent of the petroleum sold in the Tri-State region is used for motor fuel. Consequently local demand and worldwide supply are significant drivers that govern the range of planning and policy options affecting gasoline consumption in the region.

2. A policy framework to consider ways to reduce gasoline consumption will include vehicle efficiency standards, commercial and commuting driving patterns, the tax system and potential supply disruptions.

3. Until recently, there had been little or no reduction in the demand for gasoline even as prices double and tripled over the past few years. However, starting in July 2005, the year-to-year demand for gasoline began to fall for the first time in several years, suggesting that sustained high prices were having an effect on behavior. One reason that high gasoline prices have only recently led to a reduction in consumption is the relatively low percentage of gasoline as a part of the total cost of vehicle ownership. Of note, motor fuel, along with motor oil, makes up approximately 20% of that cost.

4. Rising gasoline prices will have an effect on fuel use, transportation systems, households, businesses, government and the environment; however, the region does not have in place a framework to predict the effects of these changes and to respond proactively.

5. The outlook for fuel prices suggests that the cost of gasoline will not return to its pre-September 2005 levels.

6. An increase in the average miles per gallon of vehicles can reverse the demand for growth in gasoline and mitigate the effects on budgets of rising gasoline prices.

7. Area jurisdictions are experiencing rising motor fuel prices that are causing significant increases in operating costs.

8. Area jurisdictions have plans to promote the use of Alternative Fuel Vehicles (AFV's) in their governments and in their regions.

9. The Olson Regional Plan calls for a rise in motor fuels taxes in order to use the price of gasoline as a meaningful behavior modification signal. This Plan holds that such a signal would help motorists shift to more energy efficient vehicles; engage in energy conservation behaviors; keep energy dollars in the region, thus making the motor fuel tax a more fiscally productive tax; and improve the environment.

10. The Energy Policy Act of 2005 contains the following provisions:

    a. The energy bill extends an existing tax credit, for up to $4,000, for buyers of electric vehicles or those powered by rechargeable batteries.

    b. Starting in 2006, hybrid-car buyers and advanced lean-burn technology vehicles will be eligible for tax credits ranging from $1,700-$3,000. This credit is tied with two components: hybrids that save the most fuel compared with 2002 models and the vehicle's estimated lifetime fuel savings.

    c. The amount of credit for the purchase of a fuel-cell vehicle is determined by a base credit amount that depends upon the weight class of the vehicle and, in the case of automobiles or light trucks, an additional credit amount that depends upon the rated fuel economy of the vehicle compared to a base fuel economy.

    d. For fuel-cell-powered vehicles weighing less than 8,500 pounds, the base credit is approximately $8,000 - heavier vehicles will get larger credits.

    e. Credits are offered for cars and light trucks that are more fuel-efficient than 2002 models. (A tax credit gives the taxpayer a dollar-for-dollar reduction in his or her taxes.)

    f. A provision permits taxpayers to claim a 30% credit for the cost of installing clean-fuel vehicle refueling property to be used in a trade or business of the taxpayer or installed at the principal residence of the taxpayer.

    g. Under the provision, clean fuels are considered any fuel with at least 85% of the volume that consists of ethanol, natural gas, compressed natural gas, liquefied petroleum gas, and hydrogen and any mixture of diesel fuel and biodiesel containing at least 20% biodiesel (Provision is effective for property placed in service 12/31/2005 and before 01/01/2010).

Recommendations

Recommendation: 4.1	To reduce the growth in motor fuel consumed and at the same time accommodate continued economic growth and improve the environment will take a combination of: 1. Higher gasoline prices 2. Increased education to remind drivers to approach the use of their vehicles more wisely 3. Continued promotion of the use of public transportation 4. Increased average miles per gallon of cars and trucks 5. A change in the way motor fuel taxes

Discussion

With the rapid increase in the prices of gasoline, we see households, businesses, and governments trying to adjust to these price increases. With what appears to be a very high price inelasticity of demand for gasoline, rapid price increases have not led to major reductions in miles driven. That suggests that non-gasoline consumption will be going down. However, if we were to see significant reductions in gasoline consumption, then that will have an effect on the amount of tax revenue collected, which suggests that local governments could be faced with both rising energy prices and declining revenues from gasoline taxes. Likewise, overall economic activity could be adversely affected.

Prior to Hurricane Katrina, many news articles highlighted that, adjusted for inflation, today's prices per gallon of gas (and energy prices in general) are still below their 1981 peak. This fact, while true, obscures the challenge of rising total expenditures on gasoline and the difficulty of people, governments, and businesses in shifting to alternatively-fueled forms of transportation.

1. For example, if the total miles driven are up and average miles per gallon are the same or higher, then total expenditures are up because people are driving more. Anecdotal reports suggest that what really seems to motivate motorists is the cost of filling up a tank. Further, the cost to fill up provides for an easier handle to register than the effect of price increases. It is one thing to talk about $3.00 a gallon; and another, to talk about $45.00 to fill up the gas tank. People have a real sense of what $45.00 will purchase compared to $3.00.

2. Also, having already made locational and consumption decisions, these decisions are hard for end users to reverse.

3. Information from the Energy Information Administration, as well as seasoned market-watching groups such as Oil Price Information System (OPIS), indicates that hurricane-driven prices will return to the mid-two dollar range sometime in the fall. If this prediction holds, another interesting, psychological, phenomenon may take place. Having faced several months of three dollar plus costs, motorists may actually feel good about a return to two dollar pricing, ignoring the broader reality that such prices are still relatively high.

Until recently, one conclusion that can be drawn from gasoline price increase data is that gasoline prices while, widely talked about, don't affect gasoline consumption and therefore the "market" and the "economy" are handling the price increase quite well. And if the experience from other countries, like England, is indicative, gasoline prices may rise even higher before alternatives are sought. Ironically, in the case of gasoline consumption, the last place we might see the effect of rising fuel prices will be in the reduction of miles driven. This suggests that the effects of increased prices for gasoline will appear elsewhere in the economy first.

As noted above, with the demand for gasoline being price inelastic, it's going to take really high prices or something other than high prices to change gasoline consumption patterns. If prices get to the point where they begin to reduce driving, then the whole regional economy will have big challenges, with driving being amongst the least of the challenges facing the region.

A Policy Framework for Reducing the Consumption of Motor Fuels

Since over 50 percent of the petroleum used in the Tri-State region is for motor fuels, local demand and worldwide supply help shape the range of planning and policy options for the region. The matrix summarized in Table 4-1 provides an overview of the policy discussion framework. This framework includes vehicle efficiency standards, commercial and commuting driving patterns, the tax system and potential supply disruptions. The framework also includes several policy tools – which are standards to improve vehicle efficiency, prices to guide choices, taxes to shift demand, taxes to raise dedicated revenues, and plans to manage short-term supply disruptions. The goals of these policy tools vary – improving environmental quality, managing the differential effects on households, businesses and government, strengthening the regional economy, improving the productivity of the tax system, managing temporary supply shortages, expanding the use of alternative fuel vehicles, and promoting efficiency and conservation.

Table 4.1: Gasoline Policy Discussion Framework

TABLE 4-1 Gasoline Policy Discussion Framework Over 50% of the petroleum used in the Tri-State region is for motor fuels			
Policy Area	**Policy Tool**	**Considerations**	
Vehicle Miles Per Gallon (Efficiency)	Standards to improve vehicle efficiency	The role of mileage standards in reducing the demand for petroleum	Improving Environmental Quality Managing Differential Effects on Income, Business, and Government Groups Strengthening the Regional Economy
Behavior (Commercial/ Commuting Practices)	Prices to Guide Choices	The role of relatively high prices in reducing the demand for gasoline, since trends suggest it has only been since July 2005, after three years of rising gasoline prices that gasoline sales have begun to decline	
	Taxes to Shift Demand	The role of motor fuel taxes to shift demand and to keep energy dollars from flowing out of the region	
Tax System	Taxes to Raise Dedicated Revenue	The adverse effect on tax collection due to reduced gasoline consumption: ▪ because increasing gasoline prices lead to a reduction in gasoline purchased and ▪ because the amount of tax collected varies with volume sold, not with price	Improving Productivity of Tax System
Supply Disruptions	Regional Plans to Allocate Supplies if a Shortage Occurs	The potential for short-term shortages since the worldwide demand for petroleum is increasing faster than worldwide supply	Managing Temporary Shortages Expanding Use of Alternative Fuels Promoting Efficiency & Conservation

Source: Jerome S. Paige & Associates

Table 4.2: Tri-State Petroleum Consumption—2001

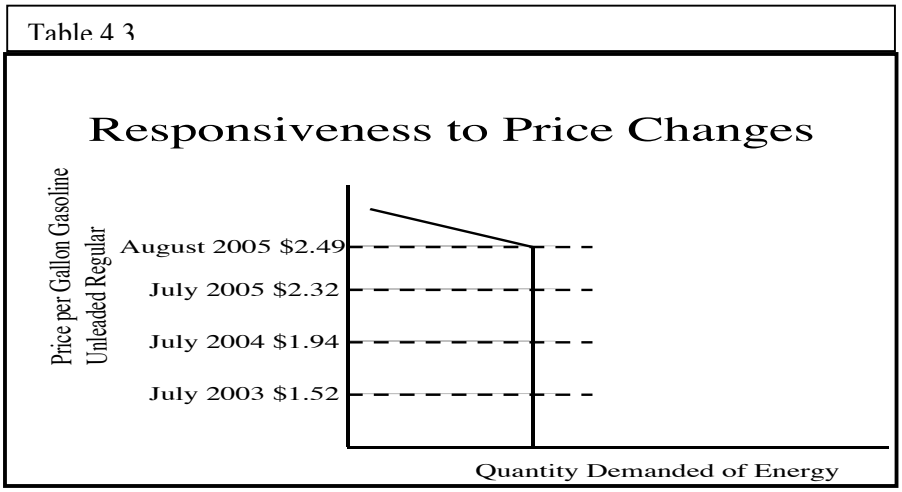
TABLE 4-2 Tri-State Petroleum Consumption, 2001			
	District of Columbia	**Maryland**	**Virginia**
Million BTU's			
Total Energy Consumption	168.2	1420.2	2314.6
Petroleum Consumption	33.5	191.4	911.2
Petroleum/Total Energy	20%	13%	39%
Million BTU's			
Motor Fuel	20.3	308.8	473
Distillate Fuel	9.7	134.8	228.9
Other	3.5	124.5	209.3
Total Petroleum	33.5	568.1	911.2
Percentage of Petroleum Consumption			
Motor Fuel	61%	54%	52%
Distillate Fuel	29%	24%	25%
Other	10%	22%	23%
Total Petroleum	100%	100%	100%

Source: US Energy Information Administration (EIA)

Based on this data, if the Tri-State Region is going to reduce its reliance on petroleum, it will require people and businesses to drive less and/or to purchase vehicles that are increasingly fuel efficient. See Table 4-2.

Until mid-Summer 2005, nationally, the demand for gasoline has been either constant or increasing even while prices were increasing. Table 4-3 provides an illustration of the relative non-responsiveness of demand to increases in prices. The July 2005 price of a gallon of gas ($2.32/gal) was 52 percent higher than the July 2003 price ($1.52/gal).

Table 4.3: Diagram "Responsiveness to Price Changes"



Source: Jerome S. Paige & Associates

Regional Gasoline Prices

Average gasoline prices in the Metropolitan Region are roughly 5 percent higher than the national average. See Table 4-4, and Table 4-5.

Table 4.4: Washington Unleaded Average (Entire Metro Average)

TABLE 4-4
American Automobile Association (AAA)
Washington Unleaded Average (Entire Metro Average)
October 4, 2005

	Regular	Mid	Premium	Diesel
Current	$3.087	$3.260	$3.365	$3.208
Yesterday	$3.087	$3.259	$3.365	$3.199
Month Ago	$3.208	$3.386	$3.497	$3.012
Year Ago	$1.911	$2.017	$2.083	$2.072
Annual % Change	61.54%	61.63%	61.55%	54.83%
Highest Recorded Price:				
Regular Unl.	$3.23	9/6/05		
DSL.	$3.21	10/4/05		

Source: American Automobile Association (AAA)

Table 4.5: National Unleaded Average

TABLE 4-5 American Automobile Association (AAA) National Unleaded Average October 4, 2005				
	Regular	Mid	Premium	Diesel
Current Avg.	$2.94	$3.12	$3.24	$3.15
Yesterday Avg.	$2.94	$3.12	$3.23	$3.13
Month Ago Avg.	$3.06	$3.24	$3.36	$2.96
Year Ago Avg.	$1.93	$2.04	$2.12	$2.06
Annual % Change	52.70%	52.74%	52.59%	,53.23%
Highest Recorded Price:				
Regular Unleaded.	$3.06	9/5/05		
DSL.	$3.15	10/4/05		
*Prices are in US dollars per gallon				
http://www.fuelgaugereport.com/index.asp				
Last Visited 10/4/05				

Source: American Automobile Association (AAA)

As gasoline prices rise, the local economy has absorbed the increases because of the economy's robustness. Yet, if business and government budgets are not expanding, the effect of the price increases will show up elsewhere within the region's economy. Alternatively, while the regional economy has been able to manage rising gasoline prices, the effects will be felt differentially among various sectors. Table 4-6 provides some effects to consider as gasoline prices continue to rise.

*Table 4.**6:** Range Of Effects of Rising Gasoline Prices*

TABLE 4-6				
RANGE OF EFFECTS OF RISING GASOLINE PRICES				
Transportation	Household	Business	Government	Environment
Reduced Gasoline Usage	Reduced shopping & eating out	Reduction in business volume	Increase cost of operations	Less air pollution
Reduction in Inefficient Vehicles	Reduced consumption of other important items like medicine	Reduction in business receipts	Reduction in Services	Greater air quality compliance
Greater Transit Use o Metro Rail o Metro Bus o Local Bus	Increased delinquencies in monthly payments	Reduced profit margins	Reduction in motor fuel taxes	
More Carpooling	Increased number of households needing energy assistance	Increased prices if market will allow higher energy costs to pass through	Increase in requests for energy assistance	

Compiled By: Jerome S. Paige & Associates

Based on national data since July 2005, it appears that the price for a gallon of gasoline needs to rise to about $3.00 before there is a reduction in gasoline consumption, suggesting that relatively high prices must be present in order to change consumption behavior. The reduction in the amount of gasoline consumed will improve air quality; however, there will be differential effects on households, businesses and government that should be considered.

Price Outlook

The short-term and long-term outlook for petroleum prices suggests that gasoline prices will remain at historically high levels. See Table 4-7.

Table 4.7: Price Summary; Short Term Outlook—September 2005

TABLE 4-7 Price Summary Energy Information Administration Short-Term Energy Outlook-- September 2005 Released September 7, 2005 Next Update: October 12, 2005									
							Percent Change		
		2003	2004	2005	2006	03-04	04-05	05-06	03-06
WTI Crude ($/barrel)	a	$31.12	$41.44	$58.77	$63.46	33.2%	41.8%	8.0%	103.9%
Gasoline ($/gal)	b	$1.56	$1.85	$2.33	$2.40	18.6%	25.9%	3.0%	53.8%
Diesel ($/gal)	c	$1.50	$1.81	$2.41	$2.50	20.7%	33.1%	3.7%	66.7%
Heating Oil ($/gal)	d	$1.36	$1.54	$2.09	$2.26	13.2%	35.7%	8.1%	66.2%
Natural Gas ($/mcf)	d	$9.51	$10.74	$13.03	$15.33	12.9%	21.3%	17.7%	61.2%
a-West Texas Intermediate.									
b-Average regular pump price.									
c-On Highway retail.									
d-Residential Average.									
http://www.eia.doe.gov/emeu/steo/pub/contents.html									
Last visited October 4, 2005									

Source: US Department of Energy

Effect of Vehicle Efficiency on Gallons of Gasoline Consumed

Given alternative assumptions, the spending on motor fuel can be estimated. While motor fuel comprises a relatively small percentage of the energy consumed in the Tri-State Area, motor fuel's importance is magnified because it is crucial to moving people, goods, and services throughout the region. It is believed that the increased spending on motor fuel means that at some point spending on non-motor fuel goods and services will diminish.

By relying on published data about vehicle miles traveled and motor oil consumed, and by adjusting that data, estimates of the demand for gasoline in the region can be made. Note that this model is preliminary and it remains under review.

For the MWCOG Region, an increase in average miles per gallon will result in a reduction in gasoline consumed. See Table 4-8.

Table 4.8: Gasoline Consumption Estimator

TABLE 4-8						
Summary Gasoline Consumption Estimator						
	1994	2002	2005	2015	Reduction Gallons	Reduction Percent
Scenarios	Gasoline Gallons Consumed by Year/ Select Jurisdictions*					
14 mpg	9,127,044	11,010,537	11,730,459	14,011,212		
20 mpg	6,388,930	7,707,376	8,211,321	9,807,849	-4,203,363	-30.00%
30 mpg	3,303,626	3,965,376	4,244,154	4,853,729	-4,954,120	-50.51%
14 mpg	9,127,044	11,010,537	11,730,459	14,011,212		
30 mpg	3,303,626	3,965,376	4,244,154	4,853,729	-9,157,483	-65.36%

Compiled By: Jerome S. Paige & Associates
** Prince Georges Frederick, Charles, Calvert, Arlington, Alexandria, Fairfax, Louden, Price William, Stafford Counties, and the District of Columbia.*

Effect of Vehicle Efficiency on Gasoline Operating Costs

At the average price per gallon for the region on October 5, 2005 ($3.09 per gallon), an increase in vehicle energy efficiency to 25 mpg from 15 mpg, will result in a reduction in the per mile costs of gasoline to 12 cents per mile ($3.09 per gallon divided by 25 mpg) from 21 cents per mile ($3.09 divided by 15 mpg).

1. If a vehicle is driven 50,000 per year and it gets 15 mpg, then it will use 3,333 gallons of gasoline per year, at a cost of $10,300 ($3.09 per gallon times 3,333 gallons).

2. If the efficiency of the vehicle rises to 25 mpg, then will take 2,000 gallons to operate the vehicle (50,000 divided by 25 mpg), at a cost of $6,180 (2,000 gallons times $3.09 gallons).

3. The annual savings in gasoline expenditures is $4,120 ($10,300 less $6,180).

4. If the replacement costs are an additional $5,000, then it would take 1.21 years to recoup those additional costs ($5,000 divided by $4,120).

5. The annualized rate of return on the additional $5,000 expenditure would be 68% ($4,120 divided by 1.21 years).

Effect of Reduction of Gasoline on Motor Fuel Tax Collections

In the region, the motor fuel tax rates range between 16 cents per gallon to 24.5 cents per gallon, depending on the state and the type of fuel which excludes aviation fuel. See Table 4-9. Motor Fuel Taxes tend to be dedicated taxes. The tax is collected by the states and allocated to regional jurisdictions for projects on their areas.

Table 4.9: Motor Fuel Tax Rates

TABLE 4-9			
Motor Fuel Tax Rates			
	Gasoline	Diesel	Aviation
District of Columbia	20	20	N/A
Maryland	23.5	24.5	0.7
Virginia*	17.5	16	N/A
*Plus 0.6-cpg petroleum storage tank fee and 2% sales tax on motor fuels in localities that are part of the Northern Virginia Transportation District			
Federal Tax=18.4 cpg			

Compiled By: Jerome S. Paige & Associates

Although the amount of taxes collected vary with the volume of gasoline sold (except for the Northern Virginia Transportation District), the falling motor fuel rates will reduce the dedicated funds available to the jurisdictions.

Effects of Motor Fuel Taxes to Shift Demand: Olson Regional Plan

On September 30, 2005, MWCOG sponsored a symposium on the "Impacts of Rising Gasoline Prices". At that event, Dr. Charles Olson – Director of Business Honors; and Business & Public Policy at the University of Maryland outlined a regional plan to reduce gasoline consumption, improve air quality and improve the efficiency of the motor fuels tax system for jurisdictions. Some of the elements of the "Olson Plan" are included in this report.

The Olson Regional Plan calls for a rise in motor fuels taxes in order to use the price of gasoline as a meaningful behavior modification signal. This Plan holds that such a signal would help motorists shift to more energy efficient vehicles; engage in energy conservation behaviors; keep energy dollars in the region, thus making the motor fuel tax a more fiscally productive tax; and improve the environment.

The Olson Regional Plan is a proposal to use the tax on motor fuels as a way:

1. To use the price of gasoline as a signal to consumers to shift to more energy efficient vehicles,

2. To use the price of gasoline as a signal to engage in energy conservation behaviors,

3. To make the motor fuel tax a more fiscally productive tax,

4. To keep energy dollars in the regional economy,

5. To improve the environment through the reduction of gasoline.

The Olson Regional Plan

The District of Columbia, Maryland, and Virginia act to increase motor fuel taxes on gasoline and diesel fuels by 15 cents per gallon in 2006, followed by a 2 cent per gallon increase for each year from 2007 to 2011. After 2011, taxes will rise each year by the Consumer Price Index plus one percent.

Disadvantages:
- Higher fuel prices
- Some sales leakage to Border States
- Greater impact on lower income families

Advantages:
- Higher pump price is an efficient and easy way to collect taxes
- Areas requires transportation infrastructure improvements
- Higher pump prices will speed conversion both in terms of short-term effects (transit, pooling, fewer trips) and long-term (vehicle conversion)
- Air pollution will be reduced with reduced usage, more efficient vehicles and better transportation systems
- The region will make the transition to more efficient transportation more quickly than other areas
- A greater percentage of the gasoline/diesel revenue flow will remain in the United States and the region

Conclusions:
- Transportation infrastructure is essential
- The gasoline/diesel tax is an efficient way to collect revenue to finance regional highway and transit construction and maintenance
- Government should act responsibility to keep up these collections in response to lower usage levels

Summary

As noted, the reduction of energy consumption by the transportation sector requires a combination of energy efficient motor vehicles, incentives to subsidize those choices, and high prices to discourage demand. In addition, there are major public finance issues related to the efficiency of the tax system and consensus on ways to use the tax system to reduce demand and to subsidize the transition to the New Energy Era.

5. DISTILLATE AND NATURAL GAS CONSUMPTION, PRICE AND EXPENDITURE TRENDS FOR HOUSEHOLDS

This section of the Regional Energy Plan surveys household energy consumption and expenditure data in an effort to reduce energy consumption within the residential sector. There appears to be a need to combine energy efficient options in order to discourage excessive demand within the residential sector. These policies will require financial subsidies to mitigate the effect of high energy prices on low and moderate income households.

Findings

Distillate Fuel-2001

1. For the Tri-State Region, Number 2 Heating Oil (distillate) comprised 9.6 percent of all energy consumed.

2. For the District, distillate comprised 29 percent of the area's petroleum use; for Maryland, it was 24 percent and for Virginia, 25 percent.

3. For the District, expenditures on distillate totaled $82.6 million; for Maryland, $1,954.5 million; and for Virginia, $3,291.9, for a total of $3,291.9 million.

Natural Gas-2001

4. For the Tri-State Region, natural gas comprised 12 percent of all energy consumed.

5. For the District, natural gas comprised 18.2 percent of all energy consumed; for Maryland, it was 13.5 percent; and for Virginia, 10.7 percent.

6. For the District, expenditures on natural gas totaled $363 million; for Maryland, $1,890.58 million; and for Virginia, $1,916.8 for a total of $4,170.3 million.

By comparison, it is also useful to look again at Electricity in 2001

7. For the Tri-State Region, electricity comprised 15 percent of all energy consumed.

8. For the District, electricity comprised 61 percent of all energy consumed; for Maryland, it was 11 percent; and for Virginia, 14 percent.

9. For the District, expenditures on electricity totaled $740.1 million; for Maryland, $3,983.3 million; and for Virginia, $5,928.4, for a total of $10,651.8 million.

Current Energy Challenges

10. Current projections for winter fuel bills suggest these bills to rise as much as 100 percent. These increases along with the projected high prices of gasoline estimate a very difficult energy costs situation.

11. The major driver of the use of distillate fuel and natural gas is the number of degree days, particularly the number of degree days in the winter.

12. Changes in energy behavior can have a major effect on reducing the demand for heating fuels.

13. If the costs and weather projections hold, there will be an increase in the number of households needing energy assistance.

Recommendations

Recommendation 5.1	Develop a data collection framework to provide current data on household energy consumption, expenditures and prices.
Recommendation 5.2	Increase promotion of options and incentives that residential consumers have in making housing and appliance energy choices.
Recommendation 5.3	Develop a monitoring system to assess the direct and indirect effects of high energy prices for households.

Discussion

As noted in the data below, the residential sector consumes 25 percent of all energy in the Tri-State Region. As outline in Table 5-1, these price increases can have several effects. Table 5-1 also highlights, several ways in which households can be encouraged to reduce energy consumption. With policies in place to improve the energy efficiency of houses (and vehicles), consumers are expected to replace these items over time, thereby reducing energy consumption. In addition, financial incentives can reduce the costs of these purchases and speed the rate of vehicle and appliance replacement. One major factor that will accelerate the process is high energy prices. Consequently, several governments will be exploring the extent to which taxes can be used to keep energy prices high. In doing that, analyst believe that public funds may be collected to help smooth out the transition process.

Table 5.1: Heating/Cooling Fuel Policy Discussion Framework

TABLE 5-1			
HEATING/COOLING FUEL POLICY DISCUSSION FRAMEWORK			
25% of the energy used in the Tri-State region is for natural gas and distillate fuels			
Policy Area	Policy Tool	Considerations	
Building Energy Efficiency Standards	Standards to improve energy efficiency of structures	The role of the building codes in fostering energy efficiency	
Appliance Efficiency Standards	Standards to improve energy efficiency of appliances	The role of the appliance efficiency standards in fostering energy efficiency.	
Behavior	Prices to Guide Choices	The role of relatively high prices in encouraging consumers to engage in wise energy practices	Improving Environmental Quality Managing Differential Effects on Income, Business, and Government Groups Strengthening the Regional Economy
	Education/Awareness to Guide Choices		
Tax System	Tax Incentives for Energy Efficiency	Using taxes as incentive to purchase energy efficient housing and appliances and using taxes as a way to reduce energy consumption	

Compiled By: Jerome S. Paige & Associates

Tri-State Residential Consumption--2001

In 2001, residential energy consumption comprised 25 percent of all energy consumed in the Tri-State Area. For the District, the percentage consumed was 20.3; the percentage for Maryland was, 27.5; and for Virginia, 23.7 percent. See Table 5-2.

Table 5.2: Tri-State Energy Consumption (End Use)

TABLE 5-2 Tri-State Energy Consumption End Use 2001				
	District of Columbia	Maryland	Virginia	Tri-State Total
			Trillion BTUs	
Residential	34.2	391.0	548.9	974.1
Commercial	104.0	372.3	533.8	1,010.1
Industrial	4.2	251.8	547.0	803.0
Transportation	25.8	405.2	684.9	1,115.9
	168.2	1,420.3	2,314.6	3,903.1
			Percent	
Residential	20.3%	27.5%	23.7%	25.0%
Commercial	61.8%	26.2%	23.1%	25.9%
Industrial	2.5%	17.7%	23.6%	20.6%
Transportation	15.3%	28.5%	29.6%	28.6%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

In the Tri-State Area, the Residential Sector used 15.9 percent of the distillate fuel; 35.4 percent of the natural gas; and 15.9 percent of the natural gas. See Tables 5-3 and 5-4.

Table 5.3: Tri-State End Use Sector (Distillate Fuel)

TABLE 5-3 Tri-State End Use Sector Distillate Fuel 2001				
All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
	Trillion BTUs			
Total Distillate Fuel	9.7	134.8	228.9	373.4
Residential Sector	1.2	27.9	30.2	59.3
Commercial Sector	3.2	14.6	17.2	35.0
Industrial Sector	0.2	13.6	29.7	43.5
Transportation Sector	4.8	72.9	143.4	221.1
Electric Power Sector	0.3	5.8	8.4	14.5
	9.7	134.8	228.9	373.4
	Percent			
Residential Sector	12.4%	20.7%	13.2%	15.9%
Commercial Sector	33.0%	10.8%	7.5%	9.4%
Industrial Sector	2.1%	10.1%	13.0%	11.6%
Transportation Sector	49.5%	54.1%	62.6%	59.2%
Electric Power Sector	3.1%	4.3%	3.7%	3.9%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

Table 5.4: Tri-State End Use Sector (Natural Gas)

TABLE 5-4 Tri-State End Use Sector Natural Gas 2001				
All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
	30.6	191.4	246.7	
Total Natural Gas	**Trillion BTUs**			
Residential Sector	13.3	79.8	72.9	166.0
Commercial Sector	17.0	62.0	62.1	141.1
Industrial Sector	0.0	28.4	69.4	97.8
Transportation Sector	0.0	3.1	8.1	11.2
Electric Power Sector	0.2	18.1	34.1	52.4
	30.5	191.4	246.6	468.5
	Percent			
Residential Sector	43.6%	41.7%	29.6%	35.4%
Commercial Sector	55.7%	32.4%	25.2%	30.1%
Industrial Sector	0.0%	14.8%	28.1%	20.9%
Transportation Sector	0.0%	1.6%	3.3%	2.4%
Electric Power Sector	0.7%	9.5%	13.8%	11.2%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

Removing the electricity sector from the analysis, the residential sector consumed about 38 percent of the electricity in the Tri-State Region. See Table 5-5.

Table 5.5:.Tri-State End Use Sector (Electricity)

TABLE 5-5 Tri-State End Use Sector Electricity 2001				
All Sectors	**District of Columbia**	**Maryland**	**Virginia**	**Tri-State Total**
	Trillion BTUs			
Residential Sector	5.7	81.9	127.1	214.7
Commercial Sector	24.8	88.5	134.1	247.4
Industrial Sector	1.0	33.0	66.4	100.4
Transportation Sector	0.6	0.6	0.3	1.5
Electric Power Sector	0.3	160.5	265.0	425.8
Totals	32.4	364.5	592.9	989.8
	Percent			
Residential Sector	17.6%	22.5%	21.4%	21.7%
Commercial Sector	76.5%	24.3%	22.6%	25.0%
Industrial Sector	3.1%	9.1%	11.2%	10.1%
Transportation Sector	1.9%	0.2%	0.1%	0.2%
Electric Power Sector	0.9%	44.0%	44.7%	43.0%
	100.0%	100.0%	100.0%	100.0%

Source: Energy Information Agency

At the federal, state, and regional levels, concerns are high surrounding the effects of high energy prices on low and moderate income households. While regional jurisdictions have access to funds to assist these households with their energy bills, the potential widespread effects from higher energy prices could pose a number of challenges for individuals, governments and businesses. In Table 5-6 some of those possible effects are outlined; some negative, others positive.

Table 5.6: Tri-State End Use Sector

TABLE 5-6 RANGE OF EFFECTS OF INCREASING HEATING OIL AND NATURAL GAS PRICES			
Household	Business	Government	Environment
Increased delinquencies in monthly payments	Reduced shopping & eating out Reduced consumption of other important items like medicine	Increased number of households needing energy assistance	Less air pollution

Source: Jerome S. Paige & Associates

During the 2002-2003 winter heating season, the DC Energy Office conducted a pilot with children in school to assess the effects of energy consumption that including smart energy choices. The DCEO received permission from 97 families to have the electric and gas companies send records of energy consumption in 2001-2002 and 2002-2003 for comparison. These energy records became a proxy for a pre-test – energy consumption before the program – and a post-test – energy consumption after the program.

Of the 97 accounts analyzed, 46 (48 percent) were gas accounts and 51 (52 percent) were electric accounts. Students were provided with low-cost energy conservation supplies like radiator reflectors, caulking, and insulation to plug small leaks. They were given instructions on how to install the items and the wise use of energy such as limiting the amount of time a refrigerator door remained open. The school children were provided incentives to participate in the pilot evaluation.

Of the 41 gas accounts analyzed, overall consumption was reduced by 5.77 percent. Over one-half of the households 54 percent (22 out of 41) reduced consumption, and of the 54 percent, the average reduction in household consumption was 24 percent (weather adjusted).

Of the 56 electric accounts analyzed, consumption was reduced as well. Overall, 32 percent (18 out of 56) of households reduced consumption, and of that 32 percent, the average reduction in household consumption was 14 percent (not weather adjusted)

This Pilot Program suggests Energy Efficiency Education Programs:

- Raise Energy Awareness of Students & Parents
- Modify Energy Behaviors of Students & Parents
- Reduce Household Emery Consumption
- Reduce Household Energy Expenditures

Summary

As noted in this chapter, to reduce energy consumption by the residential sector there needs to be a combination of energy efficient options (appliances, and buildings) that include incentives to subsidize those choices and high prices to discourage demand. These policies may be supplemented with financial subsidies to mitigate the effect of high energy prices on low and moderate income households.

6. A REGIONAL ENERGY DATA DRIVEN APPROACH TO POLICYMAKING

This section of the Regional Energy Plan presents a model of how to develop regional energy data for policy formulation. The development includes planning and the assessment of the region's progress as it relates to the reduction of energy consumption. Since the state-level data from the Energy Information Agency (EIA) cannot be disaggregated to the regional level, this section of the Regional Energy Plan provides a framework for exploring ways to develop regional energy data for policy and planning activities and to measure the energy performance of the region. Such a framework would assist the Region with its energy security planning as well.

Findings: An Energy Data Driven Approach to Policymaking

1. Currently, there is no sound methodology in place to collect regional data on energy price, consumption, and expenditures for the Metropolitan Washington Council of Government's region.

2. As a result, policymakers have no way to numerically assess the regional economic and social impacts of changes in energy prices, consumption, and expenditures for planning purposes.

3. If the patterns of energy price, consumption, and expenditures by jurisdiction throughout the region are similar to those in DC, Virginia and Maryland, then we would expect that the region has become more energy efficient.

4. The MWCOG has not assessed the results of its previous energy planning activities.

5. The MWCOG has taken few, consistent steps to develop a regional profile of its energy consumption, prices, and expenditures.

6. Currently there is no methodology in place to access the effects of changes in energy prices, consumptions and expenditures on the region.

Recommendations

Recommendation 6.1	Institute a process that will allow the region to monitor its energy price, consumption and expenditure data as a basis for regional energy planning to reduce energy dependency on non-renewable resources and strengthen the competitiveness of the regional economy.
Recommendation 6.2	Develop a region-wide monitoring system that addresses how the region is adjusting to the new energy era. This monitoring system would: 1. Identify policy gaps that might exist and suggest policies that might need to be developed to adjust the transition process. 2. Assess and guide the economic and social adjustment processes that households, businesses, and governments will have to make in this era of relatively expensive energy.
Recommendation 6.3	Create a working group among energy suppliers to develop a reporting mechanism similar to the system used by the Energy Information Agency. Such a system would be region-specific and updated frequently.
Recommendation 6.4	Develop an executive level scorecard that keeps policymakers apprised on how the region is managing the adjustment towards the new energy era.

Discussion: A Regional Energy Data-Driven Approach to Policymaking

The US Energy Information Agency (EIA) provides one of the major sources of data on energy prices, consumption and expenditures. EIA develops data at the federal and the state level, with the District of Columbia being a state for the purposes of data collection, reporting and analysis. However, to date no sound methodology exists for reporting data at the sub-state level. State trends can be compared, but sub-state information (e.g. the Metropolitan Council of Government's region) cannot be analyzed using the EIA data.

A major challenge facing planners and policymakers is the inability to adequately assess and guide the economic and social adjustments that households, businesses, and governments must possess during this era of relatively expensive energy. Of particular concern is transportation and its correlation on the above referenced users.

As the Metropolitan Washington Region moves from an era of regulated and relatively inexpensive energy to an era where energy is deregulated and relatively expensive, planners and policymakers must grapple with assessing the effects of these changes on the budgets of households, businesses and governments and on regional economic activity.

For example, with the rapid increase in the price of gasoline, we see households, businesses, and governments trying to adjust as price increases. With what appears to be a very high price inelasticity of demand for gasoline, rapid price increases have not led to major reductions in vehicles miles driven. This suggests that non-gasoline consumption will go down. However, if we were to see significant reductions in gasoline consumption, then that will in turn effect on the amount tax revenue collected. This suggests that local governments could be faced with both rising energy prices and declining tax revenues. Likewise, overall economic activity could be adversely affected.

Sections 6.1 through 6.3 provide a general overview (i) of the region's gas and electricity consumption; (ii) a gasoline estimator and (iii) an energy intelligence system. These sections demonstrate the impacts of each including the region and MWCOG.

6.1 REGIONAL GAS & ELECTRICITY CONSUMPTION

This section provides examples of regional natural gas and electricity consumption and price information by the following sectors:

1. Commercial
2. Government
3. Residential

Regional Commercial Energy Consumption: A Prototype

Table 6-1 provides an example of how data by zip code can be used. The Baltimore Gas & Electric Company serves portions of Prince George's County. Using three zip codes from Prince George's County, a trend for commercial consumption can be gleaned. When this data is compared to construction and employment data for the areas, it provides a basis for establishing a benchmark measuring energy consumption and the effects of overall energy policies.

Table 6.1: Sample Commercial Data- Selected Prince George's County Areas

TABLE 6-1 Sample Commercial Data Selected Prince George's County Areas kWh by Zip Code				
Zip Code	Jurisdiction	2002	2003	2004
20707	Laurel	5,927,917	12,663,216	16,848,576
20724	Laurel	2,524,599	4,316,298	4,438,900
20772	Upper Marlboro	7,031,482	11,986,109	14,423,327
	Totals	15,483,998	28,965,623	35,710,803

Source: Baltimore Gas & Electric Company

Table 6-2 provides additional data by zip code for 2004. There was no data prior to 2004 provided for these zip codes. A suggested follow-up activity with the energy companies should be to select a year and zip codes for an area to establish a basis for trends analysis.

Table 6.2: Sample Commercial Data- Selected Prince George's County Areas

TABLE 6-2 Sample Commercial Data Selected Prince George's County Areas kWh by Zip Code		
Zip Code	MWCOG Jurisdiction	2004
20715	Bowie	136,200
20769	Glenn Dale	1,558,736
20706	Lanham	582,930
20723	Laurel	400,400
	Totals	2,678,266

Source: Baltimore Gas & Electric

Table 6-3 includes a summary of the commercial data for Maryland jurisdictions provided by PEPCO Energy Services. The data by jurisdiction has been compiled from zip codes associated within each of the jurisdictions. What we see are several anomalies. As shown, there is a wide variability for some of the jurisdictions compared to others. One possible reason for this variability is that, while all the utility companies were cooperative, each had different challenges in sorting data by zip codes and energy units.

Table 6.3: Sample Commercial Data- Maryland Jurisdictions

TABLE 6-3 Sample Commercial Data Selected Maryland Jurisdictions kWh by Zip Code		
Maryland Jurisdictions	2002	2004
College Park	7,426,955	71,762,895
Gaithersburg	36,734,450	69,450,446
Greenbelt	52,467,566	14,488,002
Montgomery County	275,027,474	364,733,262
Prince George's County	185,432,940	110,276,973
Rockville	59,136,403	85,646,393
Takoma Park	8,879,134	3,935,103
Totals	640,588,920	758,682,143

Source: PEPCO Energy Services

Regional Government Energy Consumption: A Prototype

Several of the energy companies that service the MWCOG jurisdictions provided data based on their payments to local government. Like the data on commercial users, the data illustrates the potential for developing a regional energy information system. Such a system would provide the context for interpreting the data. For example, this includes major expansions in government capital spending, growth in public sector employment, and shifts in policies regarding the location of government services.

Energy Provider Sources of Data

Old Dominion provides electricity service to the Virginia jurisdictions in the MWCOG Region. Old Dominion has a government sales rate and hence could provide certain information by zip code (See Table 6-4). A number of factors can affect the year-to-year changes in energy consumption. However, as with commercial data, it is possible to coordinate with utility companies thus helping to establish the benchmark and trend factors.

Table 6.4: Sample Government Data- Selected Virginia Jurisdictions

TABLE 6-4			
Sample Government Data Selected Virginia Jurisdictions kWh by Zip Code			
Zip Code	Jurisdictions	2001	2002
22030	Fairfax	578,016	1,017,408
22032	Fairfax	351,936	1,006,848
22043	Falls Church	626,400	1,351,440
22070	Herndon	254,400	936,400
22075	Leesburg	504,000	1,320,000
22079	Lorton	509,600	1,265,600
22150	Springfield	377,088	967,680
22306	Alexandria	342,000	565,200
22309	Alexandria	969,120	2,185,200
22310	Alexandria	828,000	1,188,000
22314	Alexandria	685,800	760,200
Totals		6,026,360	12,563,976

Source: Old Dominion

Table 6-5 and 6-6 contain samples of government data provided by PEPCO Energy Services and Baltimore Gas & Electric Company. Because of the variability in this data,

it is divided between Montgomery County (Table 6-5) and Prince George's County (Table 6-6).

Table 6.5: Sample Government Data- Selected Maryland Jurisdictions (Montgomery County)

TABLE 6-5			
Sample Government Data Selected Maryland Jurisdictions kWh by Zip Code			
Jurisdiction	2002	2003	2004
Montgomery County	106,449,810	174,367,289	204,019,095
Rockville	6,846,932	8,960,602	13,123,305

Source: Energy Information Agency

Table 6.6: Sample Government Data- Selected Maryland Jurisdictions (Prince George's County)

TABLE 6-6				
Sample Government Data Selected Maryland Jurisdictions kWh by Zip Code				
Zip Code	Jurisdiction	2002	2003	2004
20715	Bowie	10,284,815	19,659,183	20,682,812
20720	Bowie	9,825,508	15,887,256	17,903,119
20707	Laurel	13,945,050	25,307,100	14,727,700
20708	Laurel	3,957,800	8,257,200	4,111,800
20723	Laurel	2,307,000	966,200	2,535,500
20724	Laurel	121,700	152,300	1,205,700
Totals		40,441,873	70,229,239	61,166,631
	Bowie	20,110,323	35,546,439	38,585,931
	Laurel	20,331,550	34,682,800	22,580,700
Totals		40,441,873	70,229,239	61,166,631

Source: Baltimore Gas & Electric Company

Government Sources of Data

Based on responses to a survey, the jurisdictions that comprise MWCOG do not have a system in place to collect energy consumption and expenditure data on their operations. Data is spread over a number of agencies due to programmatic and budget reasons. For

example in the case of the District of Columbia, energy bills are paid by both the executive agencies and various independent agencies. Noteworthy, other jurisdictions with different collecting protocols like Montgomery County are able to collect data for a particular fuel type.

City of Bowie

Based on responses to a survey data sheet for the years 2001-2004, the Bowie municipal government spent an annual average, of $195,197; $77,680; $63,589; $223,197; $207,338; and $8,906 on street lighting, park lighting, wastewater treatment, electricity, water authorities, and miscellaneous items respectively.

For the years 2001-2004, the City of Bowie consumed average annual kilowatts of 2,628,485; 331,947; 2,529,743; 2,991,936; 2,546,127; and 108,965 on street lighting, park lighting, wastewater treatment, electricity, water authorities, and miscellaneous items respectively.

Table 6.7: City of Bowie

TABLE 6-7 City of Bowie Average 2001-2004		
	Expenditures	Consumption/kw
Street Lighting	$195,197	2,628,485
Park Lighting	$77,680	331,947
Wastewater Treatment	$63,589	2,529,743
Electricity	$223,197	2,991,936
Water Authorities	$207,338	2,546,127
Miscellaneous	$8,906	108,965
Total	$775,907	11,137,203

Source: City of Bowie

In 2004 the City of Bowie had roughly 28 buildings totaling an average square footage of 162,405 for the buildings.

Prince William County

The government of Prince William County was unable to provide consumption and expenditure data. However, the County Government indicated that it had approximately 121 buildings in 2004, representing roughly 1,076,955 in square footage. This number of square feet of office space could provide opportunities for measuring energy savings.

City of College Park

The City of College Park (CCP) spent $155,896; $20,375; $42,919; and $61,716 on street lighting, natural gas, electricity, and vehicle fuel during the years 2000-2004. CCP consumed an annual average of 20,642 therms of natural gas, 1,489,093 kilowatts of electricity and 47,162 gallons of vehicle fuel during that same period. In 2004, the City of College Park had roughly 15 buildings totaling an average square footage of 73,230.

Loudoun County

Loudoun spent an average of $145,628 and $1,170,468 annually for natural gas and electricity during the years 2000-2004. Equally, it consumed $155,925 and $1,167,114 in both natural gas and electricity for the same period.

The county's number of buildings for the years 1990 – 2004 is 187; 208; 210; 212; 195 and 197 representing an average square footage of 942,717; 1,046,415; 1,332,447; 1,338,589; 1,239,005, and 1, 238,165. During the six years of data collected, the average number of buildings was 202, with an average square footage of 1,189,556 per building.

Loudoun County also provided data on its public schools for the years 1990-2004. The county's public schools grew from 41 in 1990 to 72 in 2004 or 75.6 percent. The growth in public schools increased consumption by 159.1 percent and expenditures by 147 percent during the period.

Montgomery County

Montgomery County provided information on total fuel consumed by both county and jurisdiction. The types of fuels consumed included (i) compressed natural gas CNG Fast Fill (ii) CNG Slow Fill, (iii) diesel, (iv) ethanol, and unleaded motor gasoline. Diesel fuel was the most used fuel type for Montgomery County. Below is a breakdown on the total quantities and amounts of fuel consumed annually.

Table 6.8: Montgomery County

	TABLE 6-8	
Year	Total Quality	Total Cost
2000	4,484,821.20	$5,696,843.46
2001	17,239.30	$31,453.88
2002	4,815,018.40	$4,760,046.74
2003	1,739,649.89	$2,135,427.60
2004	5,468,610.05	$194,400.98

Source: Montgomery County

City of Gaithersburg

This jurisdiction reported participation within an aggregation initiative. Although Gaithersburg reported having information related to the request, no specific or detailed data was provided. In 2004 the City of Gaithersburg had roughly 17 buildings totaling an average square footage of 391,091.

Arlington County

According to its website, the Arlington County Government's total annual energy bill is about $7 million. Most of that expense is electricity, used to provide air conditioning, lighting, computers, printers, fans, vending machines, refrigerators, and other building appliances. Several county buildings are also heated with electricity. In addition, the County has over 10,000 streetlights with 240 intersections that have traffic signals. The water pollution control plant on S. Glebe Road uses a great deal of energy to clean wastewater. Natural gas is used in many buildings for space heating and water heating, and the County operates over 800 vehicles, including a car pool fleet, public safety vehicles and heavy equipment. County information can be obtained at http://www.arlingtonva.us/departments/EnvironmentalServices/epo/EnvironmentalServicesEpoEnergyEfficiency.aspx.

Regional Household Energy Consumption: A Prototype

The utility companies provided the most complete set of data by zip code for the residential sector. As with the commercial and the residential data, there is wide variability in the data and the data requires further analysis. Similarly with commercial and government data from utility companies, this data suggests the potential for developing a regional energy data system.

For the residential sector, energy consumption may be seen in relationship to the increase or decrease in the number of households in the MWCOG jurisdictions over the past decade. While there has been a 16 percent growth in households for MWCOG overall from 1990-2000, six jurisdictions grew greater than 25 percent. The District of Columbia experienced slight erosion in households over the same period and two jurisdictions, Takoma Park and Greenbelt, remained the same.

Appendix 6.A summarizes the information provided by Washington Gas. The overall MWCOG picture for residential natural gas consumption is that of a declining trend over the past several years. A few qualifying comments are necessary. First, the significant drop in 2003 for the District of Columbia and Falls Church are believed to be an aberration in the data provided. Washington Gas is investigating, but there is no explanation available at the time of this report. Second, the numbers reflect only direct services from Washington Gas and not those of any third party suppliers (Washington Gas sales to third party suppliers are included in Appendix 6.B). Third, the numbers in

Appendix 6.A should not be viewed in isolation but correlated with other data (e.g., growth in households, variations in natural gas prices, the price of alternate energy sources, weather, economic activity and similar factors).

Washington Gas could not provide an average annual price, but the EIA prices reflected in Table 6-9 below for 1990 and 2000-2004 show the average price paid by residents in the respective MWCOG jurisdictions. Except for 2000, Marylanders paid less for natural gas than residents of the District of Columbia and/or Virginia and gas prices doubled in all three regions between 1990 and 2000. The drop in 2002 is likely attributable to the deregulation of natural gas prices in Maryland.

Table 6.9: Average Price for Natural Gas in Residential Sector

TABLE 6-9
Average Price for Natural Gas in Residential Sector
(Dollars Per Thousand Cubic Feet)

Area	**1990**	**2000**	**2001**	**2002**	**2003**	**2004**
District of Columbia	7.18	11.40	12.27	11.54	14.66	15.76
Maryland	6.92	11.66	12.42	11.04	12.49	14.38
Virginia	7.31	10.91	13.27	11.65	14.29	15.34

Source: Energy Information Agency

None of the utility firms supplying electricity consumption data (Dominion Virginia Power, PEPCO Energy Services and Allegheny Power) could provide consumption information for 1990. As reflected in Appendix 6.C, the data supplied primarily covers 2002 through 2004. Therefore, baselining residential electricity usage to 1990 could not be done for this report and the companies felt that it would be difficult to pull the 1990 data, even for a fee.

Generally speaking, there appears to be a rise in the use of electricity. This information needs to be viewed in the context of price, more energy-efficient houses and appliances, growth in households and similar factors. That said, three jurisdictions - Manassas, Frederick County and Montgomery County - all with double-digit household growth reflect an increase in consumption for the past five years. Further, the data for Frederick County, when put in the context of usage correlated to the number of households, suggest that consumption data for the other jurisdictions may be incomplete. An error may exist because the information provided includes apartments and these may also be covered in the Commercial Sector. For instance, Frederick County, with one-fifth the households of Montgomery County, is reported as consuming over 100+ percent more electricity.

Allegheny Power and Dominion Virginia Power provided average price information and the prices from Dominion Virginia Power only covered years 2002-2004. PEPCO Energy Services could not provide average prices. With the incompleteness of the electricity price information by companies and jurisdictions, a better sense of price trends can be gleaned from the EIA price information by state and the District of Columbia that is summarized in Table 6-10. From 1990 to 2000, price for electricity increased much less than the price for natural gas. Prices in the District of Columbia increased the most between the three regions; an increase of 33 percent. Virginia and Maryland experienced price increases of 10.2 percent and 10.8 percent respectively over the same ten-year period. One possible explanation for the relatively stable electricity prices is the capping of rates that occurred during the utility restructuring. The caps are now off for the District of Columbia and for commercial users in Maryland (caps for residential use will fall on July 1, 2006). Electricity prices were provided for three jurisdictions over 2000-2004 and when taken as an average, the prices in these MWCOG jurisdictions were lower relative to the EIA price for each state and the District of Columbia for all years compared except 2003.

Table 6.10: Average Price for Natural Gas in Residential Sector

TABLE 6-10
Average Price for Electricity in Residential Sector
(Cents Per Kilowatt Hour)

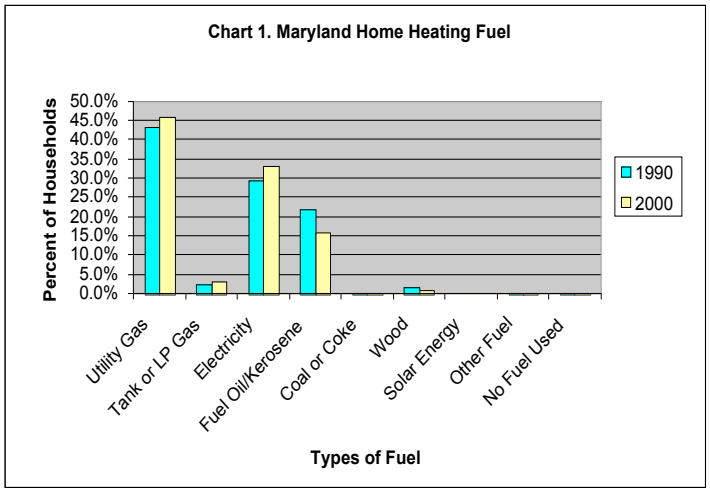
Area	1990	2000	2001	2002	2003	2004
District of Columbia	6.10	8.03	7.83	7.82	7.66	8.14
Maryland	7.22	7.95	7.70	7.71	7.73	8.00
Virginia	7.25	7.52	7.80	7.79	7.76	7.99
Selected MWCOG jurisdictions (Montgomery, Frederick and Manassas)	Not Available	6.82	7.01	7.00	8.09	7.20

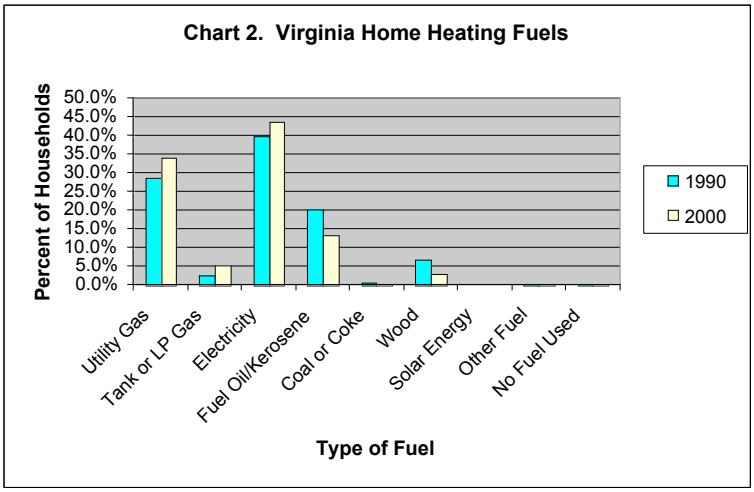
Sources: EIA, Dominion Virginia Power and PEPCO Energy Services

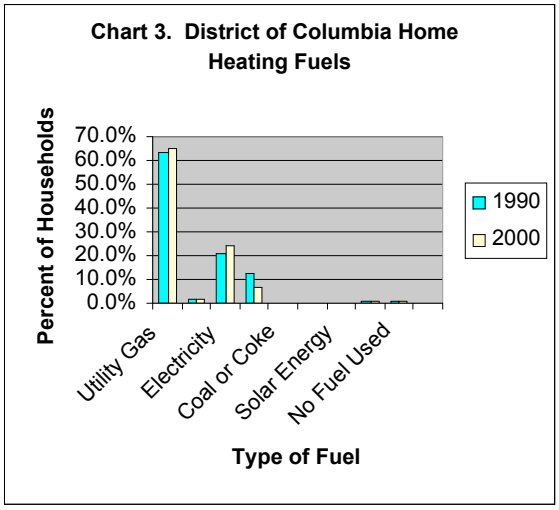
Disaggregated data for the other energy sources (distillate fuel, kerosene, liquefied petroleum gas, wood, geothermal and solar) were not available and would be difficult and costly to obtain. However, by looking at information from the US Census Bureau for 1990 and 2000 (Charts 1 through 4), shifts can be seen in energy sources by region and the MWCOG jurisdictions overall. Natural gas is the dominant home heating fuel for households in Maryland, the District of Columbia and the collective MWCOG jurisdictions. However, electricity is the dominant house heating source for the Virginia jurisdictions.

Specifically, charts 1 through 3 show the types of home heating fuel for Maryland, Virginia and the District of Columbia. Overall the charts demonstrate an overall decline in fuel oil/kerosene for the states, and the District of Columbia. Although too few to register on the chart, there are 29 solar projects underway in the Maryland MWCOG

territories; three are in Rockville, four in Prince George's County, twenty in Montgomery County and two in Frederick County.







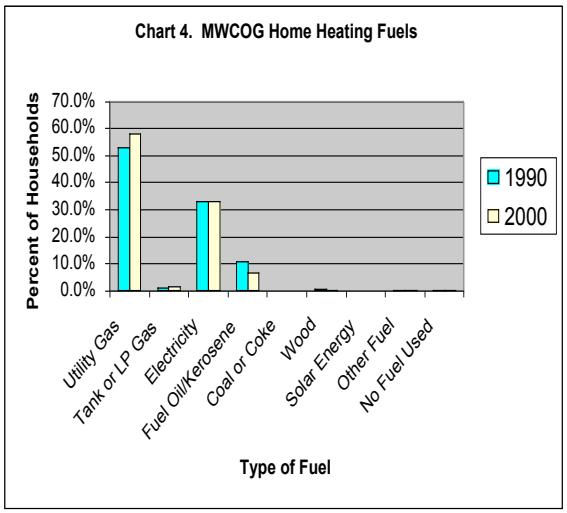
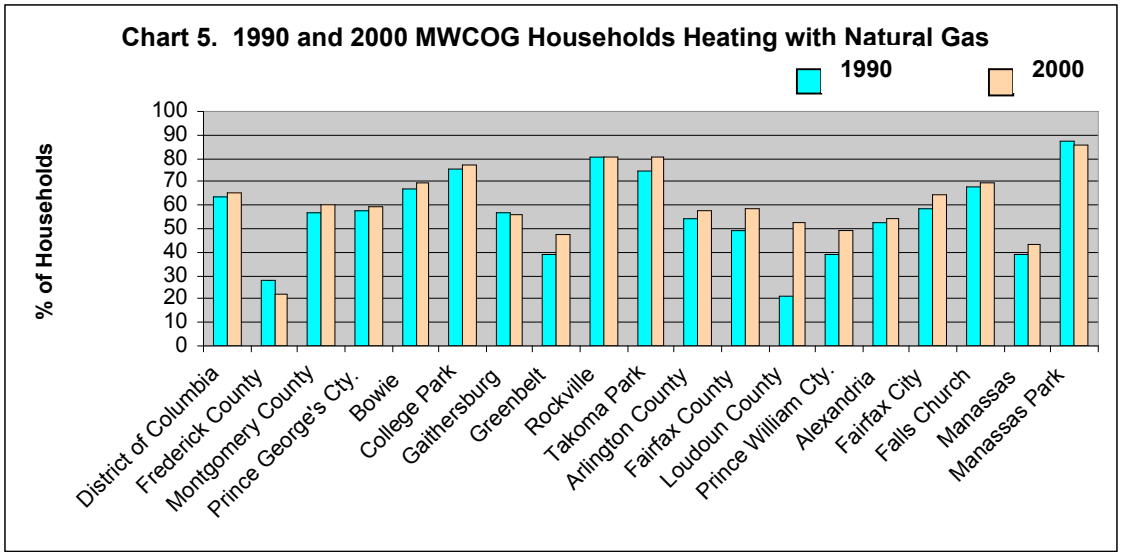
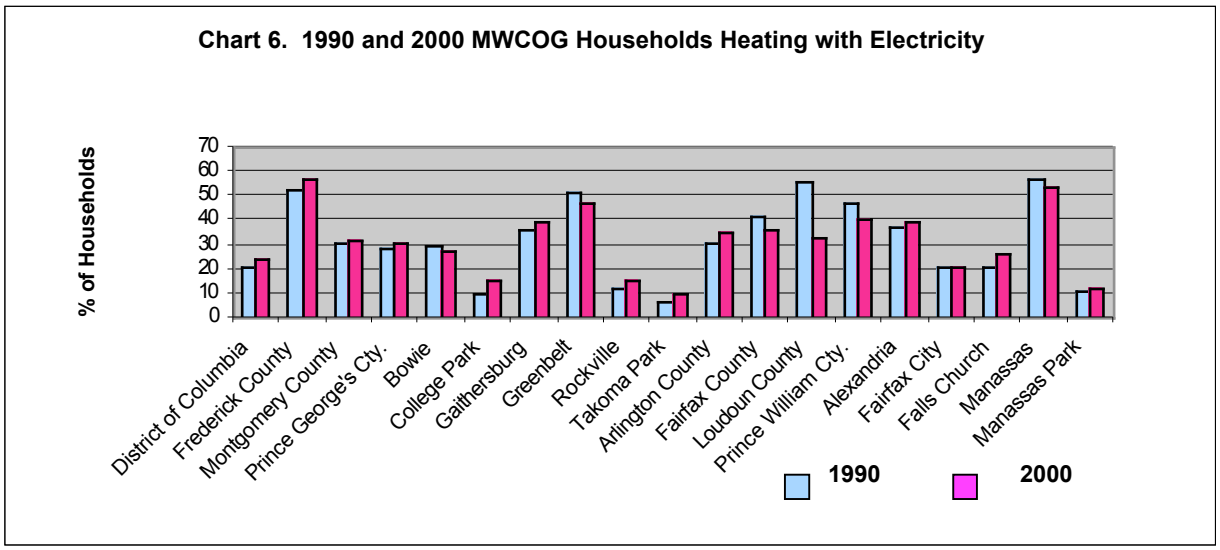


Chart 5 demonstrates the percent of households using natural gas or heating oil in 1990 and 2000 for each MWCOG jurisdiction. Loudoun County is the only jurisdiction with a significant change over the 10-year period, going from 20.9 percent to 52.9 percent of households heating with natural gas. Other counties at or approximating a 10 percent increase in household heating with natural gas are Greenbelt, Fairfax County and Prince William County. Frederick County is the only jurisdiction that experienced a decrease (from 27.3 percent to 21.7 percent) in the percentage of households heating with natural gas.



The percentage of households using electricity for home heating in 1990 and 2000 are shown in Chart 6. Five jurisdictions (Bowie, Greenbelt, Fairfax County, Loudoun



County and Prince William County) experienced a decrease in the use of electricity as a house heating fuel. The largest decrease occurred in Loudoun County (from 55.5 percent to 33 percent).

The EIA "end-use" for the energy consumed per household could not be disaggregated. The information was available by region and all the MWCOG jurisdictions are in the Southern Region. Table 6-11 summarizes per household end-use for electricity and

natural gas. Appliances are the dominant end-user for electricity and space heating is the dominant use for natural gas.

Table 6.11: End Uses of Electricity and Gas per Household

TABLE 6-11
End Uses of Electricity and Gas per Household

END USE	ELECTRICITY (14,240 kWh used per household)	NATURAL GAS (59 thousand cubic feet per household)
Space Heating	2,589	59
Air-Conditioning	3,336	41
Water Heating	2,645	20
Appliances	7,978	9

Source: EI A Residential Energy Consumption and Expenditure Survey 2001

In addition to the end-use for natural gas and electricity, EIA maintains information on the per capita expenditure by state and the District of Columbia, but this information cannot be disaggregated. As shown in Table 6-12, the average annual per capita expenditure for natural gas over the 21-year period from 1980 to 2001 decreased for Maryland and Virginia and increased slightly for the District of Columbia.

Table 6.12: Per Capita Expenditure for Natural Gas (By State)

TABLE 6-12
Per Capita Expenditure for Natural Gas, 1980 to 2001

Region	1990	2000	Average Annual Increase (Decrease)
Maryland	17 million Btu	15 million Btu	-0.50%
Virginia	10 million Btu	10 million Btu*	-0.10%
District of Columbia	21 million Btu	23 million Btu	-0.40%

Source: Energy Information Agency
**slight decrease but less than a million Btu*

As shown in Table 6-13, the annual average per capita expenditure for electricity from 1990 to 2001 increased for all three regions with the District of Columbia having the highest increase although the population decreased over that same period.

Table 6.13: Per Capita Expenditure for Electricity, 1990 to 2001

TABLE 6-13
Per Capita Expenditure for Electricity
1990 to 2000

Region	1990	2000	Average Annual Increase (Decrease)
Maryland	2,874 kWh	4,468 kWh	2.1%
Virginia	3,690 kWh	5,183 kWh	1.6%
District of Columbi	1,700 kWh	2,932 kWh	2.6%

Source: Energy Information Agency

Natural Gas & Electricity/Consumption/Price by Jurisdiction

MWCOG Jurisdiction-specific consumption, price and house heating fuel information gathered from the utility companies and the U. S. Census for the Residential Sector is summarized in Appendix 6.D. The information covered includes the following:

- Natural Gas Consumption in Therms (1990, 2000-2004)
- Electricity Consumption in Kilowatt Hours (2002-2004 for most jurisdictions)
- Average Price for Natural Gas in Dollars Per Thousand Cubic Feet (1990, 2000-2004)
- Average Price for Electricity in Cents Per Kilowatt Hour (2002-2004 for most jurisdictions)
- House Heating Fuel Use by Percent of Households (1990 and 2000)
- Number of Households (1990 and 2000)

For those instances where the utility company did not provide an average price for natural gas or electricity, the price for that state was used. Any aberrations in the information presented are also noted.

6.2 THE GASOLINE ESTIMATOR

There is limited information that provides data and analysis around gasoline consumption within the region. Thus, a gasoline estimator was developed by Jerome S. Paige & Associates to better understand gasoline consumption and the impacts of gasoline spending within the Region.

The Gasoline Estimator was derived from 1990 MWCOG air quality surveys used to develop the conformity analyses for the 2003-2008 Transportation Improvement Program/Constrained Long Range Plan (TIP/CLRP). This information was used to fill the information void in regional gasoline consumption and expenditures. Local data is necessary because EIA data does not provide any meaningful way to estimate local vehicle miles traveled (VMT).

The first step in building the Estimator was to determine the ratio of VMT for each MWCOG jurisdiction. One of the major VMT surveys in the TIP/CLRP covered these jurisdictions and hence provided usable estimates from which relative VMT could be derived. The second step was to apply these ratios against another set of data in the TIP/CLRP that estimated VMT for the entire region over the period covered in this Energy Plan. With this data in hand, the third step applied American Automobile Association gallons/mile estimates against the derived VMT in order to suggest the potential reduction in gasoline consumption afforded by various levels of gallons/per mile efficiency.

It should be noted that the MWCOG surveys were taken at different times and subsequent derivations appear to be based on many factors including traffic growth estimates. Much of the hard data is old and hence this Estimator must be viewed only as a tool for illustrating potential efficiencies. Certainly, air quality analyses provide more accurate estimates of local driving habits than national-level data; but the entire analysis would benefit from updated survey results.

To provide some indicators of the effects of improved automobile fuel efficiency on regional gasoline consumption, based on the model, we compare gasoline consumption in the years 1994, 2002, 2005, and 2015 under three scenarios which are, 14 mpg (Table 6-13), 20 mpg (Table 6-14), and 30 mpg (Table 6-15). For example, increasing miles per gallon to 20 mpg by the year 2015 from 14 mpg in the base year 1994, gasoline consumption in the region would be reduced to 9.8 million gallons -- from 14.0 million gallons, or by 4.2 million gallons (30 percent). See tables 6.13 through 6.15.

Table 6.14: Local Consumption Estimator @ 14m.p.g: A Prototype

TABLE 6-14 Local Gasoline Consumption Estimator (Detailed by Jurisdiction) 14 mpg scenario				
	1994	2002	2005	2015
Jurisdictions	Gasoline Gallons Consumed by Year/Jurisdiction			
Montgomery Co	79,750	96,207	102,498	122,426
Prince George's Co	540,238	651,723	694,336	829,336
Frederick Co	196,311	236,822	252,307	301,363
Charles Co	77,764	93,812	99,945	119,378
Calvert Co	44,265	53,399	56,891	67,952
Maryland Totals	938,326	1,131,963	1,205,977	1,440,455
Arlington	927,414	1,118,799	1,191,952	1,423,703
Alexandria	518,910	625,994	666,925	796,595
Fairfax	1,208,501	1,457,892	1,553,216	1,855,208
Loudoun Co	1,277,717	1,541,392	1,642,176	1,961,464
Prince William Co	1,816,949	2,191,902	2,335,219	2,789,256
Stafford Co	87,398	105,434	112,327	134,167
Virginia Total	5,836,890	7,041,414	7,501,815	8,960,394
District of Columbia	2,351,827	2,837,160	3,022,667	3,610,364
Total	9,127,044	11,010,537	11,730,459	14,011,212

Source: Jerome S. Paige & Associates

Table 6.15: Local Consumption Estimator @ 20 m.p.g: A Prototype

TABLE 6-15 Local Gasoline Consumption Estimator (Detailed by Jurisdiction) 20 mpg scenario				
	1994	2002	2005	2015
Jurisdictions	Gasoline Gallons Consumed by Year/Jurisdiction			
Montgomery Co	55,825	67,345	71,748	85,698
Prince George's Co	378,166	456,206	486,035	580,535
Frederick Co	137,418	165,776	176,615	210,954
Charles Co	54,435	65,668	69,962	83,565
Calvert Co	30,985	37,379	39,823	47,566
Maryland Totals	656,829	792,374	844,184	1,008,318
Arlington	649,190	783,159	834,366	996,592
Alexandria	363,237	438,196	466,847	557,617
Fairfax	845,951	1,020,525	1,087,251	1,298,646
Loudoun Co	894,402	1,078,975	1,149,523	1,373,025
Prince William Co	1,271,864	1,534,331	1,634,654	1,952,479
Stafford Co	61,178	73,803	78,629	93,917
Virginia Total	4,085,823	4,928,990	5,251,271	6,272,276
MD and VA				
District of Columbia	1,646,279	1,986,012	2,115,867	2,527,255
Total	6,388,930	7,707,376	8,211,321	9,807,849

Source: Jerome S. Paige & Associates

Table 6.16: Local Consumption Estimator @ 30 m.p.g: A Prototype

TABLE 6-16 Local Gasoline Consumption Estimator (Detailed by Jurisdiction) 30 mpg scenario				
	1994	2002	2005	2015
Jurisdictions	Gasoline Gallons Consumed by Year/Jurisdiction			
Montgomery Co	37,217	44,897	47,832	57,132
Prince George's Co	252,111	304,137	324,023	387,023
Frederick Co	91,612	110,517	117,743	140,636
Charles Co	36,290	43,779	46,641	55,710
Calvert Co	20,657	24,920	26,549	31,711
Maryland Totals	437,886	528,250	562,789	672,212
Arlington	432,793	522,106	556,244	664,395
Alexandria	242,158	292,131	311,232	371,744
Fairfax	563,967	680,350	724,834	865,764
Loudoun Co	596,268	719,316	766,349	915,350
Prince William Co	847,910	1,022,888	1,089,769	1,301,653
Stafford Co	40,786	49,202	52,419	62,611
Virginia Total	2,723,882	3,285,993	3,500,847	4,181,517
District of Columbia	141,858	151,133	180,518	
Total	3,303,626	3,965,376	4,244,154	4,853,729

Source: Jerome S. Paige & Associates

Montgomery County, MD provides one example of the effect of the rising fuel prices. From the period 2002-2005, Montgomery County increased its fuel consumption by 14 percent; however its fuel expenditures increased by 74 percent. See Appendix 6.E.

6.3 A MWCOG ENERGY INTELLIGENCE SYSTEM

Outlined below is a proposal for an energy intelligence system. As indicated in previous sections, no framework exists to provide a complete picture of the energy consumption, price, and expenditure data for the region. Consequently, the region is limited in its ability to understand and guide the region's transition to a new energy era.

Context

Given the:

1. rapid escalation of global crude oil prices to current levels over $60 per barrel, and, under a worst case scenario, consider the possibility of an escalation to nearly $100 per barrel;
2. persistent demand for petroleum and only somewhat moderate increases in natural gas and electricity demand attenuated only by appliance, building and transportation efficiency technology;
3. the new federal energy bill and its uncertain effects on energy demand and supply; and
4. the continuing threat of terrorism, particularly in the Washington Metropolitan Area, and the vulnerability of the energy and utility infrastructure serving the Metro Area,

Ultimately, the MWCOG needs to construct, manage and cultivate a Metropolitan Energy Intelligence System (EIS).

Concept

The EIS is a cost-effective resource available to the public, corporate, community-level and utility sectors that would provide:

1. ***Jurisdiction level data*** on energy consumption and expenditure patterns, by fuel type, in the residential, industrial, and commercial sectors, so that policymakers and utilities serving those jurisdictions plan more effectively for energy-related contingencies (such as supply interruptions, terrorist disruption of transmission and distribution lines, transformers, storage depots and other contingencies with alternative short-term supply alternatives).

2. ***Metropolitan-wide data*** provided on the patterns of energy consumption and expenditure data by fuel type. These data, configured and maintained in an EIS database by the MWCOG (including appropriate Geographic Information Systems data and satellite-generated data on energy infrastructure), are used to generate regional energy intelligence, to create planning scenarios and to promote short and longer-term federal, state and regional energy policy and planning.

3. ***Data to suppliers of energy,*** that includes utilities, fuel oil companies, alternative and renewable energy companies at the micro level (census-track, zip code) residential; institutional level: commercial, public sector and industrial levels. They also should address the macro: multi-jurisdictional, Washington metropolitan aggregate levels. It is evident from the research of Jerome S. Paige and Associates that most suppliers do not keep data at the jurisdictional level. Sector (customer) definitions differ by supplier; thus providing the data is easier for some rather than others. Further, few suppliers keep consumption information that can readily be assessed for more than three to five years. Cultivation of this type of data enables suppliers to generate intelligence about patterns of demand and price as well as impacts at levels not now available. These data also allow policy and planning discussions to occur between suppliers, federal, state and local policymakers using a common database and intelligence system.

Consequence

The three interrelated objectives an EIS allows include:

1. Energy Efficiency At Both Jurisdictional And Metro Levels

2. Emergency Energy Planning And Policy (Metro Energy Security)

3. Energy Supply Planning And Contingency

The EIS will enable the MWCOG to work with member jurisdictions to consider re-instituting shared fuel purchasing, residential energy demand messages, public sector transportation fleet, building and technology energy budgeting and commercial sector, particularly developers and the construction industry, to meet metro cultivated efficiency objectives.

Jurisdiction Level Data	Data on energy consumption and expenditure patterns, by fuel type, in the residential, industrial, and commercial sectors To assist policymakers and utilities to plan more effectively for energy-related contingencies such as: o Supply interruptions, o Terrorist disruption of transmission and distribution lines, transformers, storage depots, and o Other contingencies with alternative short-term supply alternatives.
Metropolitan-wide Data	Data on patterns of energy consumption and expenditure, by fuel type. This data, configured and maintained in an EIS database by the MWCOG, including appropriate Geographic Information Systems data and satellite-generated data on energy infrastructure, can be used to: o Generate regional energy intelligence, o Create planning scenarios, o Promote short and longer-term federal, state and regional energy policy and planning.
Data to Suppliers of Energy	Data on utilities, fuel oil companies, alternative and renewable energy companies at the: o Micro level (census-track, zip code) residential, institutional, commercial, public sector and industrial levels, o Macro-level: multi-jurisdictional, Washington metropolitan aggregate levels.

Compiled By: Jerome S. Paige & Associates

Summary

While the EIA data cannot be disaggregated to the regional level, this section of the Regional Energy Plan provides a framework for exploring ways to develop regional energy data for policy and planning activities and to measure the energy performance of the region. Such a framework would also assist the Region with its energy security planning as well.

7. ENERGY EFFICIENCY & CONSERVATION: BEST MANAGEMENT PRACTICES

This section of the Regional Energy Plan outlines energy best management practices. Regional energy goals can be met by developing policies and adopting best practices that significantly increase the energy efficiency of appliances, vehicles, and buildings; by diversifying the region's energy sources to include greater use of "green energy" and renewables; and by raising awareness of energy users so that they can make wise energy choices by creating a "culture of conservation".

Chapter Outline
Regional Energy Plan Policy Framework (TABLE 7-1 and 7-2) • Energy Efficiency & Conservation: Demand Side • Energy Efficiency & Conservation: Supply Side
Appliances: Best Management Practices (TABLE 7-3) • Best Management Practices in Promoting Energy Efficient Appliances • Effects of Energy Efficient Appliances • Benefits of Appliance Standards • Federal Standards • State Standards • Tax Credits & Holidays
Vehicles: Best Management Practices (TABLE 7-4) • Best Management Practices in Promoting Energy Efficiency Vehicles • Motor Fuel & Expenditures in the Tri-State Area • Mileage & Emissions Standards: California • Tax & Other Incentives • Vehicle Replacement • Return on Investment
Buildings: Best Management Practices (TABLE 7-5) • Non-Residential Sector: Building Best Management Practices • Financial Benefits of Green Buildings • Government: Building Best Management Practices • Residential Sector: Building Best Management Practices • Affordable Housing: Building Best Management Practices
Energy Behavior: Best Management Practices (TABLE 7-6) • Promoting Wise Energy Choices • Energy Taxes
Energy Sources: Best Management Practices (TABLE 7-7) • Wind Energy • Co-Generation • Solar Energy

TABLE 7-1 REGIONAL ENERGY PLAN POLICY FRAMEWORK			
Energy Efficiency & Conservation: Demand Side			
	Areas	**Importance in Energy Savings**	**Best Management Practices**
Vehicles	Fuel Efficiency Standards	Motor fuel comprises 61 percent of the petroleum consumed in the District; 54 percent of the petroleum consumed in Maryland; and 52 percent of the petroleum consumed in Virginia.	Fuel efficiency standards that meet or exceed the federal standards
Appliances			
	Appliance Efficiency Standards	The two biggest contributors to global warming are power plants and automobiles. Electricity comprises 61 percent of the energy needs of the District; 11 percent of Maryland, and 14 percent of Virginia. For the Tri-State Region, almost 26 percent of the region's energy comes from electricity.	Appliance Efficiency Standards that meet or exceed the federal standards
Buildings			
	Building Efficiency	In the United States, buildings account for major sources of total energy use, electricity consumption, greenhouse gas emissions, raw materials use, waste output, and potable water consumption.	Increase number of Green Buildings, in general, and the number of Leadership in Energy and Environmental Design (LEED) Certified Building, particular.
Behavior			
	Prices as a Conservation Incentive	There is an energy price level where consumers will begin to reduce their demand. Policymakers can increase the rate at which consumers reduce their energy demand by using taxes to raise prices.	Proposals and recommendations to use tax policy to maintain energy prices at levels that encourage a reduction in demand.
	Informed Energy Choices	Energy conservation leads to significant reductions in energy consumption.	Energy Education Programs that encourage consumers to make wise energy choices.

Table 7.2: Energy Efficiency & Conservation: Supply Side

TABLE 7-2 Energy Efficiency & Conservation: Supply Side			
	Areas	**Importance in Energy Savings**	**Best Management Practices**
Electricity	Renewable Energy	The purchase of wind energy by governments helps stimulate the generation of wind energy, conserves on non-renewable resources, and improves air quality.	Long-term contracts by governments to purchase wind energy.

Source: Jerome S. Paige & Associates

Table 7.3: Appliances: Best Case Management Practices

TABLE 7-3 Appliances: Best Management Practices	
Energy Efficient Appliances	
Best Management Practices in Promoting Energy Efficient Appliances: 1. Set regional energy efficiency standards for appliances at or above federal standards 2. Advocate for increased appliance energy efficiency standards 3. Promote "Energy Star" appliances 4. Provide incentives to purchase energy efficient appliances	
Effect of Energy Efficient Appliances: Energy Savings, Cost Savings, Power Plant Construction Avoidance:	
The biggest contributors to global warming are power plants and automobiles. Electricity comprises 61 percent of the energy needs of the District; 11 percent of Maryland, and 14 percent of Virginia. For the Tri-State Region, almost 26 percent of the region's energy comes from electricity. ENERGY STAR qualified appliances incorporate advanced technologies that use 10-50 percent less energy and water than standard models. The money saved on utility bills can more than make up for the cost of a more expensive but more efficient ENERGY STAR model.	
Benefits of Appliance Standards: Save Money, Protect Environment. Boost the Economy	
When the federal or state governments establish appliance and equipment standards, they are setting the bar for minimum energy efficiency of products. This can be done either at the manufacturing, sale, or installation stage. Standards save money for energy users, protect the environment, and boost the economy. They hasten adoption of energy-saving technology in products, often with improved performance. Greater energy efficiency means building fewer new power plants, improving air quality, and retaining more available consumer income that can be spent on other goods and services or saved. http://www.standardsasap.org/aboutstnds.htm	
Increased Efficiency Standards: Federal	New standards for furnaces and boilers alone could save about 3 percent of the oil and 6 percent of the natural gas used to heat American homes. The electricity savings could equal the output of 40 power plants, and the value to consumers could amount to about $6,000 per household by 2020.
	Appliances and Commercial Equipment Standards http://www.eere.energy.gov/buildings/appliance_standards/ Final Rules: New standards released for 11 appliances on October 18, 2005 can be found at: http://www.eere.energy.gov/buildings/appliance_standards/notices_rules.html

TABLE 7-3
Appliances: Best Management Practices

Energy Efficient Appliances		
Increased Efficiency Standards: States	A coalition of 15 states and the City of New York sued the federal Department of Energy for violating Congressionally-enacted mandates to adopt stronger energy-saving standards for 22 common appliances that use large amounts of electricity, natural gas and oil. The mandates were to be met by clearly specified deadlines. The standards, according to the federal governments own numbers, would generate substantial savings for consumers and reduce air pollution and global warming emissions from power plants. http://www.oag.state.ny.us/press/2005/sep/sep07a_05.html	
	1. New York 2. California 3. California Energy Commission 4. Connecticut 5. Iowa 6. Maine 7. Massachusetts 8. New Hampshire	9. New Jersey 10. New Mexico 11. North Carolina 12. Pennsylvania Dept. of Environmental Protection 13. Rhode Island Attorney 14. Vermont Attorney 15. Wisconsin 16. The City of New York
Tax Credits and Tax Holidays (State)	At least 16 states have tax incentive programs: http://www.ase.org/content/article/detail/2607	
	1. Arizona 2. California 3. Connecticut 4. Georgia 5. Hawaii 6. Idaho 7. Maryland	8. New Jersey 9. New Mexico 10. Nevada 11. New Jersey 12. Montana 13. Nevada 14. New York 15. Oklahoma 16. Oregon
Tax Credits (Federal)	Energy Policy Act 2005 www.energy.gov	
	The Tax Incentives Assistance Project (TIAP), sponsored by a coalition of public interest nonprofit groups, government agencies, and other organizations in the energy efficiency field, is designed to give consumers and businesses information they need to make use of federal income tax incentives for energy efficient products and technologies passed Congress as part of the Energy Policy Act of 2005 http://www.energytaxincentives.org/	

Source: Jerome S. Paige & Associates

Table 7.4: Vehicle Best Management Practices

TABLE 7-4
Vehicles: Best Management Practices

Energy Efficient Vehicles Best Management Practices

Best Management Practices in Promoting Energy Efficient Vehicles:

1. Advocate for increased automobile fuel efficiency standards
2. Promote the purchase & use of energy efficient vehicles
3. Government purchase of energy efficient vehicles
4. Provide incentives to purchase energy efficient appliances

Motor Fuel Use & Expenditures in the Tri-State Area

The Transportation Sector accounts for 15.3 percent of the energy consumed in the District; 28.5 percent of the energy in Maryland; and 29.6 percent, in Virginia. For the Tri-State region, the Transportation Sector accounts for 28.6 percent of the energy consumed.

Table 7.4: Vehicle Best Management Practices

Motor fuel comprises 61 percent of the petroleum consumed in the District; 54 percent of the petroleum consumed in Maryland; and 52 percent of the petroleum consumed in Virginia.

	District of Columbia	Maryland	Virginia	Tri-State Total	Tri-State Percent
Residential	$310	$3,179	$4,325	$7,813	26.74%
Commercial	$826	$2,433	$2,963	$6,223	21.30%
Industrial	$25	$1,170	$2,025	$3,221	11.02%
Transportation	$318	$4,663	$6,977	$11,958	40.93%
Totals	$1,479	$11,446	$16,290	$29,215	100.00%

Tri-State Area
Expenditures Petroleum, 2001
Million Dollars

	District of Columbia	Maryland	Virginia	Tri-State Total	Tri-State Percent
Distillate Fuel	$82.6	$1,254.8	$1,954.5	$3,291.9	22.42%
Jet Fuel	$0.0	$97.5	$324.9	$422.4	2.88%
LPG	$0.3	$157.8	$290.5	$448.6	3.06%
Motor Gasoline	$275.1	$3,798.8	$5,323.4	$9,397.3	64.01%
Residual Fuel	$6.4	$129.3	$179.6	$315.3	2.15%
Other	$16.8	$338.5	$449.7	$805.0	5.48%
Totals	$381.2	$5,776.7	$8,522.6	$14,680.5	100.00%
Distillate Fuel	21.67%	21.72%	22.93%	22.42%	22.42%
Jet Fuel	0.00%	1.69%	3.81%	2.88%	2.88%
LPG	0.08%	2.73%	3.41%	3.06%	3.06%
Motor Gasoline	72.17%	65.76%	62.46%	64.01%	64.01%
Residual Fuel	1.68%	2.24%	2.11%	2.15%	2.15%
Other	4.41%	5.86%	5.28%	5.48%	5.48%
Totals	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Energy Information Agency

TABLE 7-4 Continued Vehicles: Best Management Practices	
Mileage & Emissions Standards	State of California
	Ten states have or are considering adopting the California emission standards: http://www.dec.state.ny.us/website/press/pressrel/2005/2005131.html http://www.redefiningfederalism.org/SLES/Sol1.asp 1. Connecticut 2. Maine 3. Massachusetts 4. New Jersey 5. New York 6. Oregon 7. Pennsylvania 8. Road Island 9. Vermont 10. Washington Automobile manufacturers and the federal government have raised legal challenges to some of the standards.
Tax & Other Incentives	A wide variety of federal and state tax incentives exist to reduce the costs of alternative fuel vehicles. In addition, some states provide for relaxed HOV restrictions.
Vehicle Replacement	Many governmental units, at all levels, are replacing existing vehicles with ones that are more efficient and with alternative fuel vehicles that replace those using diesel fuel. Environmental Protection Agency requires States and the District of Columbia to purchase alternative fuel vehicles. The District has set a goal of a 90 percent replacement rate, which exceeds the Federal standard.
Rate of Return	For a guide to the rate of return on purchasing higher fuel efficient vehicles, see Appendix7 that illustrate the annual return on investment (ROI), under different assumptions related to price, miles driven and vehicle replacement costs.

Table 7.5: Buildings: Best Management Practices

TABLE 7-5
Buildings: Best Management Practices

Best Management Practices in Promoting Energy Efficient Buildings:

1. Insure that building and conservations codes reflect the latest advancements in building energy efficient
2. Promote & adopt LEED standards for renovation and new construction
3. Promote incentives for business and households to use the most energy efficient buildings and practices when renovating or building new.

The commercial sector accounts for 61.8 percent of the energy consumed in the District; 26.2 percent of the energy in Maryland; and 23.1 percent, in Virginia. For the Tri-State region, the commercial sector accounts for 25.9 percent of the energy consumed.

In the United States, buildings account for:

- 36 percent of total energy use;
- 65 percent of electricity consumption;
- 30 percent of greenhouse gas emissions;
- 30 percent of raw materials use;
- 30 percent of waste output;
- 12 percent of potable water consumption.

California (State)	Governor Arnold Schwarzenegger signed Executive Order S-20-04 regarding Green Buildings on December 14, 2004. It established the State of California's priority for energy and resource-efficient high performance buildings. The Executive Order sets a goal of reducing energy use in state-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encourages the private commercial sector to set the same goal. http://www.energy.ca.gov/greenbuilding/index.html
San Jose, CA	Since 2001, all new government building over 10,000 square feet have to meet LEED standards.

Financial Benefits of Green Buildings
Summary of Findings (per ft2)

Category	20-year Net Present Value
Energy Savings	$5.80
Emissions Savings	$1.20
Water Savings	$0.50
Operations & Maintenance Savings	$8.50
Productivity & Health Benefits	$36.90 to $55.30
Sub-Total	$52.90 to $71.30

TABLE 7-5 Buildings: Best Management Practices	
Average Extra Cost of Building Green	(-$3.00 to -$5.00)
Total 20-year Net Benefit	$50 to $65
Source: Capital E Analysis	
Residential Sector: Building Best Management Practices	
The residential section accounts for 20.3 percent of the energy consumed in the District; 27.5 of the energy in Maryland; and 23.7 percent, in Virginia. For the Tri-State region, the residential sector accounts for 25 percent of the energy consumed.	
Austin, Texas	In conjunction with a program sponsored by the city-owned utility company, about one-fifth of all new homes in Austin, Texas are built under green criteria, which include air-conditioners that are at least 20 percent more efficient than those adapted to national standards. This program has been in effect for 12 years.
	Austin Energy is a community-owned electric utility and a department of the City of Austin. "Our goal is to provide you with world-class customer service." http://www.austinenergy.com/ The Austin Energy Green Building Program is nationally known for expertise in "green" residential and commercial construction. http://www.ci.austin.tx.us/greenbuilder/ Rich, Motoko, "Aiming to Be the Next Big Amenity", NY Times, November 13, 2003.
Colorado Built Green	The total for 2004 Built Green home registrations statewide is approximately 5,742; 76 percent of which were in the Denver, Colorado metro area. This volume exceeded their goal for 2004 by 13 percent. Based upon total 2004 registrations, over 25,000 homes have been registered as Built Green since the program began. 2004 Built Green home registrations in the 8-county metro area represent a market share of approximately 27 percent. 2004 Built Green home registrations statewide represent a market share in Colorado of approximately 14 percent of all residential permits. The number of registered homes is a testament of the program's success and an indicator of its exponential growth over the past eight years.
	http://www.builtgreen.org/ http://www.builtgreen.org/about/2004_executive_summary.pdf Rich, Motoko, "Aiming to Be the Next Big Amenity", NY Times, November 13, 2003.

TABLE 7-5 Buildings: Best Management Practices	
National Resources Defense Council: Green Affordable Housing	In 2004, a premier national affordable housing provider and a leading national environmental group launched the Green Communities Initiative, a five-year, $550 million commitment to build more than 8,500 environmentally friendly affordable homes across the country. The initiative will offer financing, grants and technical assistance to developers to build affordable housing that promotes health, conserves energy and natural resources and provides easy access to jobs, schools and services. The Green Communities Initiative is a partnership of The Enterprise Foundation/Enterprise Social Investment Corporation (ESIC) and the Natural Resources Defense Council (NRDC), along with the American Institute of Architects, the American Planning Association, and top corporate, financial and philanthropic organizations. Over time, the initiative hopes to transform the way Americans think about, locate, design and build affordable homes.
	Enterprise and Natural Resources Defense Council Launch $550 Million Initiative For Healthy, Environmentally Friendly Affordable Housing http://www.nrdc.org/media/pressreleases/040928.asp Marks, Alexandria, "Affordable housing goes 'green'" Such homes may cost more to build, but cities are encouraging them for their long-term savings. http://search.csmonitor.com/search_content/1122/p03s03-ussc.html

Source: Vick, Robert, "A 'WHITE PAPER' Review of GREEN BUILDING", Supply House Times, Oct 2005. (48)(8)
Compiled By: Jerome S. Paige & Associates

Table 7.6 Energy Behavior: Best Management Practices

TABLE 7-6
Energy Behavior: Best Management Practices

Best Management Practices in Promoting Wise Energy Choices:

1. Promote a "culture of conservation" through energy awareness programs and messages.
2. Reassess energy taxes to insure they are promoting wise energy choice.

Expenditures by Sectors, 2001
Million Dollars

	District of Columbia	Maryland	Virginia	Tri-State Total	Tri-State Percent
Residential	$310	$3,179	$4,325	$7,813	26.74%
Commercial	$826	$2,433	$2,963	$6,223	21.30%
Industrial	$25	$1,170	$2,025	$3,221	11.02%
Transportation	$318	$4,663	$6,977	$11,958	40.93%
Totals	$1,479	$11,446	$16,290	$29,215	100.00%

Source: Energy Information Agency

Conservation focuses on encouraging energy users to make wise energy choices. The choices include appliances, vehicles and structures. Likewise sponsors noted that prices play a major role in guiding choices and thus the argument for energy taxes. However, beyond making wise choices, developing a culture of conservation is important. Consequently, public information and education programs are an important component of a strategy to reduce the reduction in the consumption in energy.

Awareness of Tax Incentives	http://www.energytaxincentives.owrg/
Education & Awareness Programs	DC Energy Office Pilot School Education Program

Energy Taxes as Incentives to Guide Choice: Behavior Best Management Practices

As the price of gasoline began to reach $3.00 a gallon and beyond, softening in demand was observed. This suggests that consumers are sensitive to sufficiently high energy prices and will adjust their demand when prices reach certain levels.

Explore proposals and recommendations tax policy to maintain energy prices at levels that encourage a reduction in demand.

Table 7-7: Energy Sources: Best Management Practices

TABLE 7-7
Energy Sources: Best Management Practices

Best Management Practices in Promoting a Variety of Energy Sources:

1. Use fuel purchasing agreements to access "green" energy
2. Adopt a "Solar Roof" goals for the region
3. Promote the expansion of co-generation of energy

Wind Energy: Renewable Energy Best Management Practices

District of Columbia Maryland Virginia	Several jurisdictions in the Tri-State area are purchasing up to 5 percent of their electricity from wind to provide power in government buildings. Montgomery County Maryland is a regional leader in purchasing wind energy for government use.

Co-Generation: Renewable Energy Best Management Practices

Combined Heat and Power (CHP) – A New Perspective on Energy

According to the Mid Atlantic Combined Heat and Power Application Center, based in the Center for Environmental Engineering at the University of Maryland, the integrated systems for cooling, heating and power (CHP) – which also are known as cogeneration, trigeneration, energy recycling, cooling, heating and power, or total energy systems – provide a mixture of energy services to a single facility or to a group of buildings. Electricity to such buildings is provided by on-site or near-site power generators using one or more of the many options: internal combustion (IC) engines, combustion turbines, microturbines, steam turbines or fuel cells. In CHP systems, heat that otherwise would be wasted is "recycled" and used for cooling, heating, or dehumidifying.

CHP Benefits Include: Reduced energy costs, Improved power reliability, Increased energy efficiency, and Improved environmental quality.

http://www.chpcenterma.org/

According to the Mid-Atlantic CHP, answering yes to any three of the following 11 questions makes a project a good candidate for CHP:

1. Do you pay more than $.06/ kWh on average for electricity (including generation, transmission and distribution)?
2. Are you concerned about the impact of current or future energy costs on your business?
3. Is your facility located in a deregulated electricity market?
4. Are you concerned about power reliability? Is there a substantial financial impact to your business if the power goes out for 1 hour? For 5 minutes?
5. Does your facility operate for more than 5000 hours/ year?
6. Do you have thermal loads throughout the year (including steam, hot water, chilled water, hot air, etc.)?
7. Does your facility have an existing central plant?
8. Do you expect to replace, upgrade or retrofit central plant equipment within the next 3-5 years?
9. Do you anticipate a facility expansion or new construction project within the next 3-5 years?
10. Have you already implemented energy efficiency measures and still have high energy costs?
11. Are you interested in reducing your facility's impact on the environment?

District of Columbia Maryland Virginia	All local jurisdictions have available to them incentives to promote CHP

Solar Energy: Renewable Energy Best Management Practices

District of Columbia Maryland Virginia	The Maryland Million Solar Roofs (MSR) Partnership was recognized as the U.S. Department of Energy's Million Solar Roofs Initiative (MSR) Best Progress in the Mid-Atlantic Region award winner of 2005 at the Interstate Renewable Energy Council's (IREC) 23rd Annual Meeting in Washington, D.C. during the Solar Power 2005 Conference.

Tri-State Energy Consumption, 2001

	Trillion Btu's				
Fuel Type (2001)	District of Columbia	Maryland	Virginia	Total	Percentage
Coal	0.70	317.20	482.40	800.30	20.50%
Natural Gas	30.60	191.40	246.70	468.70	12.01%
Petroleum	33.50	568.10	911.20	1512.80	38.76%
Nuclear Electric Power	0.00	142.70	269.10	411.80	10.55%
Hydro Electric Power	0.00	12.00	-12.50	-0.50	-0.01%
Wind & Waste	1.10	28.00	93.20	122.30	3.13%
Other	0.00	0.30	0.60	0.90	0.02%
Electricity: Net Interstate Flows of Electricity/Losses	102.30	160.50	323.90	586.70	15.03%
Total	168.20	1420.20	2314.60	3903.00	100.00%

Tri-State Energy Consumption, 2001					
	Million Dollars				
Fuel Type (2001)	District of Columbia	Maryland	Virginia	Tri-State Total	Tri-State Percent
Coal	$1.3	$496.2	$783.6	$1,281.1	4.39%
Natural Gas	$363.0	$1,890.5	$1,916.8	$4,170.3	14.27%
Petroleum	$381.1	$5,776.8	$8,522.5	$14,680.4	50.25%
Nuclear Electric Power	$0.0	$63.6	$119.0	$182.6	0.63%
Hyrdo Electric Power	$0.0	$24.0	$0.0	$24.0	0.08%
Wood & Waste	$1.8	$0.0	$107.2	$109.0	0.37%
Other	$0.0	$0.3	$0.0	$0.3	0.00%
Electric Power Sector	-$8.2	-$789.3	-$1,087.4	-$1,884.9	-6.45%
Electricity: Net Interstate Flows of Electricity/Losses	$740.1	$3,983.3	$5,928.4	$10,651.8	36.46%
Totals	$1,479.1	$11,445.4	$16,290.1	$29,214.6	100.00%
Source: Energy Information Agency					

Summary

Regional energy goals can be met by developing policies and adopting best practices that significantly increase the energy efficiency of appliances, vehicles, and buildings. Meeting these goals includes diversifying the region's energy sources to include greater use of "green energy" and renewables; and by raising the awareness of energy users so that they can make wise energy choices and opt into a "culture of conservation".

8. REGIONAL ENERGY POLICY FRAMEWORK GUIDES

This section of the Regional Energy Plan compiles all the frameworks used throughout the report. In addition, it includes the outline for an "Energy Transition Scorecard" for MWCOG Region.

List of Frameworks

1. New Energy Era Defined
2. Multi-Prong Approach to Energy Efficiency & Conservation
3. Major Energy Challenges
4. Proposed Regional Energy Goals & Objectives
5. MWCOG Policy Framework
6. Gasoline Policy Discussion Framework
7. Range of Possible Effects of Rising Gasoline Prices
8. Heating/Cooling Fuel Policy Discussion Framework
9. Energy Information System Framework
10. Energy Transition Scorecard Outline Framework

1. New Energy Era Defined

A New Energy Era Defined	
Rising global demand	World demand for energy is growing at a rate of 2% per year.
Tight energy supplies	The large economies of world are beginning to compete more openly to ensure energy is available to meet their economic growth goals.
High energy prices	High and volatile energy prices are the result of the global demand-supply relationship, and high energy prices are necessary to expand energy supplies.
"Peak Oil Debate"	Worldwide discussion, debate and analysis is underway as to whether, the world will reach its highest capacity to produce oil starting 20 years from now. Evidence is being mounted to both prove and disprove whether the world is about to enter into a period of "peak oil". Regardless of how the debate is resolved, new sources of oil will require increasingly expensive investments and thus higher prices to sustain those investments.

2. Multi-Prong Approach to Energy Efficiency & Conservation

Energy Efficiency & Conservation: Demand Side			
	Areas	**Importance in Energy Savings**	**Best Practices**
Vehicles	Fuel Efficiency Standards	Motor fuel comprises 61% of the petroleum consumed in the District; 54% of the petroleum consumed in Maryland; and 52% of the petroleum consumed in Virginia.	Fuel efficiency standards that meet or exceed the federal standards
Appliances	Appliance Efficiency Standards	The two biggest contributors to global warming are power plants and automobiles. Electricity comprises 61% of the energy needs of the District; 11% of Maryland, and 14% of Virginia. For the Tri-State Region, almost 26% of the region's energy comes from electricity.	Appliance Efficiency Standards that meet or exceed the federal standards
Buildings	Building Efficiency	In the United States, buildings account for major sources of total energy use, electricity consumption, greenhouse gas emissions, raw materials use, waste output, and potable water consumption.	Increase number of Green Buildings, in general, and the number of LEED Certified Building, particular.

Energy Efficiency & Conservation: Demand Side			
	Areas	**Importance in Energy Savings**	**Best Practices**
Behavior	Prices as a Conservation Incentive	There is an energy price level where consumers will begin to reduce their demand. Policymakers can increase the rate at which consumers reduce their energy demand by using taxes to raise prices.	Proposals and recommendations to use tax policy to maintain energy prices at levels that encourage a reduction in demand
	Informed Energy Choices	Energy conservation leads to significant reductions in energy consumption.	Energy Education Programs that encourage consumers to make wise energy choices

Energy Efficiency & Conservation: Supply Side			
	Areas	**Importance in Energy Savings**	**Best Practices**
Electricity	Renewable Energy	The purchase of wind energy by governments helps stimulate the supply of wind energy, conserves on non-renewable resources, and improves air quality.	Long-term contracts by governments to purchase wind energy

3. Major Energy Challenges

Major Energy Challenges	
Areas	**Challenges**
Economic Development	To keep dollars from following away from other regional consumption and services into energy and flowing out of the regional economy into the international economy
Energy Security	To reduce the effects of potential supply disruptions
Emergency Planning	To enhance "homeland security"
Economic Assistance	To assist low and moderate income households
Provision of Public Services	To maintain public service delivery while energy costs are rising and energy tax revenues may be falling
Environmental Quality	To improve the environment
Locational Decisions	To promote living and working locations and activity that are energy efficient; “Smart Growth”

PRELIMINARY POLICY OBJECTIVES, FOCUS, AND ACTIONS
Key Energy Policy Objectives
1. To keep dollars from following away from other regional consumption and services into energy and flowing out of the regional economy into the international economy 2. To reduce the effects of potential supply disruptions 3. To enhance "homeland security" 4. To assist low and moderate income households, with special attention to those using heating oil and propane 5. To maintain public service delivery while energy costs are rising and energy tax revenues may be falling 6. To improve the environment 7. To promote living and working locations and activity that are energy efficient

Conservation/Demand/Efficiency	
Focus	**Policy**
High prices encourage consumers to engage in wise energy practices	Prices & Taxes: Explore using some combination of the price system (relative high energy prices) and the tax system (new energy taxes) to raise the importance of energy conservation and efficiency and to fund energy assistance and energy efficiency and energy affordability assistance and tax incentives.
Guiding energy consumption choices	Tax Incentives for Energy Efficiency (Energy Start Appliances). Expand use of tax incentives and reduction of sales taxes to promote the purchase of energy efficiency appliances.

Conservation/Demand/Efficiency	
Focus	**Policy**
Standards to improve energy efficiency of appliances will play a major role in improving the energy efficiency of the region and mitigating the effects of the high and rising energy prices.	Appliance Standards: Promote the adoption of appliance standards. The Maryland Energy Office has been pursuing that issue, but their actions on hold to wait for the regulations for the new energy bill.
Standards to improve energy efficiency of structures have played a major role in improving the energy efficiency of the region. The building code is an important policy tool to foster energy efficiency.	Building Energy Efficiency Standards: Insure that the ongoing updating of the local building codes include the latest in energy efficiency and assess whether the rate can be increased that those standards can be strengthened.
	Government Buildings: Improve the energy efficiency of government buildings through performance contracting and through bond funding for energy improvements in government buildings. Prince George's County has a major initiative to improve the energy efficiency of its school buildings.
Reduction of the use of motor fuel is critical if the region is going to reduce its dependence on petroleum.	Alternative Fuel Vehicles (Consumers/Businesses): Publicize tax and non-tax incentives (federal, state, and local incentives) for hybrid fuel vehicles and vehicles that increase the average miles pre gallon. Alternative Fuel Vehicles (Government): Adopt at the regional level the state level mandates the purchase of AFVs. The District of Columbia Government has set a standard that is higher than the federal standard.
Promoting a variety of sources and of distribution networks will promote energy independence.	Renewable Energy: Expand the purchase of renewable (green) energy through aggregation agreements. Montgomery, Fairfax and Price Georges County all have municipal aggregation agreements that include renewable energy.

Conservation/Demand/Efficiency	
Focus	**Policy**
Assistance/Affordability	
Mitigating the effect of high prices on low and moderate income households will be important because of the differential effects of higher energy effects due to income groups.	Energy Assistance Funding: Expand state and local funds for Low Income Home Energy Assistance. Energy Assistance Tax Credits (Costs): Explore tax credits for energy assistance for direct relief of high energy costs. Energy Tax Credits (Efficiency) Publicize tax credits for building energy improvements and explore expanding those credits when appropriate.
Contingency Planning/Emergency Planning	
The potential for short-term energy shortages has increased because world demand has grown faster than the world supply (including production and distribution capacity).	Intergovernmental Cooperation: Update the agreement to manage energy shortages if they energy.

4. Proposed Regional Energy Goals and Objectives

Regional Energy Goals and Objectives **Proposed Energy Goal**
Energy Independence for
o Sustained Economic Growth o Enhanced Energy Affordability o Increased Energy Security & Stability o Improved Environmental Quality

Proposed Regional Energy Policy: Economic Objectives
o Insure adequate and reliable energy supply to support the region's economic growth and development o Minimize outflow of dollars from region's economy o Assist low and moderate income household to cope with the high cost of energy o Maintain public service delivery in an era of rising energy prices o Seek opportunities for aggregation of energy purchases o Support policies that result in cost-effective energy efficiency standards
Illustrative Policies/Best Practices to Support Economic Objectives
o Develop Tax and other incentives o Promote the adoption of appliance standards o Update Building Energy Efficiency Standards o Improve energy efficiency in Government Buildings o Expand state and local funds for Low Income Home Energy Assistance o Support Cost-Savings Through Aggregate Energy Purchases

Proposed Regional Energy Policy: Environmental Objectives
o Support implementation of energy technologies that are environmentally sound o Promote development and implementation of renewable energy sources o Promote development and implementation of alternatively, clean fueled vehicles o Promote and implement energy conservation practices to reduce energy consumption and limit environmental impacts of energy production and use

Illustrative Policies/Best Practices to Support Environmental Objectives

- Publicize tax & non-tax incentives for hybrid fuel vehicles and other alternative fuel vehicles
- Adopt at the regional level the state level mandates the purchase of AFVs
- Expand the purchase of renewable (green) energy through aggregation agreements
- Expand regional wind energy purchase agreement
- Incorporate ENERGY STAR equipment into MWCOG's cooperative purchasing program
- Encourage a regional agreement for LEED Standard for SIP credit

Proposed Regional Energy Policy: Security and Stability Objectives

- Protect Critical and Vital Energy Resources
- Reduce Dependence on Foreign Sources of Oil/Petroleum Products
- Reduce Potential Impacts of Energy Supply

Illustrative Policies/Best Practices to Support Energy Security Objectives

- Implement and Regularly Exercise and Test Regional Emergency Plans to Mitigate the Impacts of Energy Supply Disruptions
- Promote Redundancy and Reliability Improvements in the Region's Energy Infrastructure
- Support Diversification of Regional Energy Portfolio
- Reduce Potential Impacts of Energy Supply Disruptions
- Ensure the Coordination Among Groups Involved in Energy Emergency Planning and Preparedness

5. MWCOG Policy Framework

MWCOG Policy Framework	
Area	**Policy Actions**
Behavior	Guiding energy consumption choices
Consumption Levels	Reducing demand
Consumption Efficiency	Improving efficiency
Source Variety	Promoting a variety of sources and of distribution networks
Assistance	Mitigating the effect of high prices on low and moderate income households
Contingency Planning	Managing crises

6. Gasoline Policy Discussion Framework

GASOLINE POLICY DISCUSSION FRAMEWORK			
Over 50 percent of the petroleum used in the Tri-State Area is for motor fuels			
Policy Area	**Policy Tool**	**Considerations**	
Vehicle Miles Per Gallon (Efficiency)	Standards to improve vehicle efficiency	The role of mileage standards in reducing the demand for petroleum	Improving Environmental Quality Managing Differential Effects on Income, Business, and Government Groups Strengthening the Regional Economy
Behavior (Commercial/ Commuting Practices)	Prices to Guide Choices	The role of relatively high prices in reducing the demand for gasoline, since trends suggest it has only been since July 2005, after three years of rising gasoline prices that gasoline sales have begun to decline	
	Taxes to Shift Demand	The role of motor fuel taxes to shift demand and to keep energy dollars from flowing out of the region	
Tax System	Taxes to Raise Dedicated Revenue	The adverse of effects on tax collection ▪ due to reduced gasoline consumption, ▪ in turn, due to increasing gasoline prices, ▪ leads to a reduction in gasoline purchased ▪ (Note: the amount of tax collected varies with volume sold, not with price)	Improving Productivity of Tax System
Supply Disruptions	Regional Plans to Allocate Supplies if a Shortage Occurs	The potential for short-term shortages since the worldwide demand for petroleum is increasing faster than worldwide supply	Managing Temporary Shortages Expanding Use of Alternative Fuels Promoting Efficiency & Conservation

7. Range of Possible Effects of Rising Gasoline Prices

RANGE OF POSSIBLE EFFECTS OF RISING GASOLINE PRICES				
Transportation	Household	Business	Government	Environment
Reduced Gasoline Usage	Reduced shopping and eating out	Reduction in business volume	Increase cost of operations	Less air pollution
Reduction in Inefficient Vehicles	Reduced consumption of other important items like medicine	Reduction in business receipts	Reduction in Services	Greater air quality compliance
Greater Transit Use ▪ Metro Rail ▪ Metro Bus ▪ Local Bus	Increased delinquencies in monthly payments	Reduced profit margins	Reduction in motor fuel taxes	Greater air quality compliance
More Carpooling	Increased number of households needing energy assistance	Increased prices if market will allow higher energy costs to pass through	Increase in requests for energy assistance	Greater air quality compliance

8. Heating/Cooling Fuel Policy Discussion Framework

<table>
<tr><th colspan="4">HEATING/COOLING FUEL POLICY DISCUSSION FRAMEWORK</th></tr>
<tr><td colspan="4">21 percent of the energy used in the Tri-State Area is for natural gas and distillate fuels</td></tr>
<tr><th>Policy Area</th><th>Policy Tool</th><th colspan="2">Considerations</th></tr>
<tr><td>Building Energy Efficiency Standards</td><td>Standards to improve energy efficiency of structures</td><td colspan="2">The role of the building codes in fostering energy efficiency</td></tr>
<tr><td>Appliance Efficiency Standards</td><td>Standards to improve energy efficiency of appliances</td><td colspan="2">The role of efficiency standards in fostering energy efficiency</td></tr>
<tr><td rowspan="2">Behavior</td><td>Prices to Guide Choices</td><td rowspan="2">The role of relatively high prices in encouraging consumers to engage in wise energy practices</td><td rowspan="2">Improving Environmental Quality

Managing Differential Effects on Income, Business, and Government Groups

Strengthening the Regional Economy</td></tr>
<tr><td>Education/Awareness to Guide Choices</td></tr>
<tr><td>Tax System</td><td>Tax Incentives for Energy Efficiency</td><td colspan="2">The role of tax policy in guiding energy choices, keeping dollars in local economy, and financing energy efficiency and conservation initiatives.</td></tr>
</table>

9. Energy Efficiency Information System

<table>
<tr><th colspan="2">ENERGY EFFICIENCY INFORMATION SYSTEM</th></tr>
<tr><td colspan="2">The EIS will enable the MWCOG to work with member jurisdictions to consider re-instituting shared fuel purchasing, residential energy demand messages, public sector transportation fleet, building and technology energy budgeting and commercial sector, particularly developers and the construction industry, to meet metro cultivated efficiency objectives.</td></tr>
<tr><td colspan="2">The three interrelated objectives an EIS allows include:</td></tr>
<tr><td colspan="2">1. Energy Efficiency At Both Jurisdictional and Metro Levels
2. Emergency Energy Planning and Policy (Metro Energy Security)
3. Energy Supply Planning and Contingency</td></tr>
<tr><td>Jurisdictional Level Data</td><td>Data on energy consumption and expenditure patterns, by fuel type, in the residential, industrial, and commercial sectors

To assist policymakers and utilities to plan more effectively for energy-related contingencies such as:

• Supply interruptions
• Terrorist disruption of transmission and distribution lines, transformers, storage depots and
• Other contingencies with alternative short-term supply alternatives.</td></tr>
<tr><td>Metropolitan-wide Data</td><td>Data on patterns of energy consumption and expenditure, by fuel type

These data, configured and maintained in an EIS database by the MWCOG, including appropriate Geographic Information Systems data and satellite-generated data on energy infrastructure, can be used to:

• Generate regional energy intelligence,
• Create planning scenarios
• Promote short and longer-term federal, state and regional energy policy and planning.</td></tr>
<tr><td>Data to Suppliers of Energy</td><td>Data on utilities, fuel oil companies, alternative and renewable energy companies at the

Micro level (census-track, zip code) Residential, institutional, commercial, public sector and industrial levels

Macro-level: multi-jurisdictional, Washington metropolitan aggregate levels.</td></tr>
</table>

10. Energy Transition Scorecard

THE ENIGMATIC EFFECTS OF RISING GASOLINE PRICES ON THE REGION OF METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS	
Stylized Facts 1. Gasoline prices have been increasing 2. Demand for gasoline has remained unchanged and in some cases has increased 3. Metro Ridership not up due to rising gasoline prices	
Major Economic Question	If rising gasoline prices do not lead to a reduction in the quantity of gasoline consumed – total or average -- then what changes are taking place outside of the gasoline market to accommodate the increase in gasoline prices? In other words, what adjustments are taking place outside of the gasoline markets?
Key MWCOG Policy Enigma	As long as gasoline supplies are adequate, policymakers will have to look to areas other than the reduction in demand for gasoline to understand the effects of rising gasoline prices on households, businesses, and governments in the region.
If rising gasoline prices do not lead to a reduction in the demand for gasoline, then how are households and business adjusting to these higher prices?	Households are reducing their consumption of other goods & services Businesses are reducing other costs – non-energy costs Business and households are replacing existing vehicles with more fuel-efficient vehicles.
If rising gasoline prices do not lead to a reduction in the demand for gasoline, then where do regional policy makers look to find early warnings signals to respond to rising energy prices?	Declining sales and or sales tax receipts from small businesses Negative effects on low-income consumers Decreasing numbers of people working at individual businesses Reduction in number of operating businesses that is dependent on gasoline.
If rising gasoline prices do not lead to a reduction in the demand for gasoline, then what are the prospects of improving air quality through the reduction in the demand for gasoline?	Air quality improvements will not be realized because demand is not falling.

Trend	Economic Concept	Discussion MWCOG Policy Challenge
Gasoline Demand		
Rising gasoline does not lead to a reduction in the total or average miles driven	Price Inelasticity of the Demand for Gasoline	Short Run: Rising prices of gasoline may not lead to a reduction in demand – in total or average miles driven. In such a situation, quantity demanded is considered to be price inelastic. This may be particularly true in the short-run. In the short-run, consumers may not be able to alter their habits, such as commuting patterns, the average miles per gallon of existing automobiles, or the location of services only available by car. So in the short-run, there may be little responsiveness to rising gasoline prices.
Rising gasoline does not lead to a reduction in the total or average miles driven	Price Inelasticity of the Demand for Gasoline	Long Run: Over time, there may be a change in "habits" – in consumption and driving patterns or in the types of vehicles purchased. Over time consumers may be able to alter their "habits", such as commuting patterns, the average miles per gallon of existing automobiles, or the location of services only available by car.

Demand for Non-Gasoline Goods & Services			
Rising gasoline prices lead to a reduction in the demand for non-gasoline purchases	Substitution of Goods & Services	Rising gasoline prices may lead consumers to reduce their consumption of energy. Because of rising energy prices, they may cut back spending on other items such as food, entertainment or clothes.	This may be the major policy challenge, identifying the effects of rising gasoline on the reduction of consumption of other goods and services. In other words, the early warning signals for rising gasoline prices may show up in the non-gasoline sales.
Rising gasoline prices lead to a reduction in the gasoline because budgets can absorb significant increases prices	Substitution of Goods & Services	For the "average" household in the Southern Region, with an income of $76,000 and spending $1,400 a year on motor fuels,	The major policy challenge here is the effects of the rising gasoline on those with incomes below the average.

Rising gasoline prices lead to significant increases in overall inflation	Real income effects offset	If energy prices are rising, but overall prices are relatively stable or falling, then the effects of rising prices may not have an effect on overall real purchasing power.	The policy challenge is to identify the areas of the economy where rising gasoline are having a negative effect.

Non-Gasoline Company Prices, Costs and Profits		
Rising gasoline prices lead to significant increases in overall inflation	Retail prices remain relatively constant causing internal company adjustments	Due to globalization and other competitive forces, companies may not be able to increase prices, even if energy costs are increasing.
Overall Economic Activity		
Rising gasoline prices lead to reductions in economic output	Energy efficiency/Energy Management	More housing, population, employment and sales are evident. Economic growth is taking place without significant increases in energy, which suggests that rising gasoline prices may not have a dramatic effect on the economy as whole.

Overall Economic Activity		
Rising gasoline prices have not lead to reductions in economic output	Energy efficiency/Energy Management	With more housing, population, employment and sales, economic growth is taking place without significant increases in energy consumption.
Rising gasoline prices are causing increasing amount of money to flow out of the region	Exporting Dollars from the Regional Economy	With gasoline prices rising, and demand steady, more and more money is exported out of the local economy. Alternatively, more spending could be injected into the regional economy if spending were shifted away from gasoline purchases.

Table 8.1: Example Score Card at a Glance - Prices

Prices							
	1990	2000	2001	2002	2003	2004	2005
Crude Oil $ per barrel							
Gasoline $ per gallon							
Heating Oil $ per gallon							
kWh							
$ per kWh							

Source: Jerome S. Paige & Associates

Table 8.2: Example Score Card at a Glance – Tax Receipts

Tax Receipts							
	1990	2000	2001	2002	2003	2004	2005
Motor Fuel							
Gross Receipts							

Source: Jerome S. Paige & Associates

Table 8.3: Example Score Card at a Glance – Rate of Growth

Rate of Growth of Gross State Product & Energy Consumed							
	1990	2000	2001	2002	2003	2004	2005
District of Columbia GSP							
District of Columbia Consumption							
Maryland GSP							
Maryland Consumption							
Virginia GSP							
Virginia Consumption							

Source: Jerome S. Paige & Associates

Table 8.4: Example Score Card at a Glance – Economic/Demographic

Economic/Demographic							
	1990	2000	2001	2002	2003	2004	2005
Households							
Households Qualifying for Energy Assistance							
Employment							
Unemployment							
VMT							
Transit Ridership							

Source: Jerome S. Paige & Associates

Table 8.5: Example Score Card at a Glance – Alternative Fuels

Alternative Fuels							
	1990	2000	2001	2002	2003	2004	2005
AFVS							
Wind Power							
Solar Power							
Average MPG of Automobiles							

Source: Jerome S. Paige & Associates

Table 8.6: Example Score Card at a Glance – Locational Codes

Locational Choices							
	1990	2000	2001	2002	2003	2004	2005
Percent of New Construction within x miles of Metro							
Average Miles Driven to Work							
Average Vehicle Miles Driven							

Source: Jerome S. Paige & Associates

Summary

As the Region transitions to a new energy era defined by rising global demand, tight global energy supplies and high global energy prices, policymakers will need several guides to help shape a new energy future. Throughout this report several matrices were provided to help summarize actions policymakers can consider and some of the implications of those suggested actions. This section compiles an overview of the various frameworks presented and referenced in the full report.

9. SECTOR RESEARCH

Residential Research Approach

A thorough review has been made of the likely sources of energy consumption, price and expenditure information for the non-government sectors (Residential, Commercial, Industrial, and Transportation) for 1990 and 2000-2004. See APPEN_9.A for a definition of each sector. The review included web searches and telephone conversations to confirm the existence, or lack thereof, of consumption-price-expenditure information and the ability to disaggregate the available information to the jurisdictional level. As can be seen in the Table 9.1, none of the agencies or organizations listed could provide the energy consumption/price/expenditure information, disaggregated by jurisdiction, for the desired time frames for the non-governmental sectors.

Table 9.1: Agency/Organization Resource Summary

AGENCY/ORGANIZATION	CONSUMPTION & PRICE EXPENDITURE DATA	DATA CAN BE DISAGGREGATED
MWCOG Headquarters	**Very Limited**	**Yes**
MWCOG 19 Jurisdictions	**Very Limited**	**Yes**
Public Service Commissions (3) and State Energy Administration Offices	**Yes**	**No**
Energy Information Administration (EIA)	**Yes**	**No**
Chambers of Commerce for jurisdictions (15)	**No**	**n/a**
National Association of Counties (NACO)	**No**	**n/a**
National Association of Regional Councils	**No**	**n/a**
National League of Cities	**No**	**n/a**

Source: Jerome S. Paige & Associates

For parallelism in reviewing energy consumption, price and expenditure data, it seemed best to follow the report format used by the U.S. Energy Information Administration (EIA) for the jurisdictional information and, to the extent possible to use the same sources for gathering and/or deriving the data. Table 9.2 summarizes the EIA primary sources of information but does not list every source that is used or portray the complexity inherent in the consumption, price and expenditure estimates that are prepared for each state on an annual basis.

Table 9.2: EIA Primary Sources of Consumption, Price and Expenditure Information

ENERGY	DATA SOURCE	COMMENT
Gas	Service utility companies, gas producers, processors, distributors, storage operators and pipeline operators	Companies submit data EIA form 176) in aggregate by state
Electricity	Service utility companies, electric power producers, wholesale power marketers, energy service providers	Companies submit data (EIA form 861) in aggregate by state
	Dealer Survey	EIA Survey forms (821 and 782c) that were sent to 3800 dealers nationwide are confidential and disaggregation may not be statistically valid
Petroleum	EIA survey of Power Plants and State Energy Data Systems (SEDS)	EIA combines the coal consumed for the residential and commercial sectors and factors an amount (less than one percent of all coal consumed). State consumption figures are used for the industrial sector. No data is available for the transportation sector.
Coal	EIA survey, Census data and U.S. Bureau of Census Manufacturing and Industries survey and SEDS	EIA combines information from these sources to derive consumption and expenditure information.

Compiled By: Jerome S. Paige & Associates

Data Collection

The public service commissions for Maryland, Virginia and the District of Columbia were contacted to determine the suppliers of natural gas and electric services to the MWCOG jurisdictions. The suppliers listed in APPEN_9.B were contacted directly (by telephone and email) and asked to provide energy consumption and price information for 1990 and 2000-2004 by jurisdiction and, within jurisdiction, by sectors (Residential, Commercial, Industrial and Transportation).

Non-Government Sector Gas & Electric Service Suppliers

Requests were made to the utility suppliers during March 15-30, 2005. See sample request in APPEN_9.C. Numerous phone calls were made and emails sent to garner the requested information. As can be seen from APPEN_9.D it took almost five months to secure the requested data and in most instances, not all of the requested information was provided.

Two jurisdictions, Montgomery County and Manassas, were able to supply energy information from their own databases. In every other instance, the information requested required the suppliers to generate non-standard report information and in several instances (PEPCO Energy Services and Washington Gas), listings of jurisdictional zip codes were provided to facilitate company extraction of information in disaggregated form from their databases (see APPEN_9.E & APPEN_F) for the zip code listing by jurisdiction). One company supplied the information by zip codes per year, per segment so it was necessary to sort and summarize the data for each jurisdiction. Only one supplier, Northern Virginia Electric Cooperative (NOVEC), required payment ($10,000) to supply the requested information. The NOVEC request was withdrawn. Information received from BGE Home Services and Columbia Gas of Virginia was provided for the entire region served by the firm and neither firm could provide a method (zip codes, market share or percent of total sales) for disaggregating its data.

Although there are database issues and time constraints, the gas and electric utilities are by far the best source of energy information and, by working with each supplier, a consumption and price profile (by sector within each jurisdiction) can be completed and maintained as part of the recommended Energy Intelligence System (EIS) discussed in Section 6.3 of this report.

Residential-Specific Sector Information

In addition to the gas and electric information supplied by the utility service companies, EIA information was culled to determine the best approach for building a jurisdictional profile for the other energy sources (petroleum, coal, wood and solar). The findings from this review are recapped below.

Petroleum:

The Residential Sector uses three types of petroleum products; specifically, distillate fuel, kerosene and liquefied petroleum gas (LPG). EIA annually collects and maintains petroleum product consumption and expenditure information and reports these residential petroleum products by State. Efforts were made to secure the raw data (EIA survey forms 821 and 782c) for Maryland and Virginia (the District of Columbia would not need to be disaggregated) but the request was denied because the information is confidential to EIA and there is serious concern that any approach used to disaggregate the data may be statistically invalid. Since petroleum dealers are encouraged to submit the survey forms to their state energy administration office, these offices were contacted for raw data. The state administration offices do not receive these forms consistently so the states' raw data are incomplete.

A list of the petroleum dealers that have participated in the EIA petroleum dealer survey for Maryland, Virginia and the District of Columbia was secured for future reference. Fifty-five (55) dealers report sales in Virginia, 43 report sales in Maryland and 16 report sales in the District of Columbia. Only three of the firms reporting sales

in Maryland, Virginia and the District of Columbia are based in Virginia (two firms) or Maryland (one firm).

It is difficult to disaggregate the petroleum information to the jurisdictional level for the residential sector since, according to a representative from the Maryland Energy Administration; dealers are reluctant to provide information even to the State. Consequently, the following alternate approaches were considered.

a) Using the EIA petroleum information by region (Maryland, Virginia and the District of Columbia) to develop a "per household" petroleum measure to be applied to the corresponding census year household population.
b) Using the house heating fuels Census information to assess the trend in petroleum usage for the residential sector.

Because petroleum consumption in the Residential Sector is minor compared to natural gas and electricity, the emphasis was placed on securing gas and electricity consumption and using the U. S. Census information to determine the trend in petroleum usage among MWCOG households.

Wood, Geothermal, Coal and Solar Energy

EIA also estimates wood, geothermal, coal and solar energy usage for the Residential Sector by year, by State. As with petroleum usage, a "per household" measure for each fuel type could be calculated and applied to Census household populations or the Census house heating fuel information could be used to monitor trends with these energy sources. Collectively, these energy sources represent very limited usage by the Residential Sector so the house heating fuels Census information was used for this report to look at trend in usage versus the amounts of each type of energy consumed.

Residential Energy "End-Use" Data Collection

EIA conducts an annual survey of the Residential Sector energy end-use (space heating, water heating, air conditioning and appliances). The information is collected by Census Region and cannot be disaggregated. The 19 MWCOG jurisdictions fall in the South Census Region. The data is calibrated for households per square miles and annual weather norms (precipitation, heating-degree and cooling-degree days) per for each State within the South Census Region. Per household calculations are provided for each energy source end-use. It appears the only way to secure end-use information by jurisdiction is to conduct primary research either as an independent project or as a sub-set of the EIA annual survey.

MWCOG Government Sector Research

All 19 of the regions jurisdictions were contacted either via email and/or telephone to obtain consumption and expenditure data for the state and local government area. As mentioned in an earlier status report our initial contact was an introductory email on March 28, 2005, introducing them to the project and deliverable.

That letter stimulated much feedback, which resulted in various conference calls starting April 1 through April 5, 2005. Each jurisdiction was encouraged to call in and share feedback regarding initial request. Over the next several months, correspondence and questions were provided to each jurisdiction regarding deliverables and next steps. The final deadline was extended until July 1, 2005.

As of August 15, 2005 the following jurisdictions responded, which represent 31.6% of those contacted:

Table 9.3: MWCOG Sample Research

Jurisdiction	Provided By	Information Received
City of Bowie	Joy Tyson/Byron Matthews	Data Sheet
Prince William County	Prashant Shrestha	Data Sheet
City of College Park	Sara Imhulse/Joe Nagro	Data Sheet
Loudoun County	Najib Salehi	Data Sheet
Loudoun County	Michael Barancewicz/John Lord	Data Sheet
Loudoun County	Jnajib Laehi	Data Sheet
Montgomery County Maryland	Mark Ricketts	Fuel Use for Montgomery County
City of Gaithersburg	Bob Peeler	Data Sheet
District of Columbia	Howard Ebenstein	District's Cost

Compiled By: Jerome S. Paige & Associates

Summary

This section demonstrates the approach used to collect data on energy consumption, expenditures, and prices from both government and non-governmental sources. The section highlights several of the challenges in getting current data. Further it illustrates that with the assistance of the major energy suppliers for the region, a local energy information system can constructed. Supplementary a successful regional energy system can provide the baseline data needed to measure the progress, outline trends, and provide early warning signals related to energy needs and/or concerns within the region.

10. RECOMENDATIONS & INITIATIVES

As demonstrated throughout this document, the MWCOG should focus on several initiatives to ensure adequate energy for the region presently and going forward. Thus, we recommend the following:

- Key Recommendations
  - Adopting a Regional Energy Information System
  - Setting Regional Energy Savings Targets
  - Expanding Education & Outreach
  - Monitoring & Updating Energy Policy & Planning

Appendix 10.A provides a comprehensive PowerPoint outlining the proposed recommendations and solutions.

MWCOG Regional Energy Plan

APPENDIX 2

APPEN_2.A List of the Energy Programs for Virginia.

Energy Efficiency and Renewable Energy in Virginia

Energy Efficiency and Conservation
Virginia Building Energy Codes Source: Building Energy Codes

State Energy Management Programs Source: Federal Energy Management Program

Weatherization and Low-Income Energy Programs Source: Weatherization Assistance Program

Renewable Energy
Virginia Bioenergy Resources Source: State Energy Alternatives

Virginia Hydropower Resources Report Source: INEEL Hydropower Program

Virginia Wind Activities Source: Wind Powering America

Distributed Energy Information for Virginia Source: Distributed Energy Program

Solar Resources Source: State Energy Alternatives

Wind Resource Map Source: Wind Powering America

Transportation
Transportation Fuel Vehicle Incentives and Laws in Virginia Source: Alternative Fuels Data Center

State Energy Program
Energy Office Project Briefs Source: SEP newsletter, *Conservation Update*

SEP Projects in Virginia Source: State Energy Program (SEP)

Financial Incentives for State Consumers
Virginia Incentives for Renewable Energy Source: Database of State Incentives for Renewable Energy

State Publications
Virginia Case Studies Source: State Energy Program

Virginia Publications on Renewable Energy and Energy Efficiency Source: State Energy Program

http://www.eere.energy.gov/states/state_specific_information.cfm/state=VA

APPEN_2.B Virginia Incentives for Renewable Energy

Virginia Incentives for Renewable Energy

http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=VA

Financial Incentives

Industry Recruitment
Solar Manufacturing Incentive Grant (SMIG) Program

Property Tax Exemption
Local Option Property Tax Exemption for Solar

State Grant Program
Virginia Small Wind Incentives Program (VSWIP)

Alternative Fuel and Vehicle Incentives
U.S. Department of Energy's Alternative Fuels Data Center

Rules, Regulations & Policies

Generation Disclosure
Fuel Mix and Emissions Disclosure

Interconnection
Interconnection Standards

Net Metering Rules
Net Metering

Solar Access Law/Guideline
Solar Easements

Solar and Wind Access Law
Rockingham County - Small Wind Ordinance

Alternative Fuel and Vehicle Policies
U.S. Department of Energy's Alternative Fuels Data Center

APPEN_2.C Energy Programs for the District of Columbia

Energy Efficiency and Renewable Energy in District of Columbia

The following are links to EERE Web sites that have District of Columbia -specific pages.

Energy Efficiency and Conservation
District of Columbia Building Energy Codes
Source: Building Energy Codes

State Energy Management Programs
Source: Federal Energy Management Program

Weatherization and Low -Income Energy Programs
Source: Weatherization Assistance Program

Renewable Energy
District of Columbia Bioenergy Resources
Source: State Energy Alternatives

District of Columbia Wind Activities
Source: Wind Powering America

Distributed Energy Information for District of Columbia

Source: Distributed Energy Program

Transportation
Transportation Fuel Vehicle Incentives and Laws in District of Columbia

Source: Alternative Fuels Data Center

State Energy Program
Energy Office Project Briefs Source: SEP newsletter, *Conservation Update*

SEP Projects in District of Columbia
Source: State Energy Program (SEP)

Financial Incentives for State Consumers
District of Columbia Incentives for Renewable Energy
Source: Database of State Incentives for Renewable Energy

State Publications
District of Columbia Publications on Renewable Energy and Energy Efficiency Source: State Energy Program

http://www.eere.energy.gov/states/state_specific_information.cfm/state=DC

APPEN_2.D District of Columbia Incentives for Renewable Energy

District of Columbia Incentives for Renewable Energy
http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=DC

Financial Incentives ?

State Grant Program
District of Columbia Renewable Demonstration Project
Alternative Fuel and Vehicle Incentives
U.S. Department of Energy's Alternative Fuels Data Center

Rules, Regulations & Policies

Generation Disclosure
Fuel Mix Disclosure
Interconnection
Interconnection Standards
Net Metering Rules
Net Metering
Public Benefits Fund
Reliable Energy Trust Fund
Renewables Portfolio Standard
Renewables Portfolio Standard
Alternative Fuel and Vehicle Policies
U.S. Department of Energy's Alternative Fuels Data Center

APPEN_2.E Maryland List of Energy Programs

Energy Efficiency and Renewable Energy in Maryland

Energy Efficiency and Conservation
Maryland Building Energy Codes
Source: Building Energy Codes

State Energy Management Programs

Source: Federal Energy Management Program

Weatherization and Low-Income Energy Programs

Source: Weatherization Assistance Program

Renewable Energy
Maryland Bioenergy Resources
Source: State Energy Alternatives

Maryland Hydropower Resources Report
Source: INEEL Hydropower Program

Maryland Wind Activities
Source: Wind Powering America

Distributed Energy Information for Maryland
Source: Distributed Energy Program

Solar Resources Source: State Energy Alternatives

Wind Resource Map
Source: Wind Powering America

Transportation
Transportation Fuel Vehicle Incentives and Laws in Maryland
Source: Alternative Fuels Data Center

State Energy Program
Energy Office Project Briefs Source: SEP newsletter, *Conservation Update*

SEP Projects in Maryland
Source: State Energy Program (SEP)

Financial Incentives for State Consumers
Maryland Incentives for Renewable Energy
Source: Database of State Incentives for Renewable Energy

State Publications
Maryland Case Studies
Source: State Energy Program

Maryland Publications on Renewable Energy and Energy Efficiency Source: State Energy Program

http://www.eere.energy.gov/states/state_specific_information.cfm/state=MD

APPEN_2.E Maryland List of Energy Programs CONT'D

Maryland Incentives for Renewable Energy

http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=MD

Financial Incentives

Corporate Tax Credit

Corporate Income Tax Credit for Green Buildings

Local Rebate Program

Montgomery County - Clean Energy Rewards Program

Personal Tax Credit

Personal Income Tax Credit for Green Buildings

Property Tax Exemption

Local Option - Corporate Property Tax Credit
Special Property Assessment

Sales Tax Exemption

Wood Heating Fuel Exemption

State Loan Program

Community Energy Loan Program
State Agency Loan Program

State Rebate Program

Solar Energy Grant Program

Alternative Fuel and Vehicle Incentives

U.S. Department of Energy's Alternative Fuels Data Center

http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=MD

APPEN_2.E Maryland List of Energy Programs CONT'D

Maryland Incentives for Renewable Energy

Rules, Regulations & Policies

Generation Disclosure
Fuel Mix and Emissions Disclosure
Green Power Purchasing/Aggregation
Montgomery County - Green Power Purchasing
Prince George's County - Green Power Purchasing
State of Maryland - Clean Energy Procurement
Interconnection
Interconnection Standards
Net Metering Rules
Net Metering
Renewables Portfolio Standard
Renewable Energy Portfolio Standard and Credit Trading
Solar Access Law/Guideline
Solar Access
State Construction Policy
Life Cycle Costs in State Building Projects

APPEN_2.F U.S. Department of the Energy's Efficiency and Renewable Energy Programs & Activities by State

Related Programs & Initiatives

Green Power Network: Buying Green Power in Your State ?The U.S. Department of Energy's Green Power Network provides news and information on green power markets and related activities. This site provides state-by-state information on Green Power Marketing in Competitive Electricity Markets and Utility Green Pricing Programs.

In addition, the site lists marketers of Renewable Energy Certificates (RECs -- also known as green tags or tradable renewable certificates), which represent the environmental attributes of the power produced from a renewable energy project. Whether or not consumers have access to green power through their local utility or a competitive electricity marketer, consumers can purchase RECs without having to switch electricity suppliers.

Million Solar Roofs Initiative ?The U.S. Department of Energy's Million Solar Roofs (MSR) Initiative brings together business, government, the energy industry, and community organizations with a commitment to install a set number of solar energy systems by 2010. Activities typically include consumer education, professional workshops, and other outreach activities to help individuals and organizations who are considering installing a solar system. Click here to find Partnerships in your state.

Wind Powering America ?The U.S. Department of Energy's Wind Powering America site provides state-by-state wind project information, including validated wind maps, anemometer loan programs, small wind guides, legislative briefings, wind working groups, and state-specific news.

Source: The Database of State Incentives of Renewable Energy (DSIRE)

MWCOG Regional Energy Plan

APPENDIX 6

APPEN_6.A MWCOG Residential Natural Gas Consumption

APPEN_6.A MWCOG Residential Natural Gas Consumption Years 1990 and 2000-2004 (in Therms)						
Jurisdiction	**1990**	**2000**	**2001**	**2002**	**2003**	**2004**
Alexandria	12,518,054	15,143,151	14,229,176	15,012,307	17,616,892	11,261,119
Arlington	22,497,929	25,861,171	23,389,363	24,654,751	27,277,170	17,322,835
Bowie	1,112	15,850,986	14,870,430	15,848,690	17,622,868	11,628,231
College Park	N/A	3,411,289	3,416,658	3,224,658	8,778,097	2,544,573
District of Columbia	104,011,435	100,969,445	95,620,402	94,161,986	1,441,753	69,592,559
Falls Church	13,511,941	15,665,023	14,053,282	14,645,070	1,277,910	10,039,885
Fairfax City	12,954,305	21,587,925	21,818,051	22,109,064	26,185,889	17,833,029
Fairfax County	56,032,056	84,126,795	82,541,397	83,710,888	96,770,184	65,886,376
Frederick	N/A	456	771	591	937	570
Gaithersburg	N/A	13,608,166	13,554,099	14,635,796	17,039,196	11,000,956
Greenbelt	N/A	564,764	585,001	573,477	533,184	469,661
Loudoun County	2,655,949	17,251,916	21,266,658	24,876,740	23,064,248	24,333,477
Manassas	636,238	1,620,300	1,945,250	2,353,191	2,359,523	2,075,562
Manassas Park City	1,651	654,438	793,983	892,743	888,188	815,400
Montgomery County	2,734	78,916,441	77,102,918	77,889,696	77,439,787	58,970,896
Prince George's County	N/A	81,636,706	80,647,138	80,544,297	79,812,732	63,238,664
Prince William County	11,098,759	19,009,396	19,595,512	22,281,084	22,520,901	19,652,384
Rockville	N/A	31,807,018	30,950,701	31,641,949	31,847,850	23,721,354
Takoma Park	N/A	N/A	N/A	N/A	N/A	N/A

Source: Washington Gas

APPEN_6.B Gas Sales to Third Party Suppliers

MWCOG Residential Natural Gas Sales to Third Party Sales Reported by Washington Gas: Years 2001-2004 (in Therms)

Jurisdiction	1990	2000	2001	2002	2003	2004
Alexandria	2,752,832	2,965,091	2,723,182	2,785,596	3,223,893	2,069,787
Arlington	5,184,000	5,730,376	5,133,002	5,321,378	5,799,693	3,666,834
Bowie	N/A	4,191,932	3,877,745	4,004,199	4,305,041	2,734,648
College Park	N/A	983,123	988,632	916,754	11,338,433	732,028
District of Columbia	12,450,370	13,090,795	12,371,871	12,403,047	1,831,758	9,078,155
Falls Church	3,683,549	1,433,979	3,664,572	3,793,927	1,978,902	2,559,837
Fairfax City	3,809,986	5,290,720	5,215,135	5,116,935	37,495,309	3,916,114
Fairfax County	16,450,994	22,071,853	21,444,464	21,215,487	24,045,908	15,968,814
Frederick	N/A	N/A	N/A	N/A	N/A	N/A
Gaithersburg	N/A	3,311,210	3,243,352	3,332,426	3,736,589	2,386,808
Greenbelt	N/A	174,258	179,637	169,454	158,061	140,319
Loudoun County	639,238	3,1231,474	3,608,154	3,789,380	3,500,714	3,077,680
Manassas	57,823	252,730	272,971	306,849	308,033	241,052
Manassas Park City	N/A	88,302	116,785	128,748	128,035	100,435
Montgomery County	N/A	25,627,749	24,921,364	24,692,141	24,565,642	18,210,623
Prince George's County	N/A	19,619,135	19,428,994	19,137,620	18,944,590	14,717,261
Prince William County	2,795,427	32,952,933	3,923,159	4,098,051	22,520,901	3,010,240
Rockville	N/A	11,376,473	11,019,230	11,048,133	11,110,885	7,978,109
Takoma Park	N/A	N/A	N/A	N/A	N/A	N/A

Source: Washington Gas

APPEN_6.C MWCOG Electricity Consumption

Table 6-C
MWCOG Electricity Consumption
2000-2004
(in Kilowatt Hours)

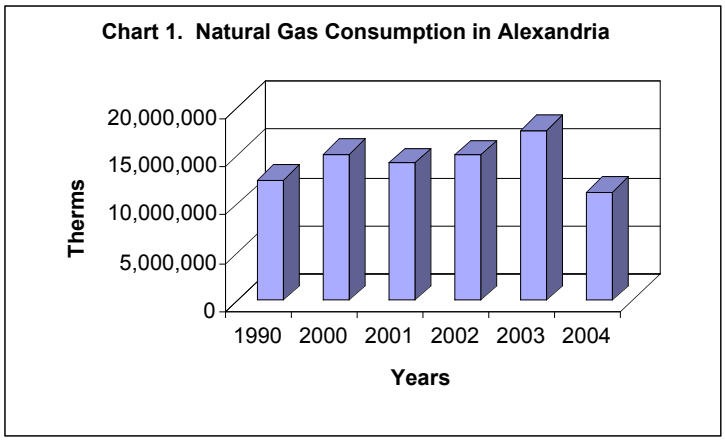
Jurisdiction	2000	2001	2002	2003	2004
Alexandria	N/A	N/A	3,788,811	5,001,776	4,551,851
Arlington	N/A	N/A	3,650,880	4,797,932	4,177,501
Bowie	N/A	30,051	312,079	587,033	505,365
College Park	N/A	903,758	2,945,739	2,882,263	2,706,361
District of Columbia	3,687,000	3,775,000	TBD	TBD	TBD
Falls Church	N/A	N/A	1,272,575	1,594,749	1,581,303
Fairfax City	N/A	N/A	3,289,931	2,922,992	2,389,202
Fairfax County	N/A	N/A	20,829,838	22,234,957	20,109,911
Frederick	1,099,914,858	1,183,075,682	1,206,273,200	1,300,672,200	1,404,613,607
Gaithersburg	N/A	7,375,342	22,972,359	31,131,978	25,829,764
Greenbelt	N/A	434,598	1,774,309	1,981,465	1,763,113
Loudoun County	N/A	N/A	4,181,322	3,699,237	3,177,446
Manassas	166,811,000	170,297,000	174,186,000	180,508,000	186,287,000
Manassas Park City	N/A	N/A	N/A	N/A	N/A
Montgomery County	298,409,697	395,864,323	489,008,643	631,305,934	642,175,303
Prince George's County	N/A	6,756,052	44,989,090	77,797,565	74,715,422
Prince William County	N/A	N/A	709,255	729,604	737,751
Rockville	N/A	11,105,840	31,396,312	36,922,395	34,016,019
Takoma Park	N/A	698,391	1,668,532	1,745,308	1,826,711

Sources: Dominion Virginia Power, Pepco Energy Services and Allegheny Power

APPEN_6.D

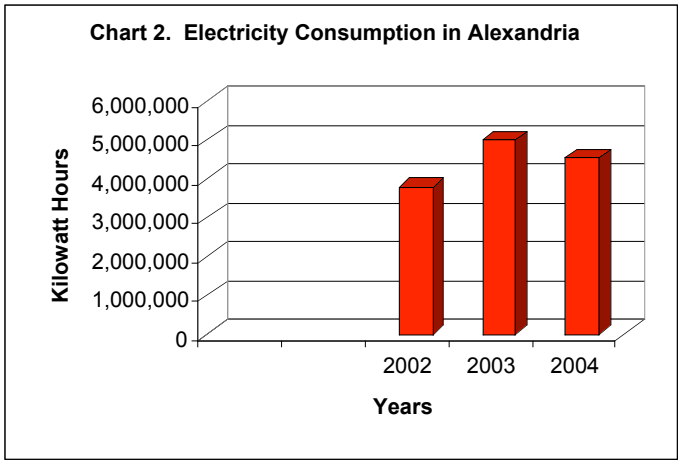
GAS & ELECTRIC CONSUMPTION/PRICE BY MWCOG JURISDICTION

ALEXANDRIA - RESIDENTIAL ENERGEY PROFILE



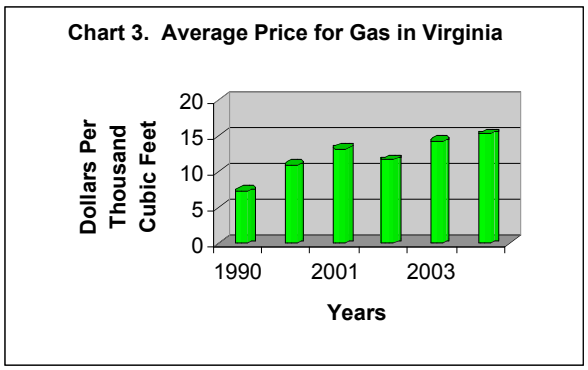
Year	Therms Consumed	Source/Supplier
1990	12,518,054	Washington Gas
2000	15,143,151	Washington Gas
2001	14,229,176	Washington Gas
2002	15,012,307	Washington Gas
2003	17,616,892	Washington Gas
2004	11,261,119	Washington Gas

Source: Washington Gas



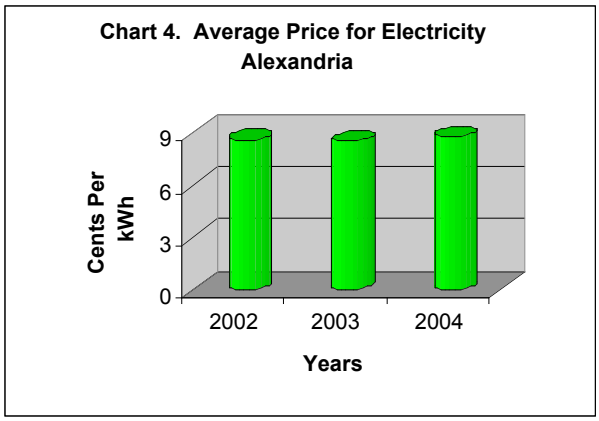
Year	Kilowatt Hours	Source/Supplier
2002	3,788,811	Dominion VA Power & PEPCO
2003	5,001,776	Dominion VA Power & PEPCO
2004	4,551,851	Dominion VA Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services



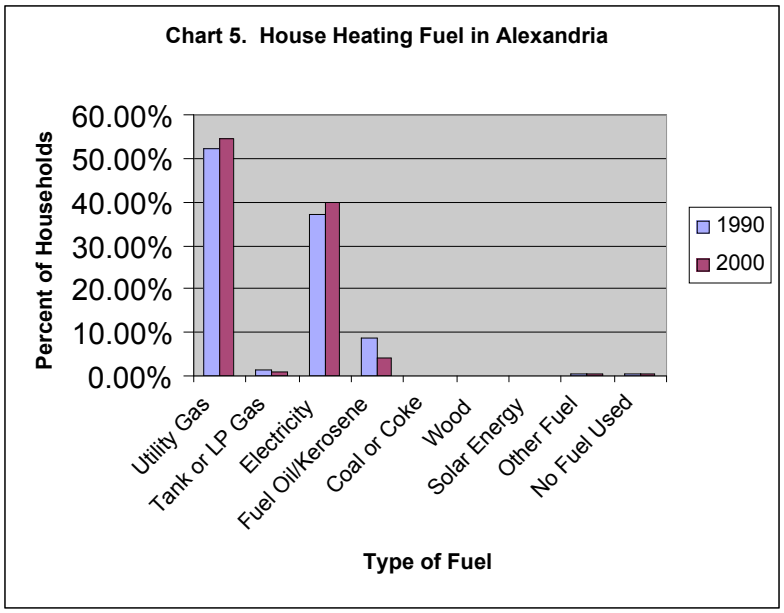
Year	Dollars per Thousand Cubic
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Price, 8/30/05



Year	Cents Per kWh
2002	8.62
2003	8.56
2004	8.82

Source: Dominion VA Power

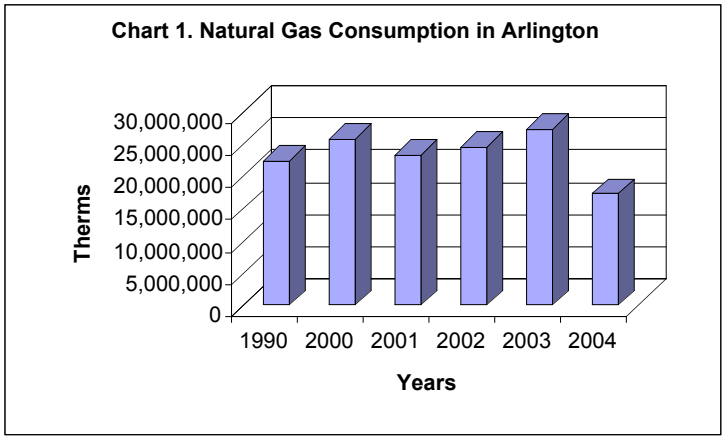


Year	Number of Households
1990	53,280
2000	61,889
% Increase	16%

Source: U. S. Census 1990 & 2000

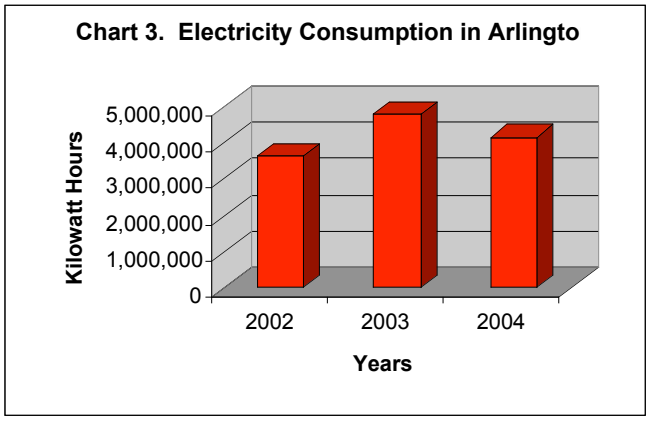
Type of Fuel	1990	2000
Utility Gas	52.20%	54.40%
Tank or LP Gas	1.20%	1.10%
Electricity	36.90%	39.70%
Fuel Oil/Kerosene	8.60%	4.00%
Coal or Coke	0.00%	0.00%
Wood	0.10%	0.00%
Solar Energy	0.00%	0.00%
Other Fuel	0.50%	0.40%
No Fuel Used	0.50%	0.50%

ARLINGTON - RESIDENTIAL ENERGEY PROFILE



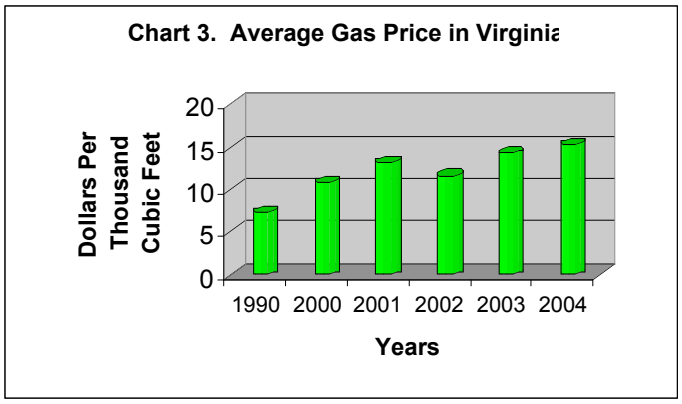
Year	Therms Consumed	Source/Supplier
1990	22,497,929	Washington Gas
2000	25,861,171	Washington Gas
2001	23,389,363	Washington Gas
2002	24,654,751	Washington Gas
2003	27,277,170	Washington Gas
2004	17,322,835	Washington Gas

Source: Washington Gas



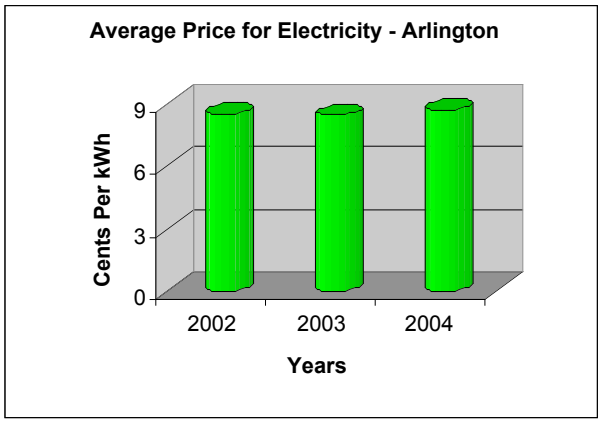
Year	Kilowatt Hours	Source/Supplier
2002	3,650,880	Dominion VA Power & PEPCO
2003	4,797,932	Dominion VA Power & PEPCO
2004	4,177,501	Dominion VA Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services



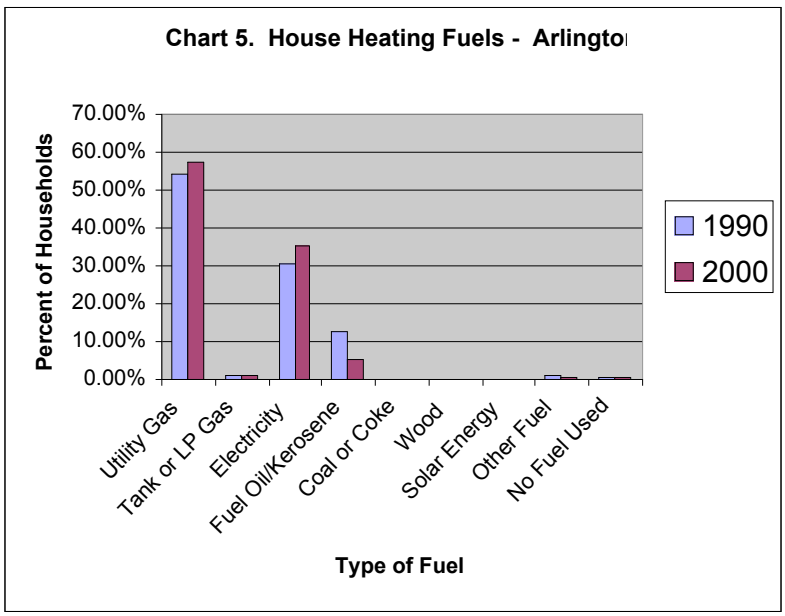
Year	Dollars per Thousand Cubic
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Prices, 8/30/05



Year	Cents per kWh
2002	8.53
2003	8.47
2004	8.74

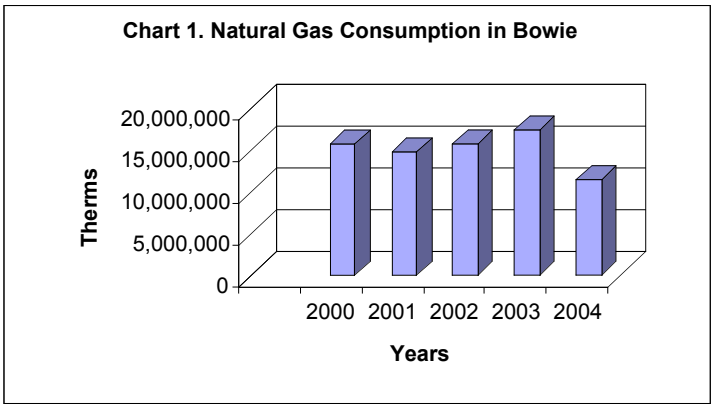
Source: Dominion Virginia Power



Year	Number of Households
1990	78,520
2000	86,350
% Increase	10%

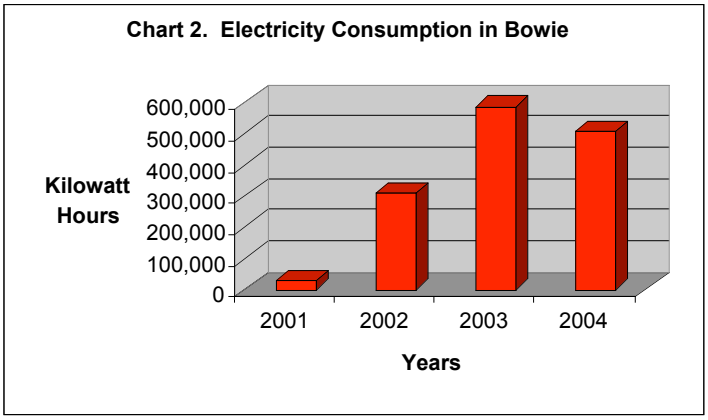
Source: U. S. Census 1990 & 2000

BOWIE - RESIDENTIAL ENERGEY PROFILE



Year	Therms Consumed	Source/Supplier
2000	15,850,986	Washington Gas
2001	14,870,430	Washington Gas
2002	15,848,690	Washington Gas
2003	17,622,868	Washington Gas
2004	11,628,231	Washington Gas

Source: Washington Gas



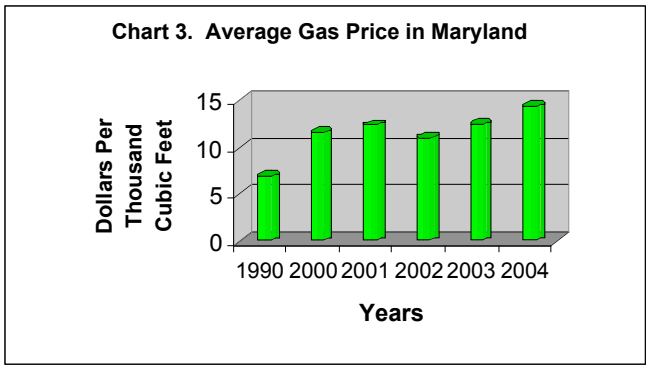
Years	kWh Consumed	Source/Supplier
2001	30,051	PEPCO
2002	312,079	PEPCO
2003	587,033	PEPCO
2004	505,365	PEPCO

Source: PEPCO Energy Services

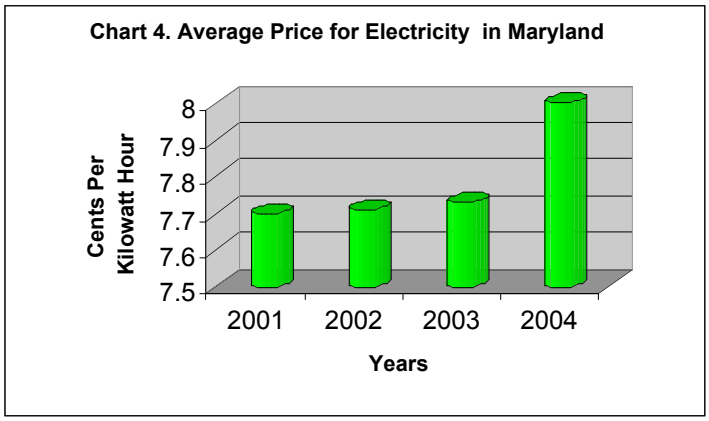
Note: The 2001 electricity consumption number is believed to be an aberration in the data provided.

Utility Gas	54.30%	57.50%
Tank or LP Gas	1.10%	1.00%
Electricity	30.50%	35.10%
Fuel Oil/Kerosene	12.60%	5.10%
Coal or Coke	0.00%	0.00%
Wood	0.10%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.80%	0.70%
No Fuel Used	0.60%	0.40%

Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

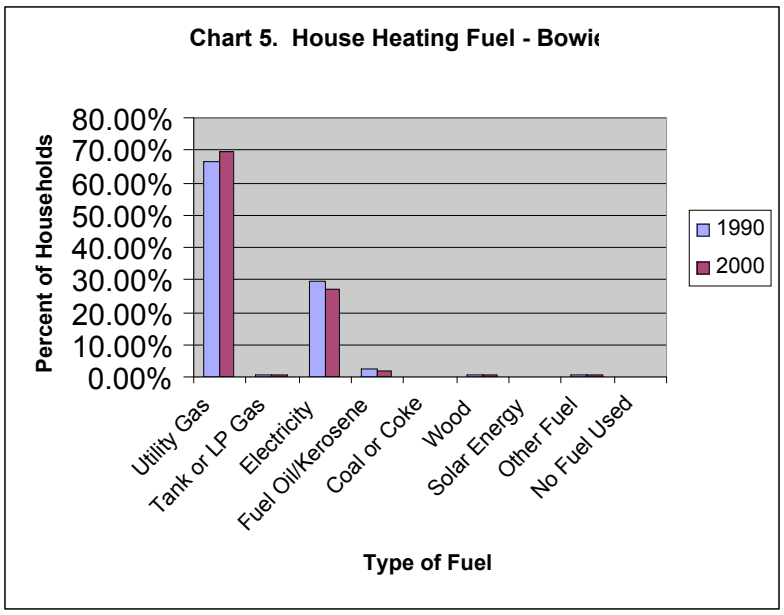


Source: Maryland Natural Gas Residential Price, 8/30/05



Year	Cents Per kWh
2001	7.7
2002	7.71
2003	7.73
2004	8.00

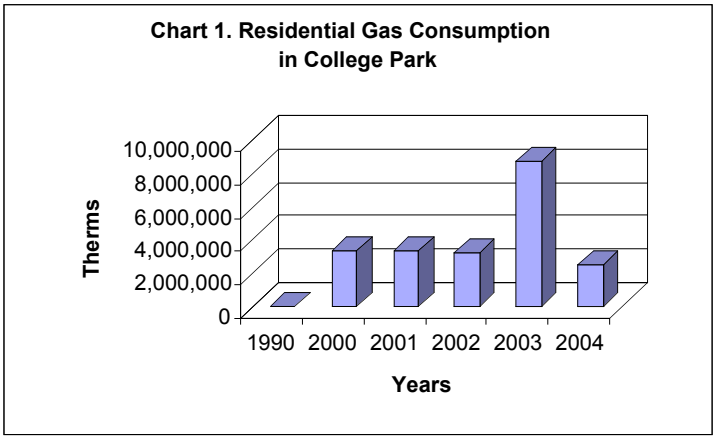
Source: EIA – Maryland Electricity Residential Price, 8/30/05



Year	Number of Households
1990	12,891
2000	18,102
% Increase	40%

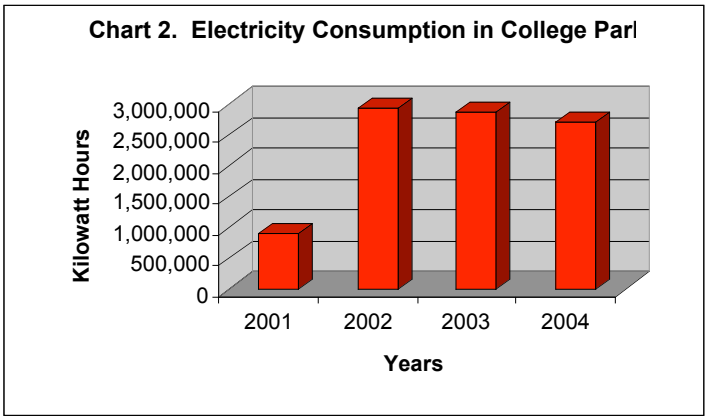
Source: U. S. Census 1990 & 2000

COLLEGE PARK - RESIDENTIAL ENERGEY PROFILE



Year	Therms Consumed	Source/Supplier
1990	N/A	Washington Gas
2000	3,411,289	Washington Gas
2001	3,416,658	Washington Gas
2002	3,224,658	Washington Gas
2003	8,778,097	Washington Gas
2004	2,544,573	Washington Gas

Source: Washington Gas

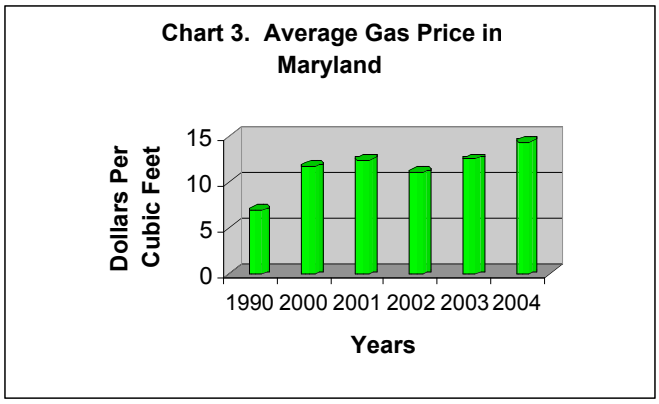


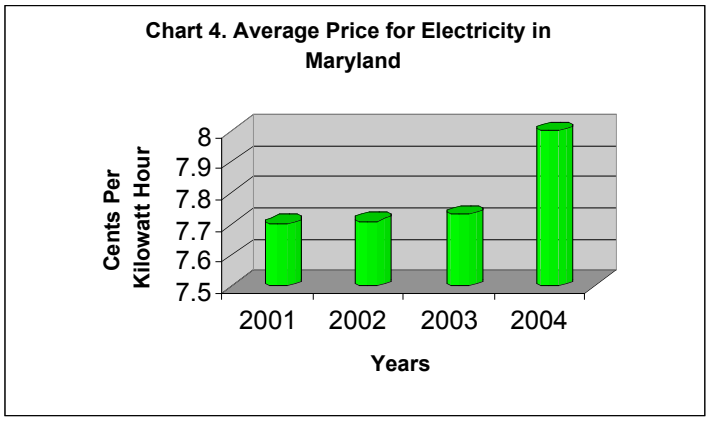
Years	kWh Consumed	Source/Supplier
2001	903,758	PEPCO
2002	2,945,739	PEPCO
2003	2,882,263	PEPCO
2004	2,706,361	PEPCO

Source: PEPCO Energy Services

Type of Fuel	1990	2000
Utility Gas	66.60%	69.80%
Tank or LP Gas	0.40%	0.60%
Electricity	29.80%	27.00%
Fuel Oil/Kerosene	2.30%	2.00%
Coal or Coke	0.00%	0.00%
Wood	0.60%	0.40%
Solar Energy	0.10%	0.00%
Other Fuel	0.70%	0.70%
No Fuel Used	0.00%	0.10%

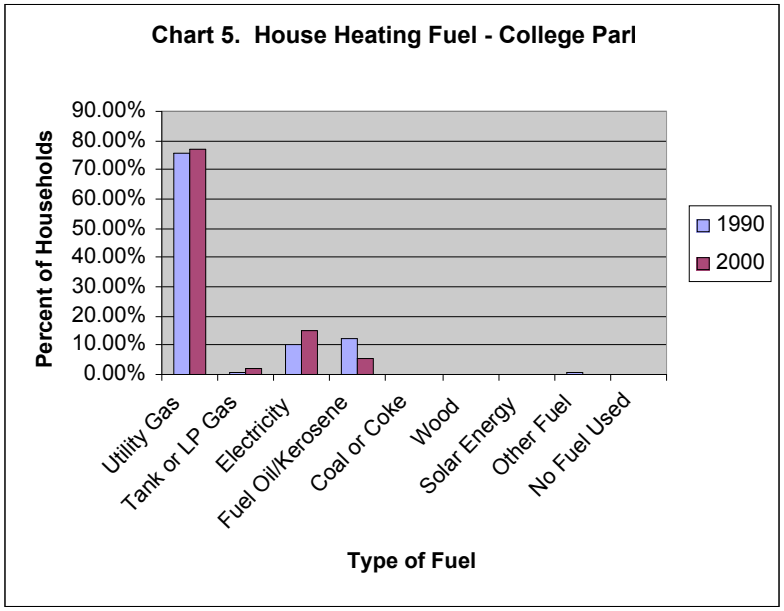
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38





Year	Cents Per kWh
2001	7.7
2002	7.71
2003	7.73
2004	8.00

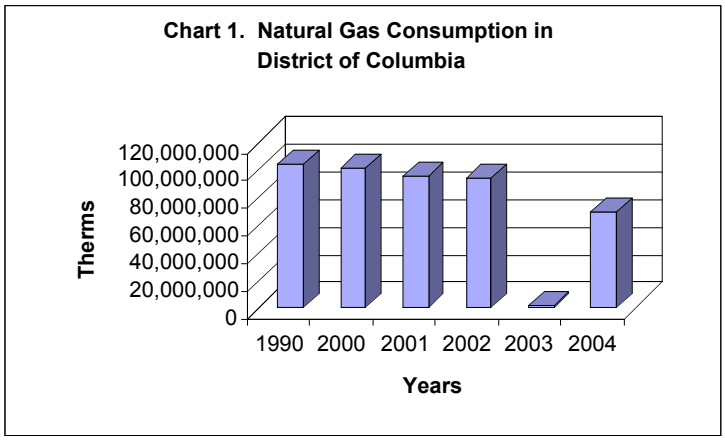
Source: EIA – Maryland Electricity Residential Price, 8/30/05



Year	Number of Households
1990	5,740
2000	6,046
% Increase	5%

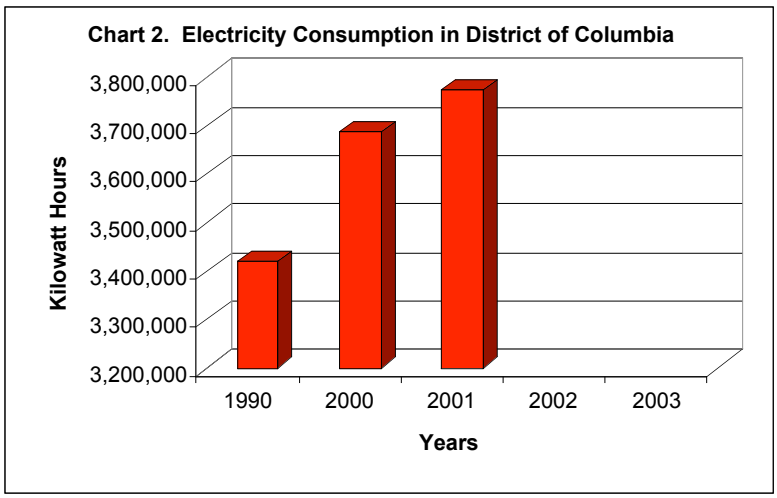
Source: U. S. Census 1990 & 2000

DISTRICT OF COLUMBIA - RESIDENTIAL ENERGEY PROFILE



Year	Therms Consumed	Source/Supplier
1990	104,011,435	Washington Gas
2000	100,969,445	Washington Gas
2001	95,210,402	Washington Gas
2002	94,161,986	Washington Gas
2003	1,441,753	Washington Gas
2004	69,592,559	Washington Gas

Source: Washington Gas

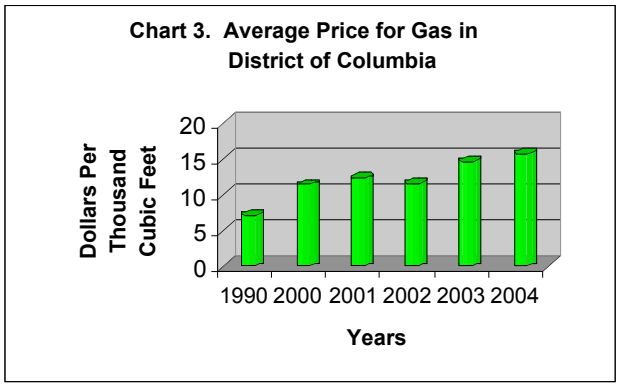


Year	kWh Consumed	Source/Supplier
1990	3,419,000	EIA
2000	3,687,000	EIA
2001	3,775,000	EIA
2002		EIA
2003		EIA
2004		EIA

Source: EIA, Residential Sector Energy Consumption Estimates, 1960-2001

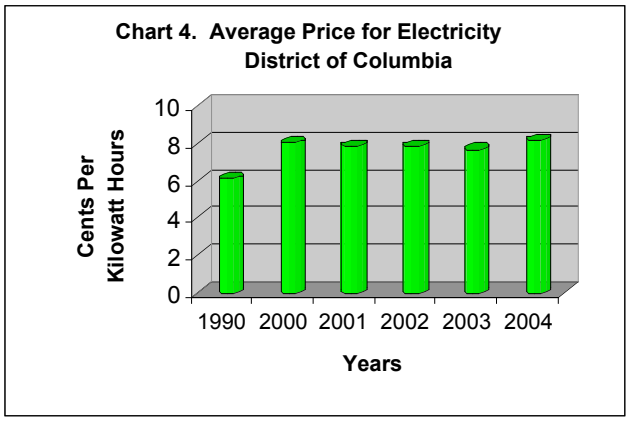
NOTE:

The number for 2003 is believed to be an aberration; Washington Gas is investigating. Also, at the writing of the report, the electricity consumption for the District of Columbia was not available from PEPCO Energy Services. Consequently, the EIA consumption numbers were used since the numbers do not have to be disaggregated.



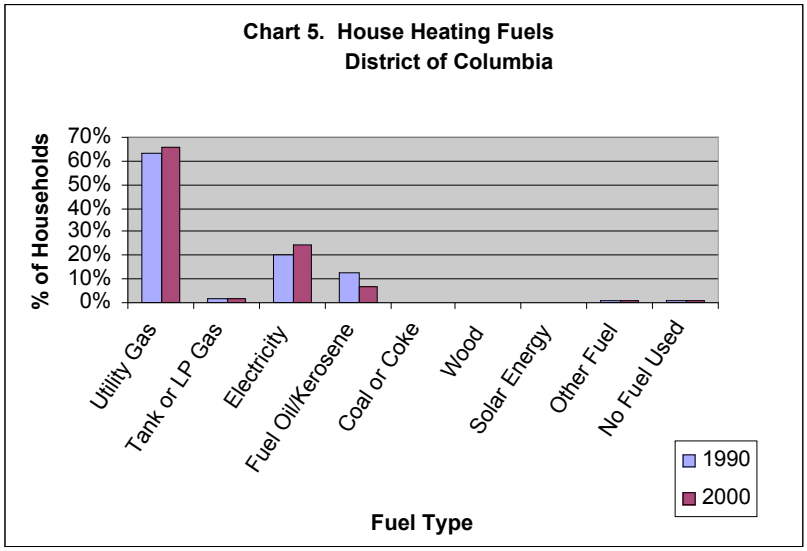
Year	Ave. Price Per Thousand Cubic Feet
1990	7.17
2000	11.4
2001	12.27
2002	11.54
2003	14.66
2004	15.76

Source: EIA – District of Columbia Residential Electricity Price, 8/30/05



Year	Av. Cents Per kWh
1990	6.1
2000	8.03
2001	7.83
2002	7.82
2003	7.66
2004	8.14

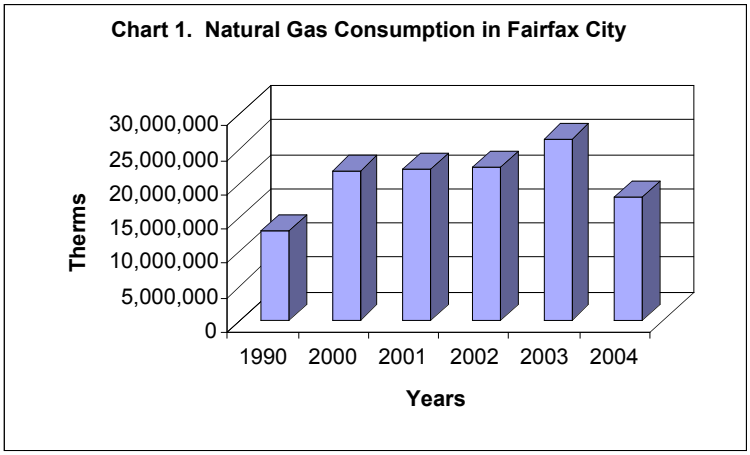
EIA – District of Columbia Electricity Residential Price, 8/30/05



Type of Fuel	1990	2000
Utility Gas	63.50%	65.40%
Tank or LP Gas	2.00%	1.80%
Electricity	20.50%	24.20%
Fuel Oil/Kerosene	12.50%	6.90%
Coal or Coke	0.00%	0.00%
Wood	0.00%	0.00%
Solar Energy	0.10%	0.00%
Other Fuel	0.60%	0.70%
No Fuel Used	0.80%	1.00%

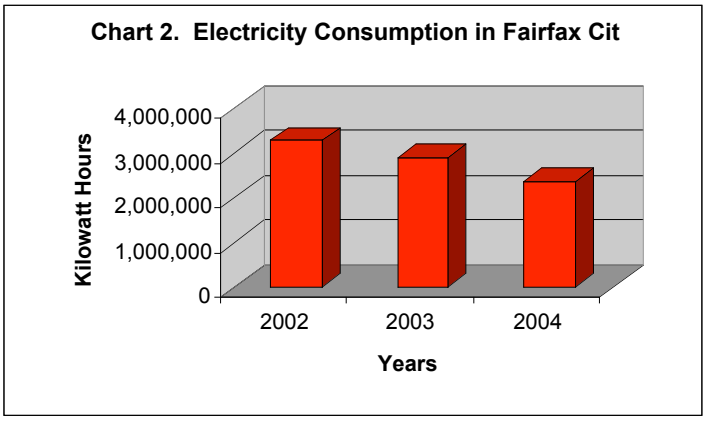
Year	Number of Households
1990	249,634
2000	248,338
% Decrease	(0.5%)

FAIRFAX CITY – RESIDENTIAL ENERGY PROFILE



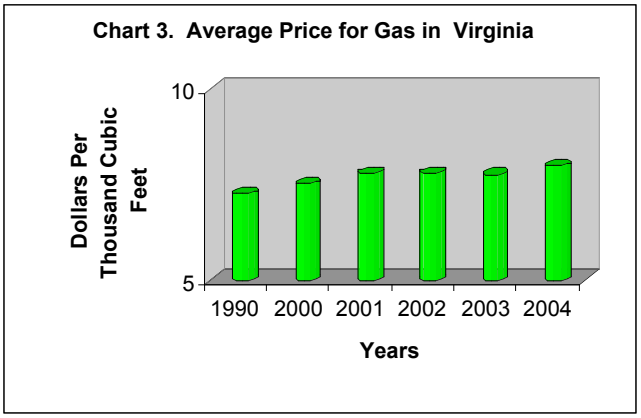
Year	Therms Consumed	Source/Supplier
1990	12,954,305	Washington Gas
2000	21,587,925	Washington Gas
2001	21,818,051	Washington Gas
2002	22,109,064	Washington Gas
2003	26,185,889	Washington Gas
2004	17,833,029	Washington Gas

Source: Washington Gas



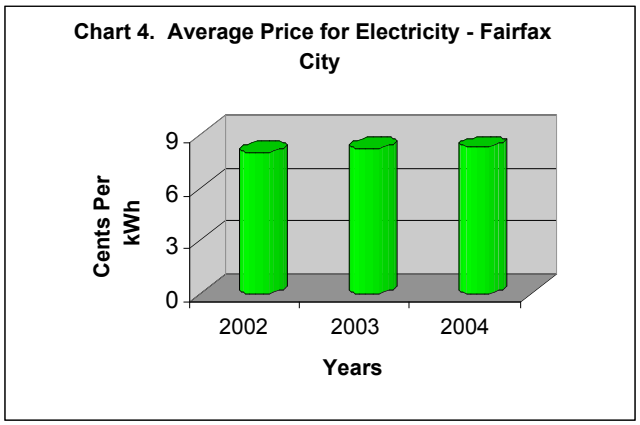
Year	Kilowatt Hours	Source/Supplier
2002	3,289,931	DomInion VA Power & PEPCO
2003	2,922,992	Dominion VA Power & PEPCO
2004	2,389,202	Dominion VA Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services



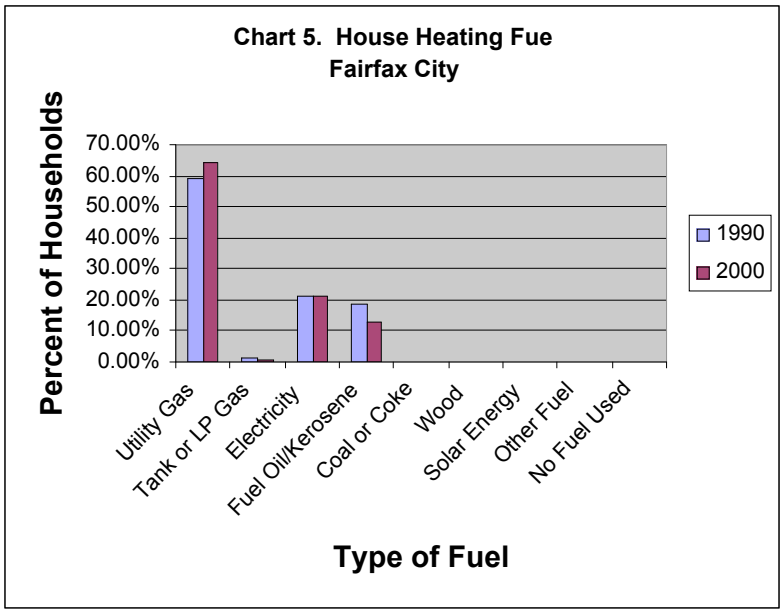
Year	Dollars per Thousand Cubic
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2002	8.53
2003	8.47
2004	8.74

Source: EIA – Dominion VA Power

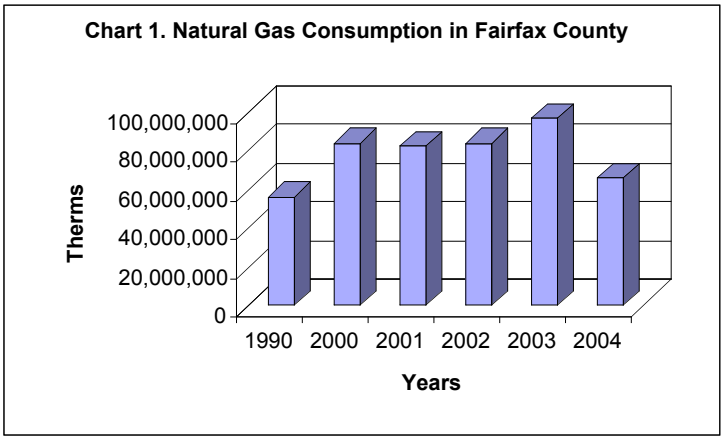


Year	Number of Households
1990	7,362
2000	8,035
% Increase	9%

Source: U. S. Census 1990 & 2000

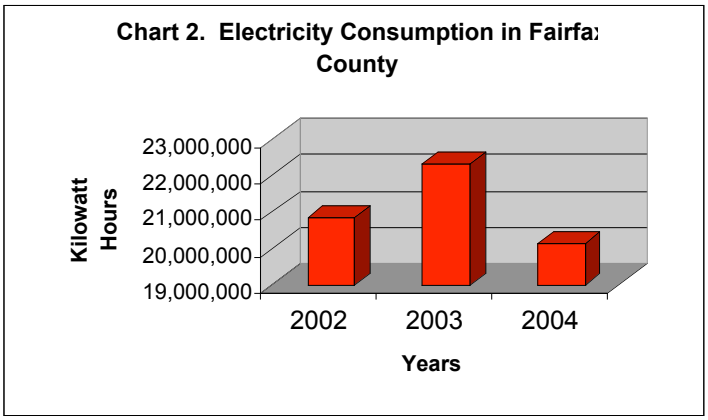
Type of Fuel	1990	2000
Utility Gas	58.80%	64.30%
Tank or LP Gas	1.20%	0.90%
Electricity	21.00%	21.30%
Fuel Oil/Kerosene	18.70%	12.90%
Coal or Coke	0.00%	0.00%
Wood	0.30%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.10%	0.20%
No Fuel Used	0.00%	0.20%

FAIRFAX COUNTY – RESIDENTIAL ENERGY PROFILE



Year	Therms Consumed	Source/Supplier
1990	56,032,056	Washington Gas
2000	84,126,795	Washington Gas
2001	82,541,397	Washington Gas
2002	83,710,888	Washington Gas
2003	96,779,184	Washington Gas
2004	65,886,376	Washington Gas

Source: Washington Gas

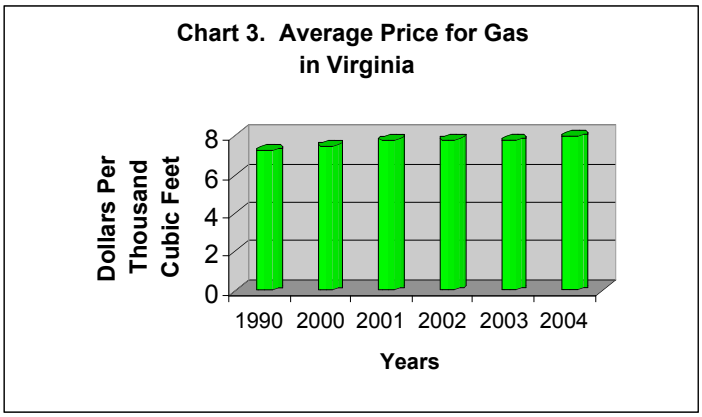


Year	Kilowatt Hours	Source/Supplier
2002	20,829,838	Dominion VA Power & PEPCO
2003	22,324,957	Dominion VA Power & PEPCO
2004	20,109,911	Dominion VA Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services

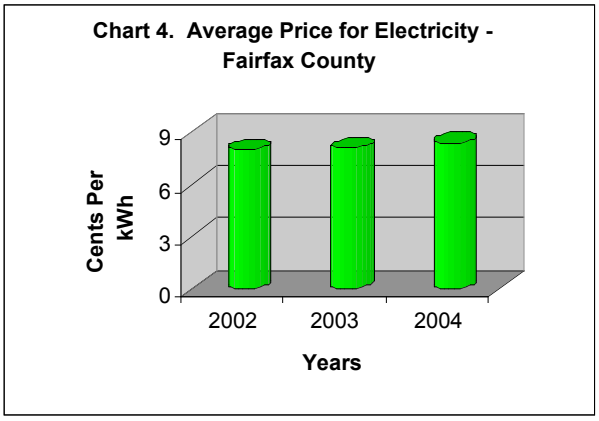
NOTE:

Fairfax County gas consumption does not include numbers from Columbia Gas of Virginia (numbers could not be disaggregated). Neither are the numbers from NOVEC included (due to their fee to provide).



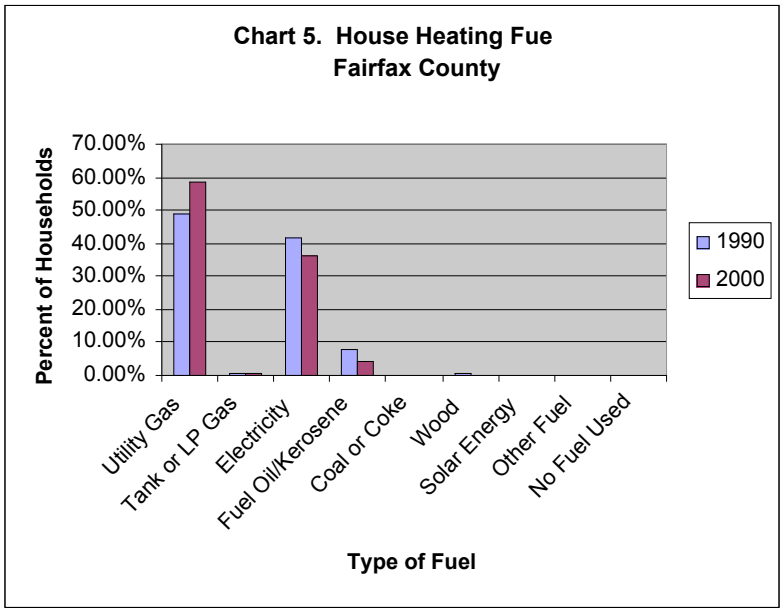
Year	Dollars per Thousand Cubic
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2002	8.02
2003	8.1
2004	8.39

Source: Dominion VA Power

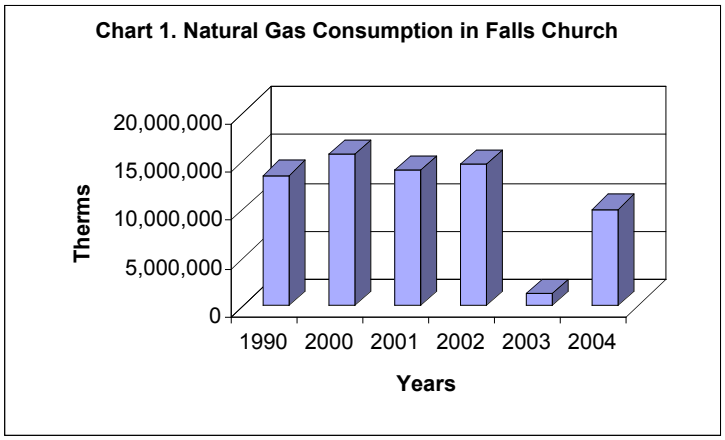


Type of Fuel	1990	2000
Utility Gas	49.10%	58.50%
Tank or LP Gas	0.90%	0.90%
Electricity	41.60%	36.10%
Fuel Oil/Kerosene	7.80%	4.20%
Coal or Coke	0.00%	0.00%
Wood	0.40%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.10%	0.10%
No Fuel Used	0.10%	0.10%

Year	Number of Households
1990	292,345
2000	350,714
% Increase	20%

Source: U. S. Census 1990 & 2000

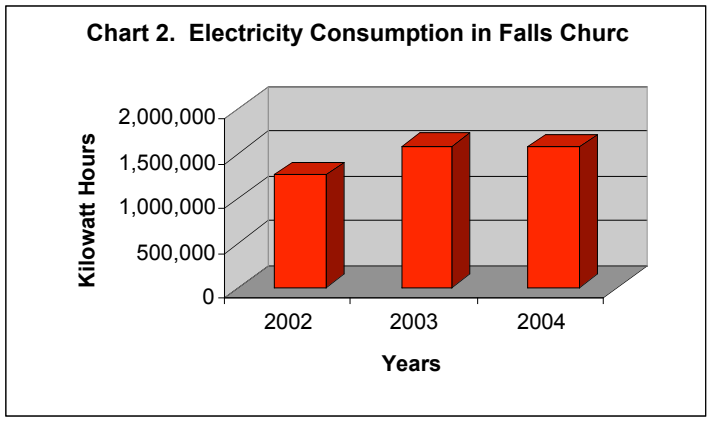
FALLS CHURCH – RESIDENTIAL ENERGY PROFILE



Year	Therms Consumed	Source/Supplier
1990	13,511,941	Washington Gas
2000	15,665,023	Washington Gas
2001	14,053,282	Washington Gas
2002	14,645,070	Washington Gas
2003	1,277,910	Washington Gas
2004	10,039,885	Washington Gas

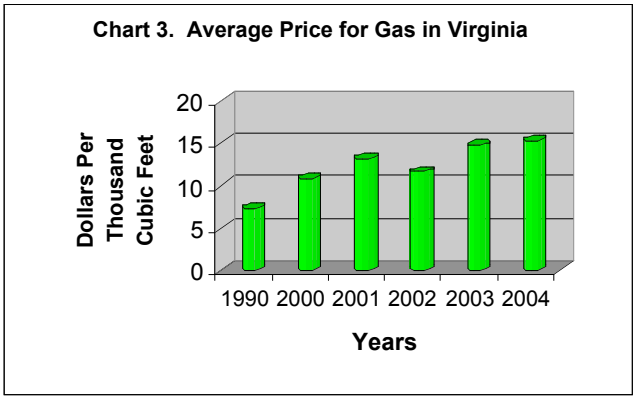
Source: Washington Gas

NOTE: The 2003 gas consumption number is believed to be an aberration.



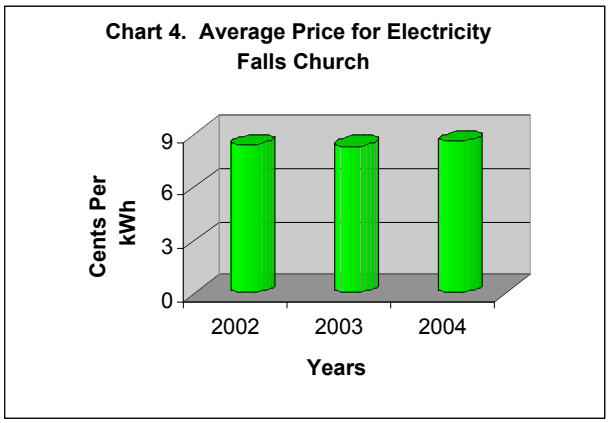
Year	Kilowatt Hours	Source/Supplier
2002	1,272,575	Dominion VA Power & PEPCO
2003	1,594,749	Dominion VA Power & PEPCO
2004	1,581,303	Dominion VA Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services



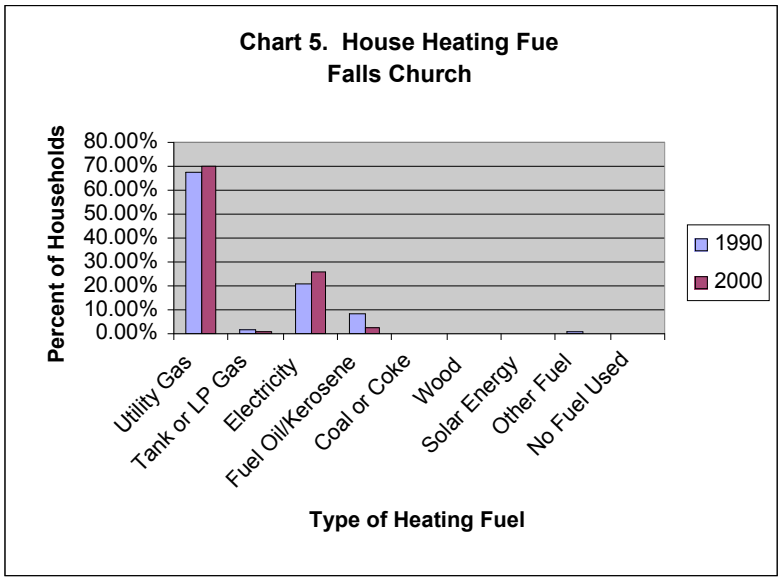
Year	Dollars per Thousand Cubic
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2002	8.41
2003	8.33
2004	8.62

Source: Dominion VA Power

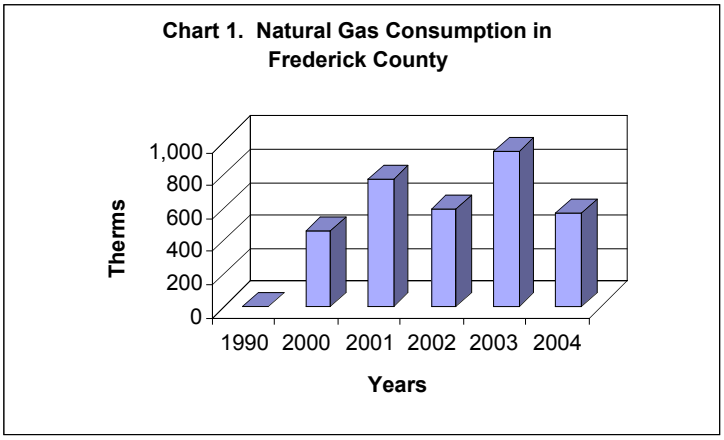


Year	Number of Households
1990	4,195
2000	4,471
% Increase	7%

Source: U. S. Census 1990 & 2000

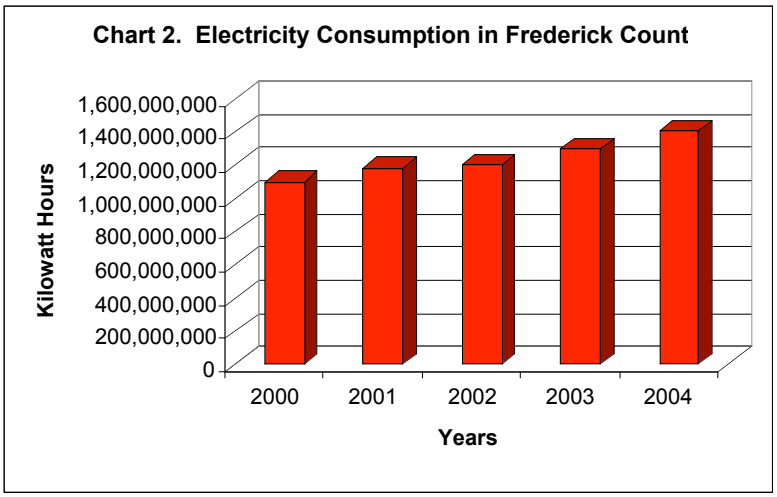
Type of Fuel	1990	2000
Utility Gas	67.68%	69.90%
Tank or LP Gas	1.45%	1.19%
Electricity	20.95%	26.00%
Fuel Oil/Kerosene	8.75%	2.49%
Coal or Coke	0.00%	0.00%
Wood	0.36%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.81%	0.40%
No Fuel Used	0.00%	0.30%

FREDERICK COUNTY – RESIDENTIAL ENERGY PROFILE



Year	Therms Consumed	Source/Supplier
1990	N/A	Washington Gas
2000	456	Washington Gas
2001	771	Washington Gas
2002	591	Washington Gas
2003	937	Washington Gas
2004	570	Washington Gas

Source: Washington Gas

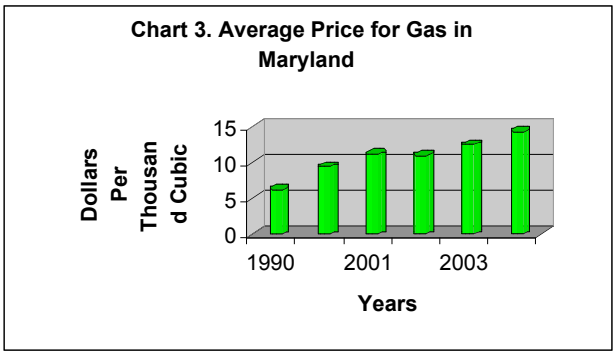


Year	kWh Consumed	Source/Supplier
2000	1,099,914,858	Allegheny Power
2001	1,183,075,682	Allegheny Power
2002	1,206,273,200	Allegheny Power
2003	1,300,672,200	Allegheny Power
2004	1,404,613,607	Allegheny Power

Source: Allegheny Power

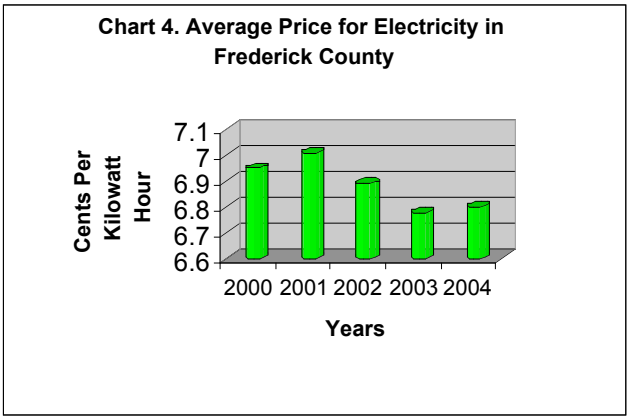
NOTE:

The number reported by Allegheny County for Frederick County is significantly higher than counties that have five times the population of this county. Allegheny Power verified the number was accurate but does include apartment buildings with individually metered consumption. Typically, apartment buildings are included under the Commercial Sector.



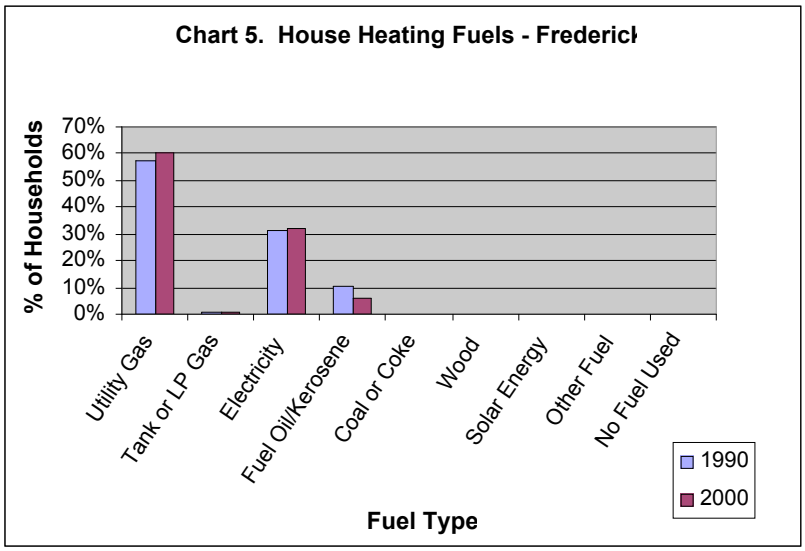
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: Maryland Natural Gas Residential Price, 8/30/05



Year	Av. Cents Per kWk
2000	6.95
2001	7.01
2002	6.89
2003	6.78
2004	6.8

Source: Allegheny Power

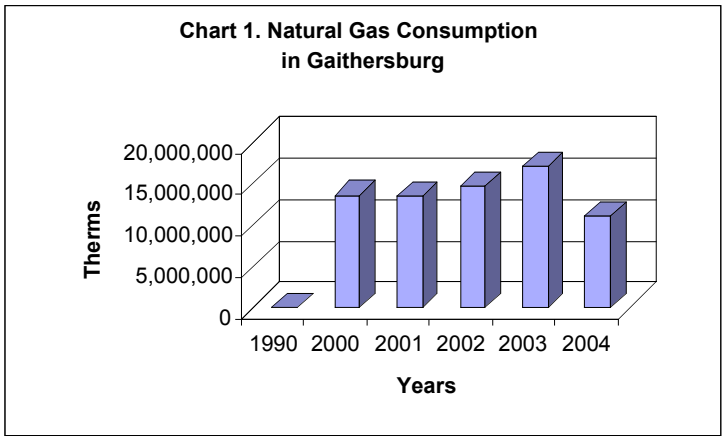


Year	Number of Households
1990	52,570
2000	70,060
% Increase	33%

U.S. Census 1990 & 2000

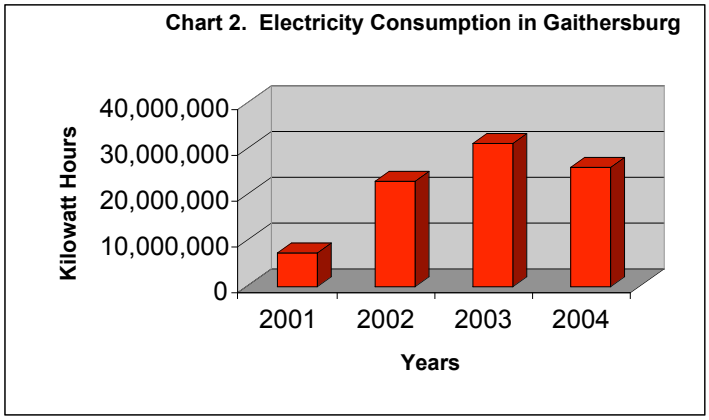
Type of Fuel	1990	2000
Utility Gas	57.20%	60.40%
Tank or LP Gas	0.90%	0.90%
Electricity	31.10%	31.70%
Fuel Oil/Kerosene	10.20%	6.30%
Coal or Coke	0.00%	0.00%
Wood	0.30%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.20%	0.20%
No Fuel Used	0.10%	0.20%

GAITHERSBURG – RESIDENTIAL ENERGY PROFILE



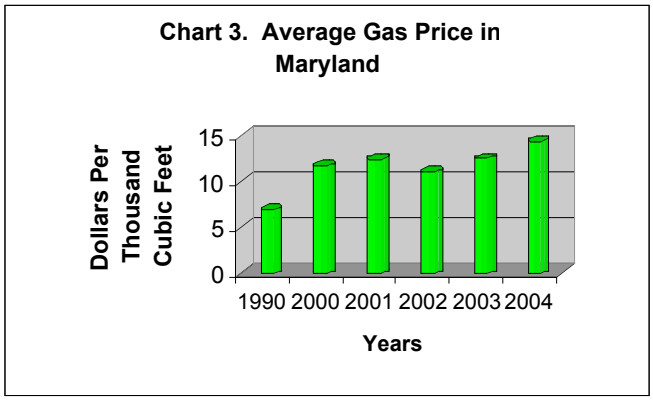
Year	Therms Consumed	Source/Supplier
1990	N/A	Washington Gas
2000	13,608,166	Washington Gas
2001	13,554,099	Washington Gas
2002	14,635,796	Washington Gas
2003	17,039,196	Washington Gas
2004	11,000,956	Washington Gas

Source: Washington Gas



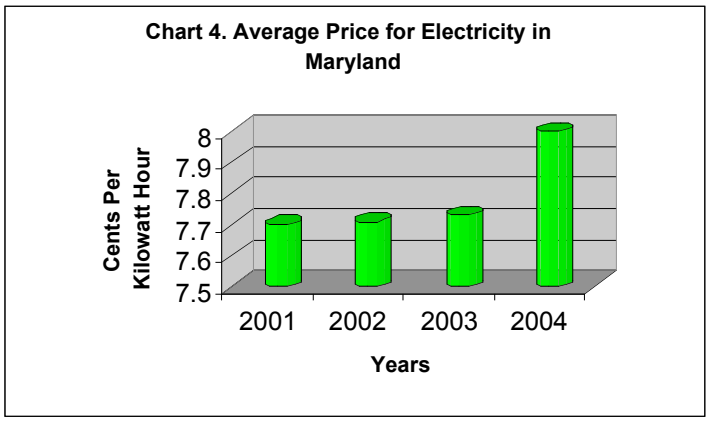
Year	kWh Consumed	Source/Supplier
2001	7,375,342	PEPCO
2002	22,972,359	PEPCO
2003	31,131,978	PEPCO
2004	25,829,764	PEPCO

Source: PEPCO Energy Services



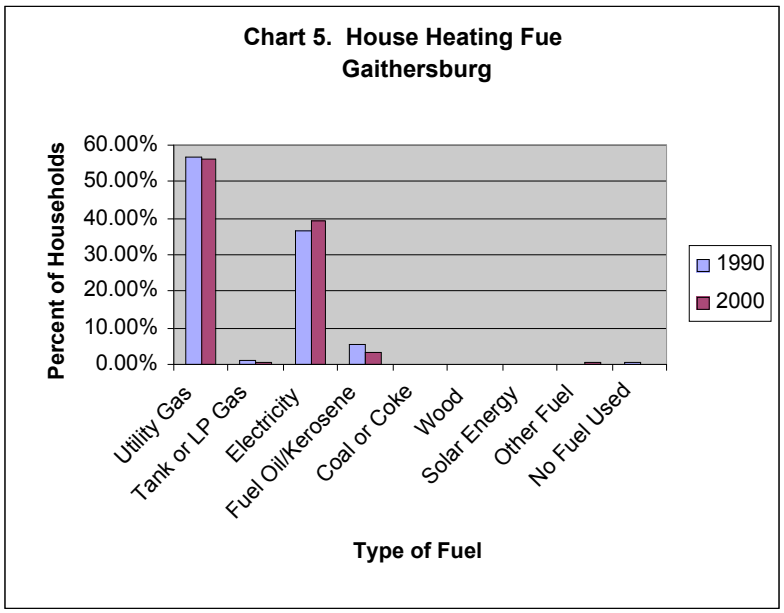
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: Maryland Natural Gas Residential Price, 8/30/05



Year	Cents Per kWh
2001	7.7
2002	7.71
2003	7.73
2004	8.00

Source: EIA – Maryland Electricity Residential Price, 8/30/05



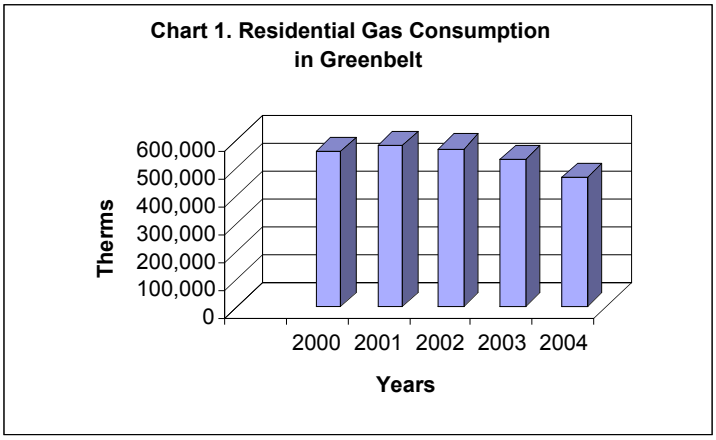
Year	Number of Households
1990	15,202
2000	19,501
% Increase	28%

Source: U.S. Census 1990 & 2000

Type of Fuel	1990	2000
Utility Gas	56.60%	56.30%
Tank or LP Gas	1.10%	0.80%
Electricity	36.50%	39.20%
Fuel Oil/Kerosene	5.40%	3.30%
Coal or Coke	0.00%	0.00%
Wood	0.10%	0.00%
Solar Energy	0.00%	0.00%
Other Fuel	0.00%	0.30%
No Fuel Used	0.30%	0.20%

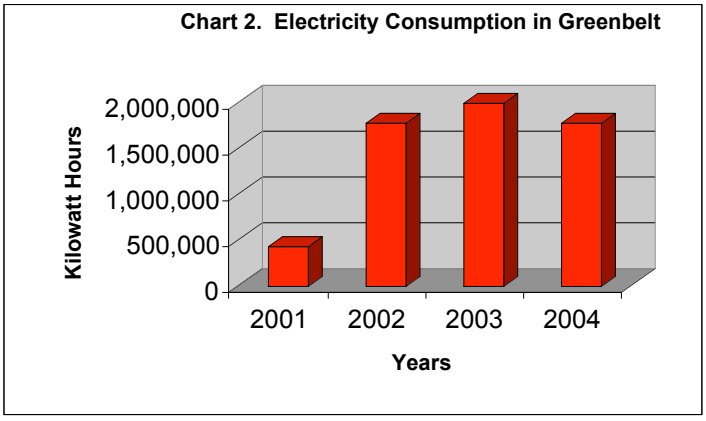
Note: The Gaithersburg Chamber of Commerce was planning to start an Electricity Purchasing Cooperative by May 2005. Project is currently on hold due to staff transitions.

GREENBELT - RESIDENTIAL ENERGEY PROFILE



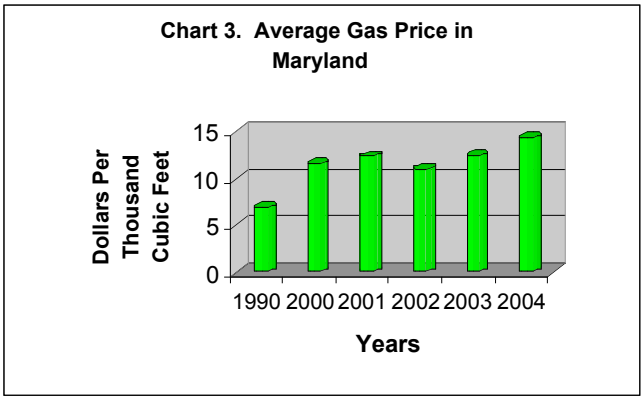
Year	Therms Consumed	Source/Supplier
2000	564,764	Washington Gas
2001	585,001	Washington Gas
2002	573,477	Washington Gas
2003	533,184	Washington Gas
2004	469,661	Washington Gas

Source: Washington Gas



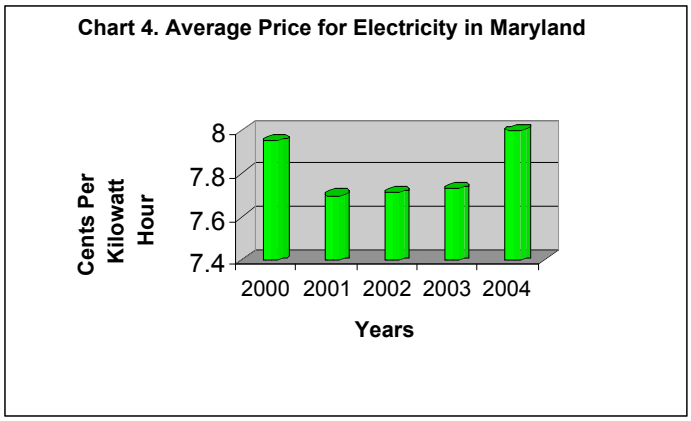
Year	Kilowatt Hours	Source/Supplier
2001	434,598	PEPCO
2002	1,774,309	PEPCO
2003	1,981,465	PEPCO
2004	1,763,113	PEPCO

Source: PEPCO Energy Services



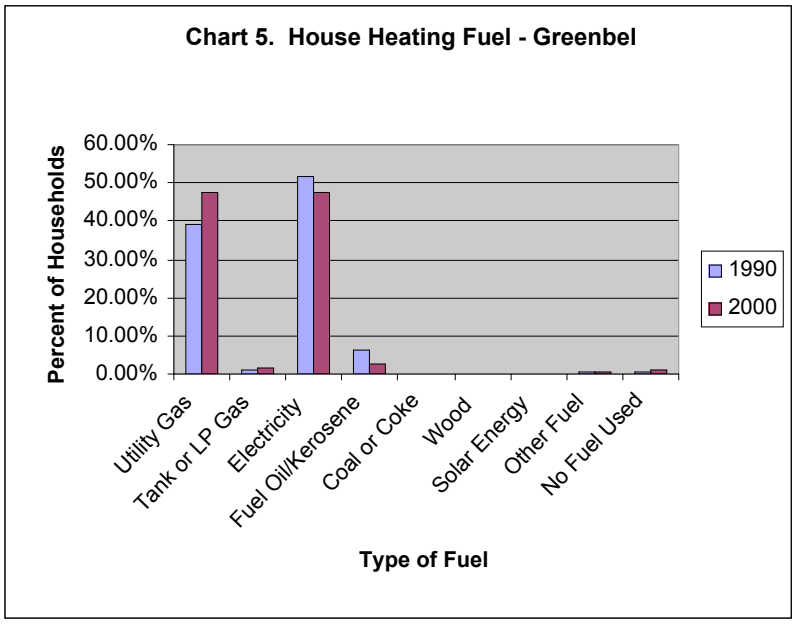
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: EIA – Maryland Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2000	7.95
2001	7.70
2002	7.71
2003	7.73
2004	8.00

Source: EIA – Maryland Electricity Residential Price, 8/30/05



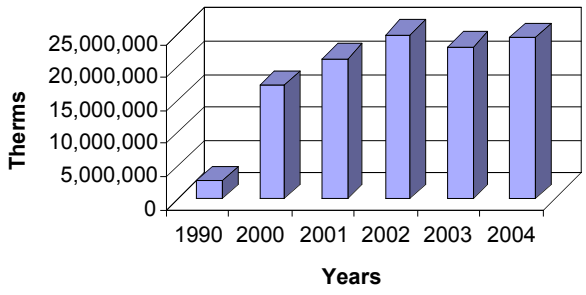
Year	Number of Households
1990	9,347
2000	9,342
% Increase	0%

Source: U. S. Census 1990 & 2000

Type of Fuel	1990	2000
Utility Gas	52.20%	54.40%
Tank or LP Gas	1.20%	1.10%
Electricity	36.90%	39.70%
Fuel Oil/Kerosene	8.60%	4.00%
Coal or Coke	0.00%	0.00%
Wood	0.10%	0.00%
Solar Energy	0.00%	0.00%
Other Fuel	0.50%	0.40%
No Fuel Used	0.50%	0.50%

LOUDOUN COUNTY – RESIDENTIAL ENERGY PROFILE

Chart 1. Natural Gas Consumption in Loudoun County

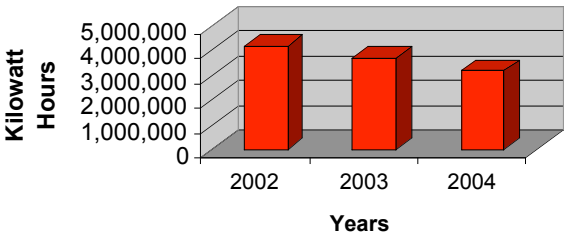


Year	Therms Consumed	Source/Supplier
1990	2,655,949	Washington Gas
2000	17,251,916	Washington Gas
2001	21,266,658	Washington Gas
2002	24,876,740	Washington Gas
2003	23,064,248	Washington Gas
2004	24,333,477	Washington Gas

Source: Washington Gas

Note: Loudoun County gas consumption does not include numbers from Columbia Gas of Virginia; their consumption numbers could not be disaggregated. Also missing are numbers from NOVEC (due to their fee to provide numbers).

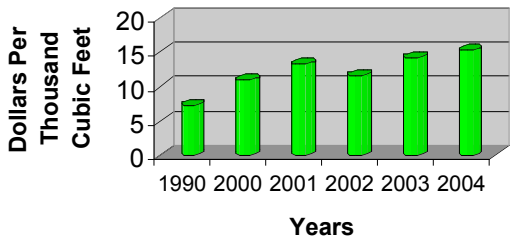
Chart 2. Electricity Consumption in Loudoun County



Year	Kilowatt Hours	Source/Supplier
2002	4,181,322	Dominion VA Power & PEPCO
2003	3,699,237	Dominion VA Power & PEPCO
2004	3,177,446	Dominion VA Power & PEPCO

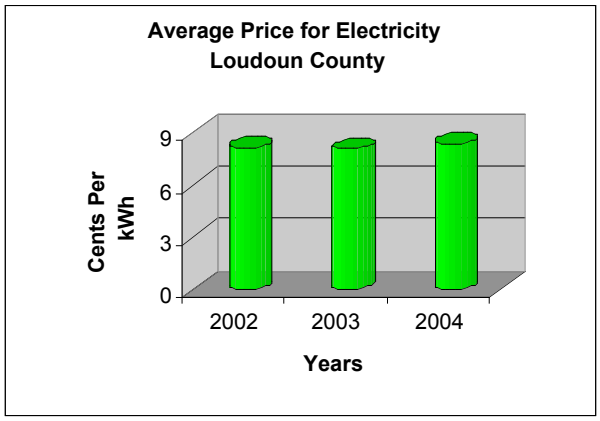
Source: Dominion VA Power and PEPCO Energy Services

Chart 3. Average Price for Gas in Virginia



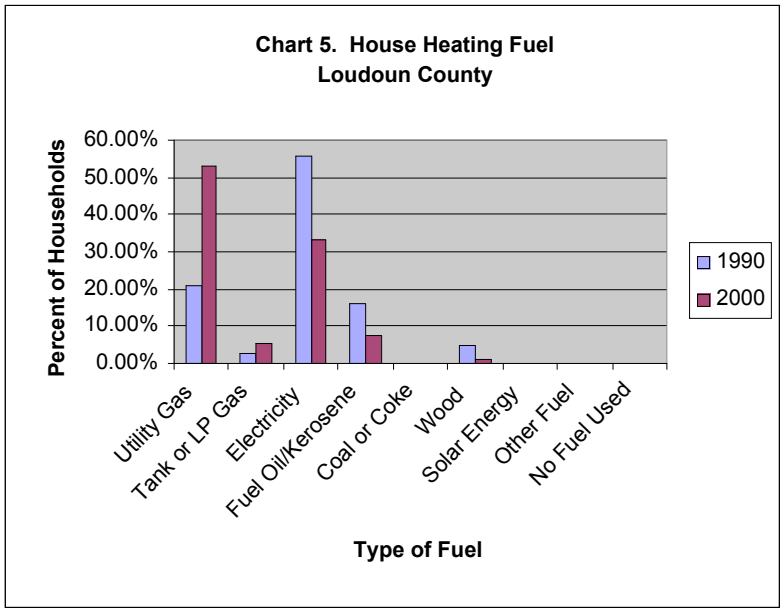
Year	Dollars per Thousand Cubic Feet
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Maryland Natural Gas Residential Price, 4/30/05



Year	Cents per kWh	Source/ Suppliers
2002	8.16	Dominion VA Power
2003	8.08	Dominion VA Power
2004	8.38	Dominion VA Power

Source: Dominion VA Power

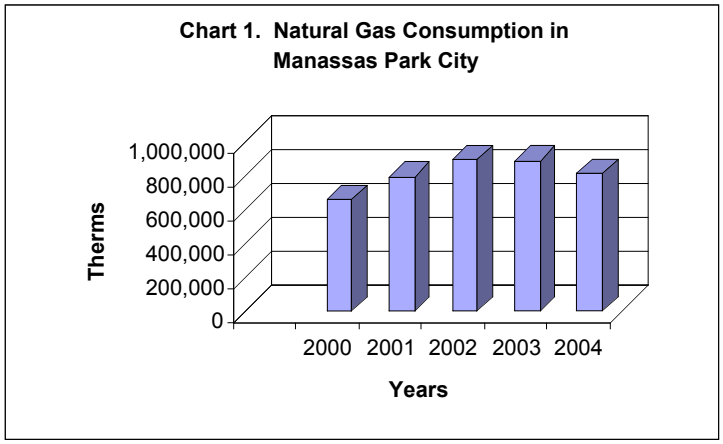


Year	Number of Households
1990	30,490
2000	59,900
% Increase	97%

Source: U.S. Census 1990 and 2000

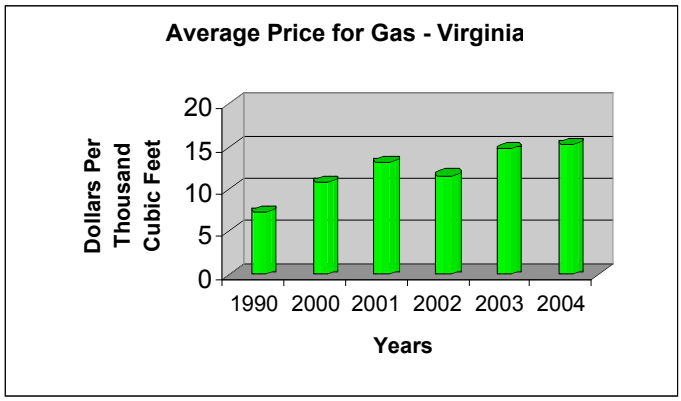
Type of Fuel	1990	2000
Utility Gas	20.90%	52.90%
Tank or LP Gas	2.50%	5.40%
Electricity	55.50%	33.00%
Fuel Oil/Kerosene	16.30%	7.30%
Coal or Coke	0.00%	0.00%
Wood	4.60%	1.20%
Solar Energy	0.10%	0.00%
Other Fuel	0.10%	0.20%
No Fuel Used	0.00%	0.10%

MANASSAS PARK CITY – RESIDENTIAL ENERGY PROFILE



Year	Therms Consumed	Source/Supplier
2000	654,438	Washington Gas
2001	793,983	Washington Gas
2002	892,743	Washington Gas
2003	888,188	Washington Gas
2004	815,400	Washington Gas

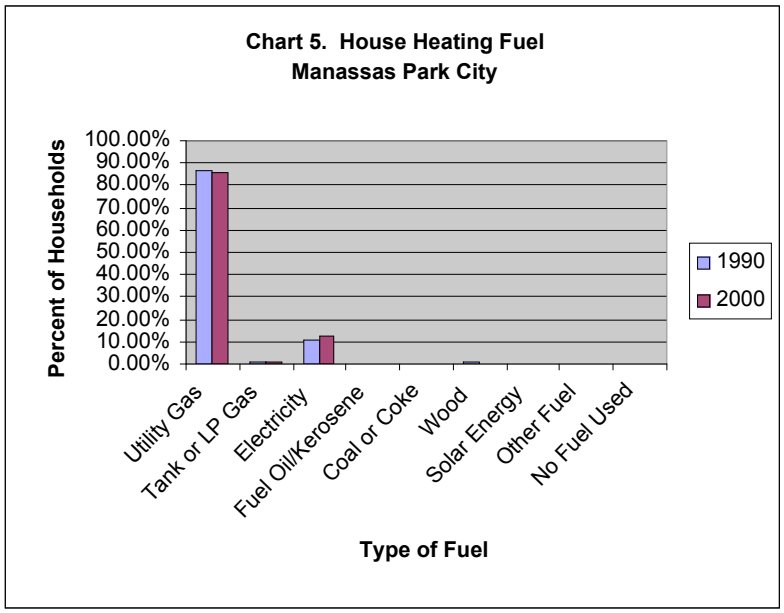
Source: Washington Gas



Year	Dollars per Thousand Cubic Feet
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: EIA – Virginia Natural Gas Residential Price, 8/30/05

Note: The gas consumption numbers from Columbia Gas of Virginia are not included because company's numbers could not be disaggregated. The electricity consumption information from NOVEC is not included due to the firm's fee to provide the numbers.



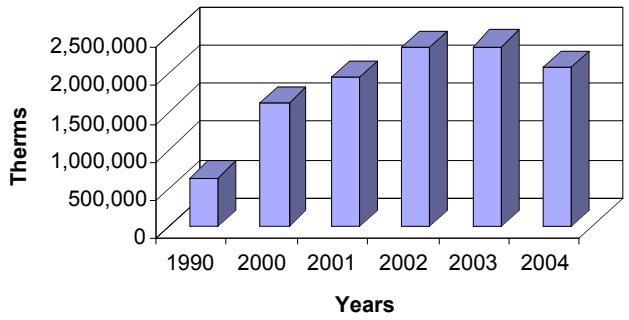
Year	Number of Households
1990	2,184
2000	3,254
% Increase	49%

Source: U.S. Census 1990 and 2000

Type of Fuel	1990	2000
Utility Gas	86.89%	85.90%
Tank or LP Gas	0.92%	1.30%
Electricity	10.72%	12.30%
Fuel Oil/Kerosene	0.37%	0.10%
Coal or Coke	0.00%	0.00%
Wood	0.78%	0.40%
Solar Energy	0.00%	0.00%
Other Fuel	0.00%	0.00%
No Fuel Used	0.32%	0.00%

MANASSAS - RESIDENTIAL ENERGY PROFILE

Chart 1. Natural Gas Consumption in Manassas

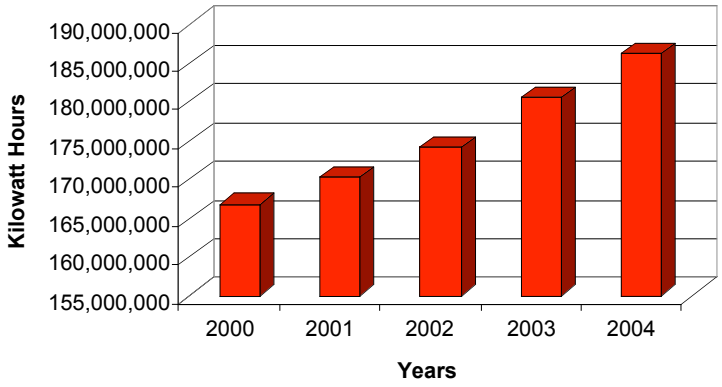


Year	Therms Consumed	Source/Supplier
1990	636,238	Washington Gas
2000	1,620,300	Washington Gas
2001	1,945,250	Washington Gas
2002	2,353,191	Washington Gas
2003	2,359,523	Washington Gas
2004	2,075,562	Washington Gas

Source: Washington Gas

Note: Manassas gas consumption numbers do not include numbers from Columbia Gas of Virginia; their numbers could not be disaggregated.

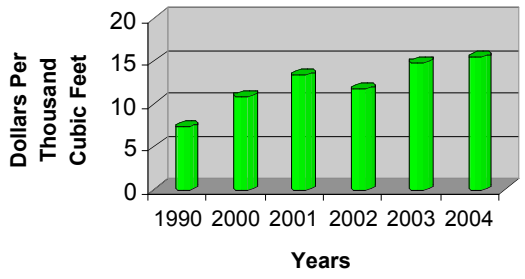
Chart 2. Electricity Consumption in Manassas



Year	MWH	Source/Supplier
2000	166,811,000	Manassas Utilities
2001	170,297,000	Manassas Utilities
2002	174,186,000	Manassas Utilities
2003	180,508,000	Manassas Utilities
2004	186,287,000	Manassas Utilities

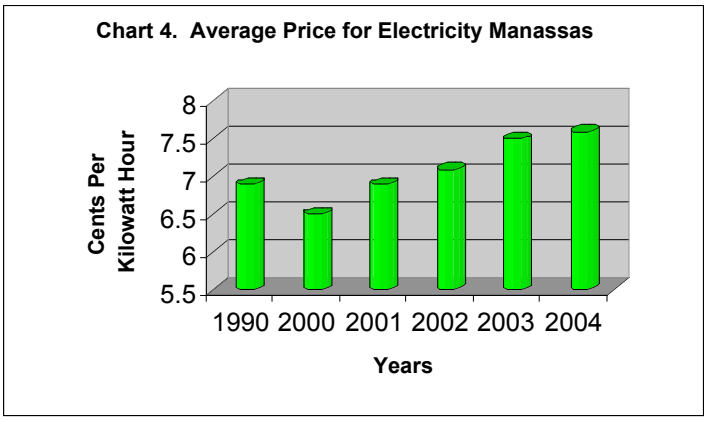
Source: Manassas Utilities

Chart 3. Average Price for Gas in Virginia



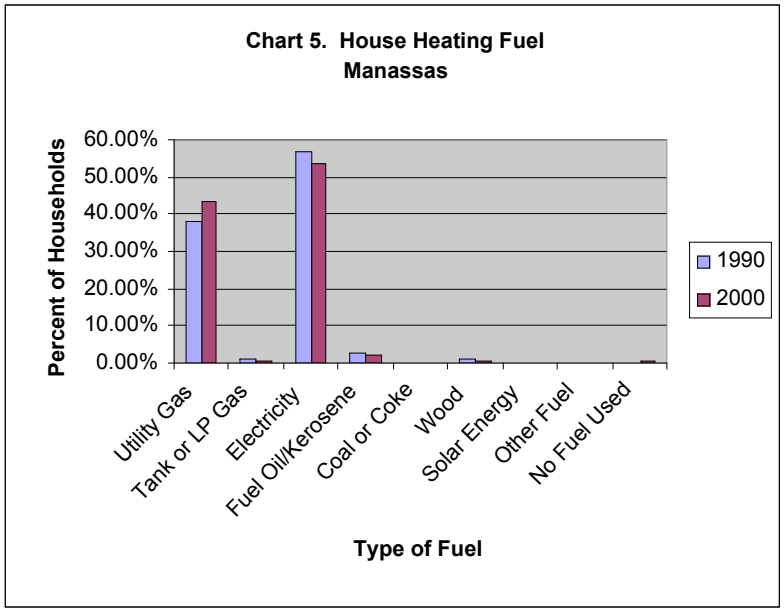
Year	Dollars per Thousand Cubic Feet
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

Source: Virginia Natural Gas Residential Price, 8/30/05



Year	Av. Cents Per kWh	Source/Supplier
1990	6.9	Manassas Utilities
2000	6.5	Manassas Utilities
2001	6.9	Manassas Utilities
2002	7.1	Manassas Utilities
2003	7.5	Manassas Utilities
2004	7.6	Manassas Utilities

Source: Manassas Utilities

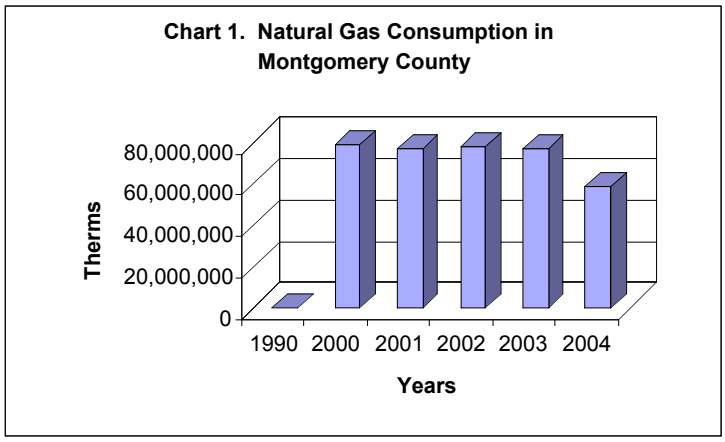


Year	Number of Households
1990	9,481
2000	11,757
% Increase	7%

Source: U. S. Census 1990 and 2000

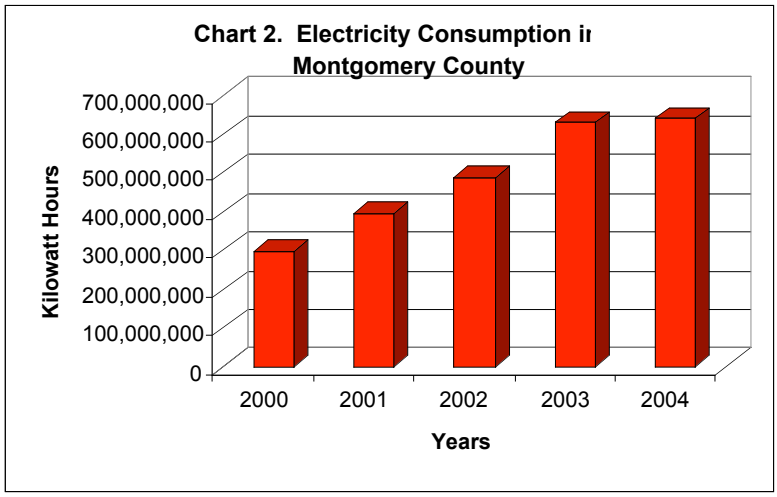
Type of Fuel	1990	2000
Utility Gas	37.98%	43.40%
Tank or LP Gas	1.28%	0.60%
Electricity	56.59%	53.40%
Fuel Oil/Kerosene	2.88%	1.90%
Coal or Coke	0.00%	0.00%
Wood	1.24%	0.40%
Solar Energy	0.00%	0.00%
Other Fuel	0.05%	0.00%
No Fuel Used	0.00%	0.30%

MONTGOMERY COUNTY - RESIDENTIAL ENERGY PROFILE



Year	Therms Consumed	Source/Supplier
1990	2,734	Washington Gas
2000	78,916,441	Washington Gas
2001	77,102,918	Washington Gas
2002	77,889,696	Washington Gas
2003	77,439,787	Washington Gas
2004	58,970,896	Washington Gas

Source: Washington Gas

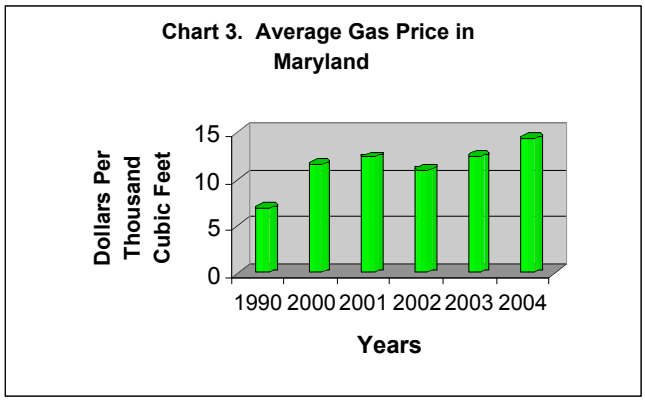


Year	Kwh Consumed	Source/Supplier
2000	298,409,697	Allegheny Power
2001	395,864,323	Allegheny Power & PEPCO
2002	489,008,643	Allegheny Power & PEPCO
2003	631,305,934	Allegheny Power & PEPCO
2004	642,175,303	Allegheny Power & PEPCO

Source: Dominion VA Power & PEPCO Energy Services

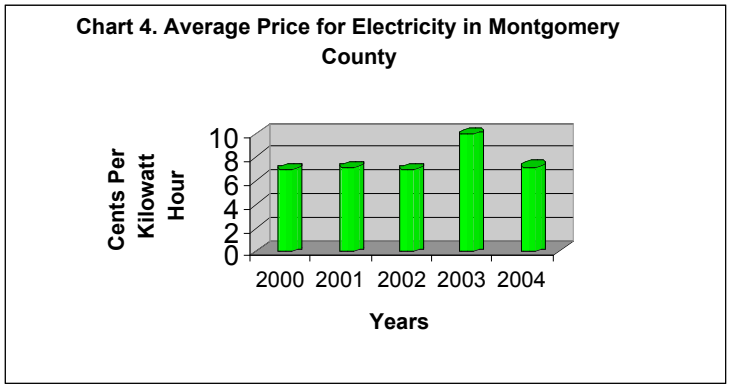
Consumption #s Provided by Montgomery County (Taken from Energy Tax Records)		
Years	**Electricity in kWh**	**Natural Gas in Therms**
2002	4,412,776,817	148,798,901
2003	4,932,616,301	270,127,631
2004	4,679,966,359	220,562,267

Montgomery County's numbers are significantly higher for electricity and gas than Allegheny, Pepco and Washington Gas. Montgomery's numbers included apartments that are typically included under the Commercial Sector or there is an error by one or more of the reporting utility companies.



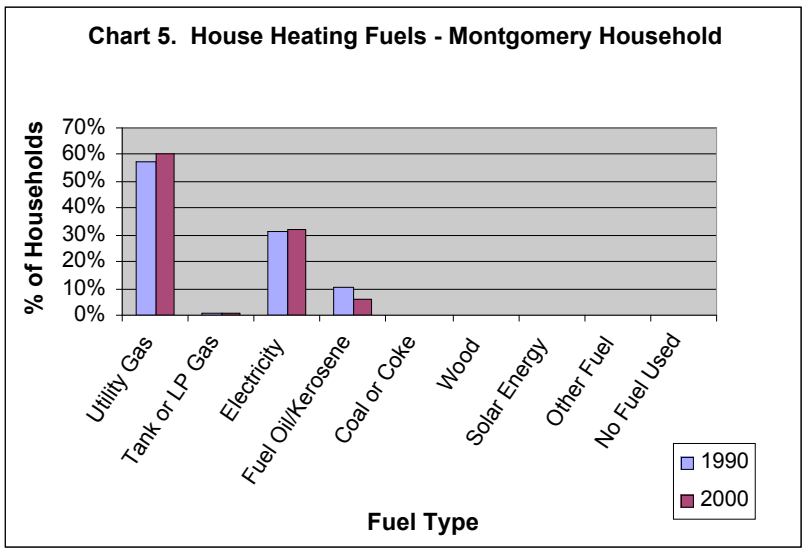
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: EIA – Maryland Natural Gas Residential Price, 8/30/05



Year	Av. Cents Per kWh	Source/Supplier
2000	7.01	Allegheny Power
2001	7.13	Allegheny Power
2002	7	Allegheny Power
2003	9.98	Allegheny Power
2004	7.2	Allegheny Power

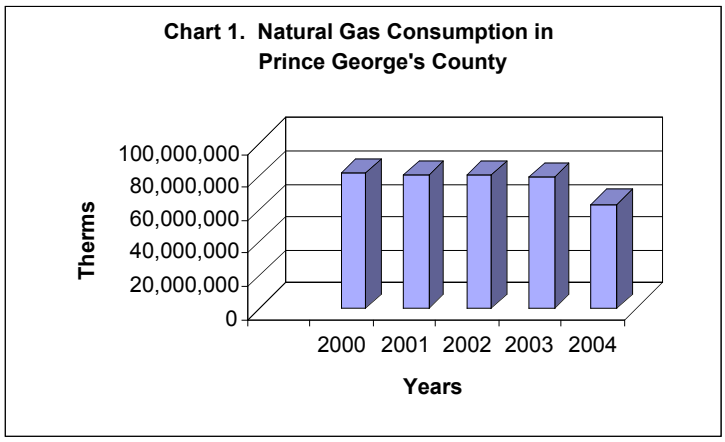
Source: Allegheny Power



Type of Fuel	1990	2000
Utility Gas	57.20%	60.40%
Tank or LP Gas	0.90%	0.90%
Electricity	31.10%	31.70%
Fuel Oil/Kerosene	10.20%	6.30%
Coal or Coke	0.00%	0.00%
Wood	0.30%	0.10%
Solar Energy	0.00%	0.00%
Other Fuel	0.20%	0.20%
No Fuel Used	0.10%	0.20%

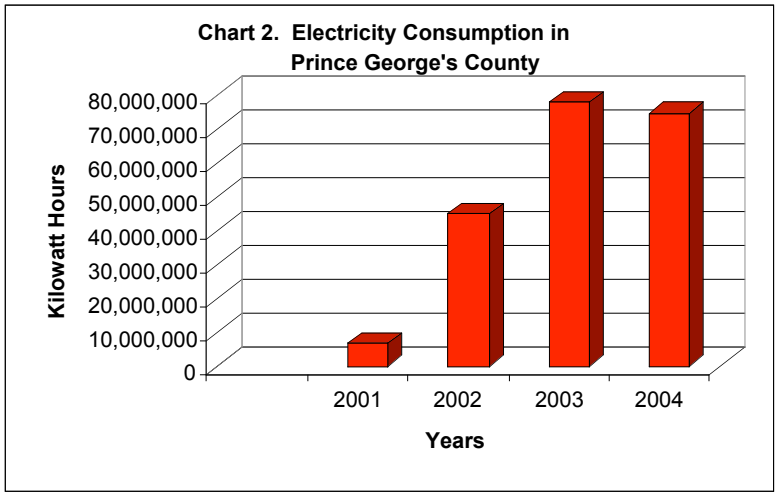
Year	Number of Households
1990	282,228
2000	324,565
% Increase	15%

PRINCE GEORGE'S COUNTY - RESIDENTIAL ENERGY PROFILE



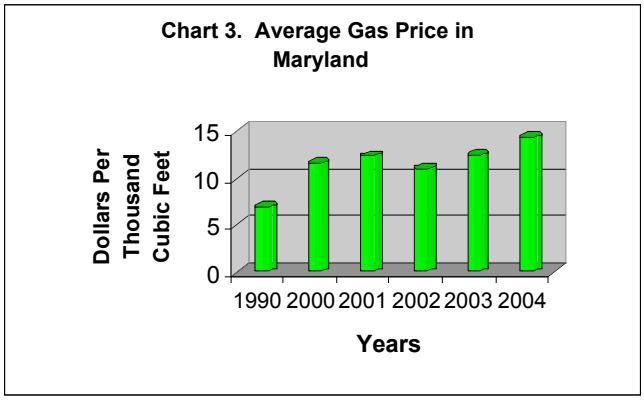
Year	Therms Consumed	Source/Supplier
2000	81,636,706	Washington Gas
2001	80,647,138	Washington Gas
2002	80,544,297	Washington Gas
2003	79,812,732	Washington Gas
2004	63,238,664	Washington Gas

Source: Washington Gas



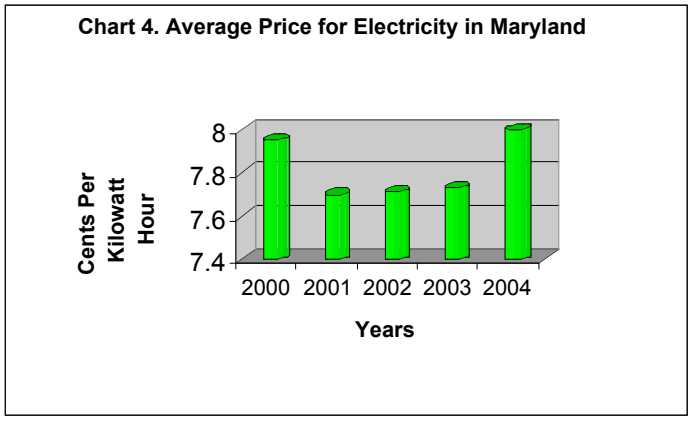
Year	Kilowatt Hours	Source/Supplier
2001	6,756,052	PEPCO
2002	44,989,090	PEPCO
2003	77,797,565	PEPCO
2004	74,715,422	PEPCO

Source: PEPCO Energy Services



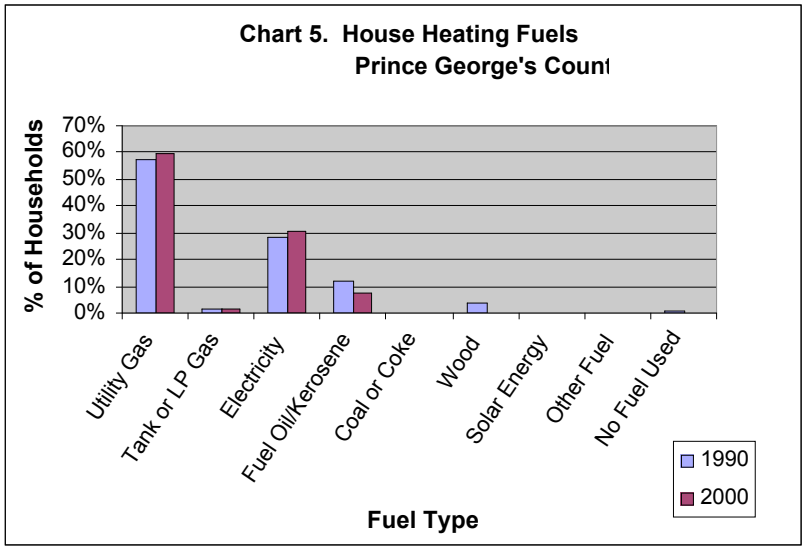
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: EIA – Maryland Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2000	7.95
2001	7.70
2002	7.71
2003	7.73
2004	8.00

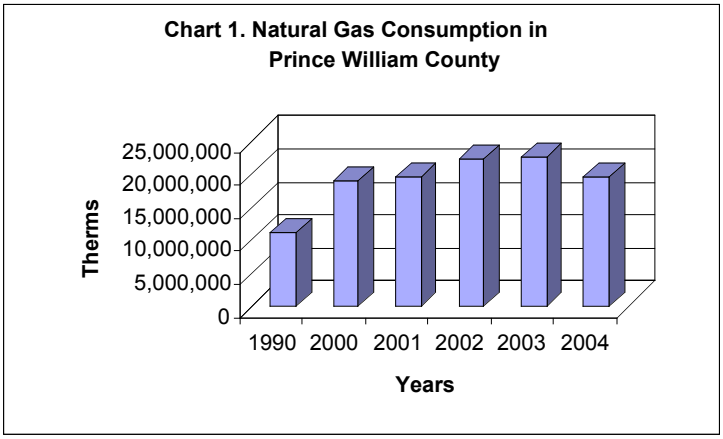
Source: Maryland Electricity Residential Price, 8/30/05



Year	Number of Households
1990	258,011
2000	286,610
% Increase	11%

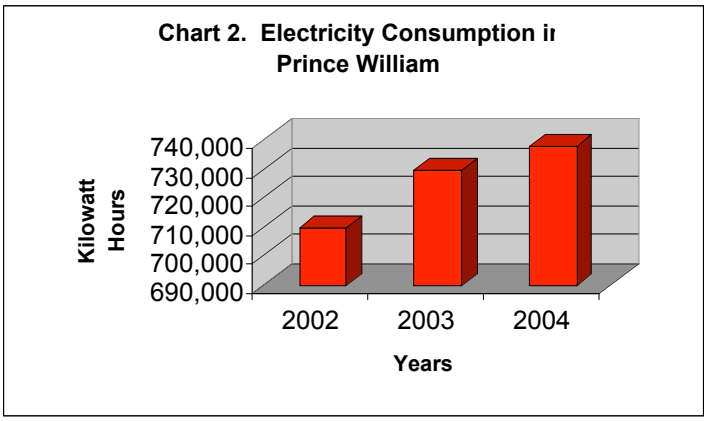
Type of Fuel	1990	2000
Utility Gas	57.70%	59.70%
Tank or LP Gas	1.20%	1.20%
Electricity	28.00%	30.90%
Fuel Oil/Kerosene	11.70%	7.40%
Coal or Coke	0.00%	0.00%
Wood	4.00%	0.20%
Solar Energy	0.00%	0.00%
Other Fuel	0.30%	0.30%
No Fuel Used	0.60%	0.30%

PRINCE WILLIAM COUNTY - RESIDENTIAL ENERGY PROFILE



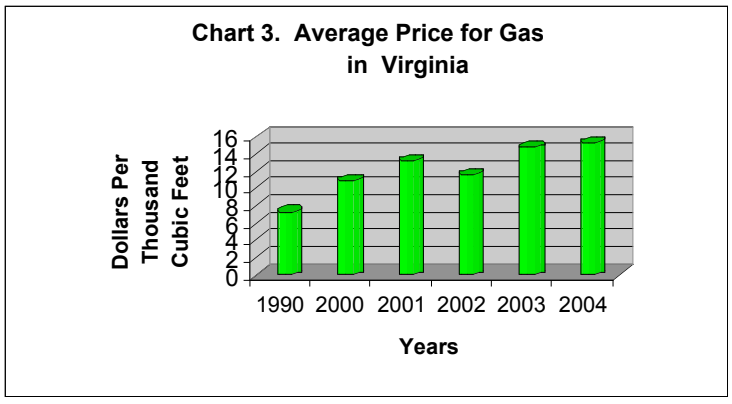
Year	Therms Consumed	Source/Supplier
1990	11,098,759	Washington Gas
2000	19,009,396	Washington Gas
2001	19,595,512	Washington Gas
2002	22,281,084	Washington Gas
2003	22,520,901	Washington Gas
2004	19,652,384	Washington Gas

Source: Washington Gas



Year	Kilowatt Hours	Source/Supplier
2002	709,255	Dominion VA Power & PEPCO
2003	729,604	Dominion VA Power & PEPCO
2004	737,751	Dominion VA Power & PEPCO

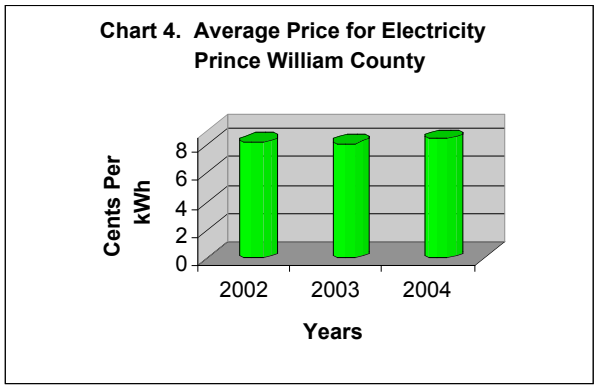
Source: Dominion VA Power & PEPCO Energy Services



Year	Dollars per Thousand Cubic Feet
1990	7.31
2000	10.91
2001	13.27
2002	11.65
2003	14.29
2004	15.35

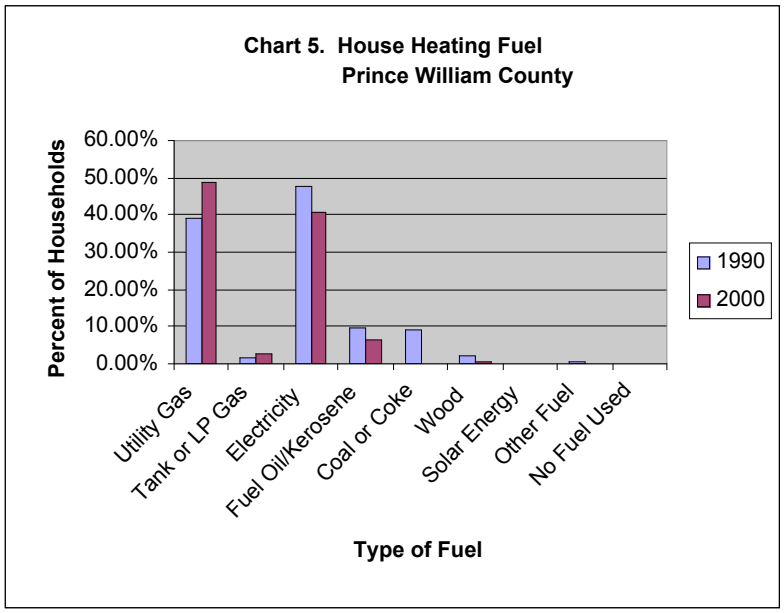
Source: Virginia Natural Gas Residential Price, 8/30/05

Note: Prince William County gas and electric consumption numbers do not include those from Columbia Gas of Virginia since their numbers could not be disaggregated and NOVEC (fee to provide numbers).



Year	Cents per kWh	Source/ Suppliers
2002	8.22	Dominion VA Power
2003	8.14	Dominion VA Power
2004	8.44	Dominion VA Power

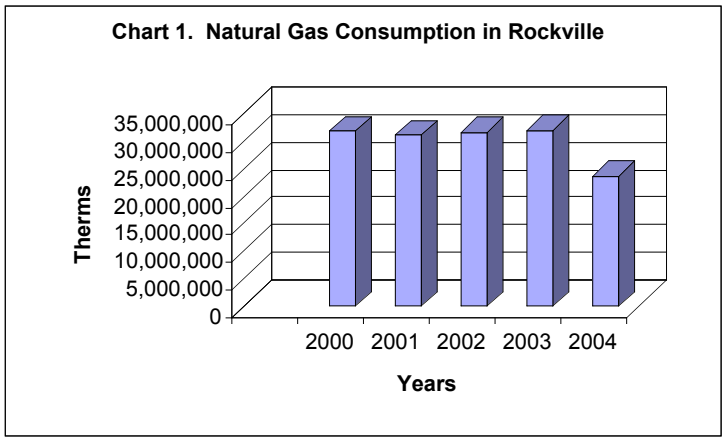
Source: Dominion VA Power



Year	Number of Households
1990	69,709
2000	94,570
% Increase	36%

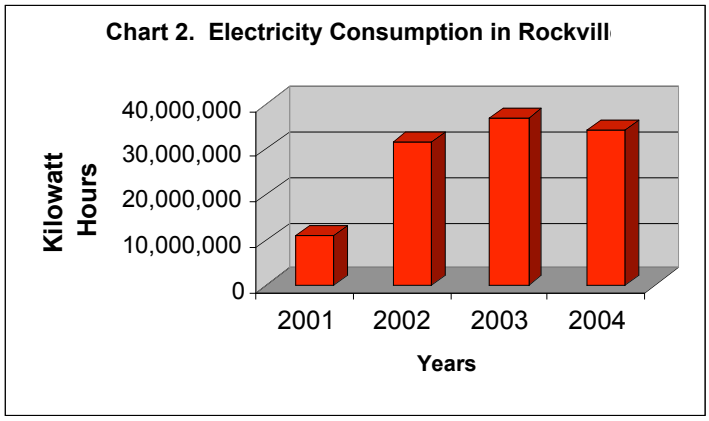
Type of Fuel	1990	2000
Utility Gas	38.90%	48.90%
Tank or LP Gas	1.50%	2.60%
Electricity	47.50%	40.70%
Fuel Oil/Kerosene	9.40%	6.60%
Coal or Coke	9.10%	0.00%
Wood	2.00%	0.80%
Solar Energy	0.10%	0.00%
Other Fuel	0.30%	0.20%
No Fuel Used	0.10%	0.10%

ROCKVILLE - RESIDENTIAL ENERGY PROFILE



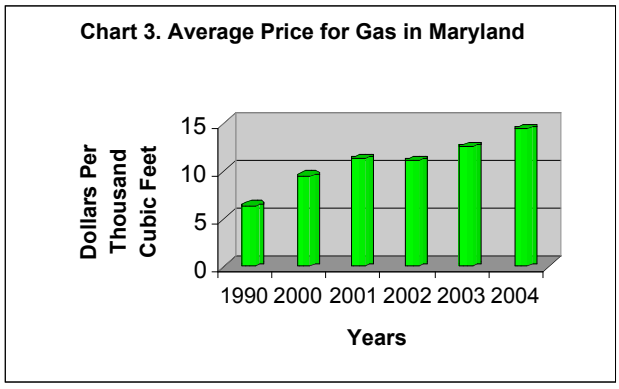
Year	Therms Consumed	Source/Supplier
2000	31,807,018	Washington Gas
2001	30,950,701	Washington Gas
2002	31,641,949	Washington Gas
2003	31,847,850	Washington Gas
2004	23,721,354	Washington Gas

Source: Washington Gas



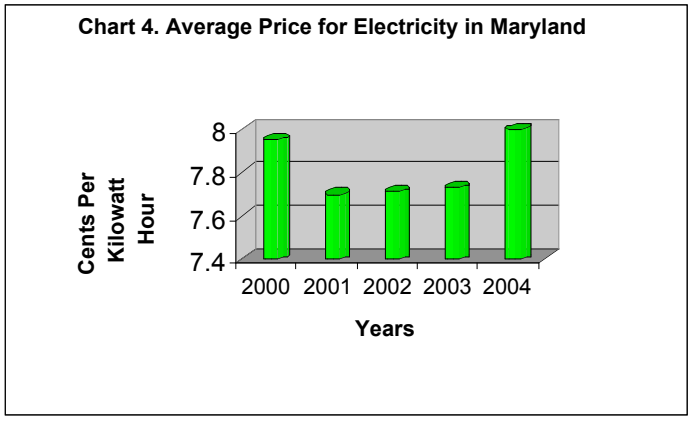
Year	Kilowatt Hours	Source/Supplier
2001	11,105,840	PEPCO
2002	31,396,312	PEPCO
2003	36,922,395	PEPCO
2004	34,016,019	PEPCO

Source: PEPCO Energy Services



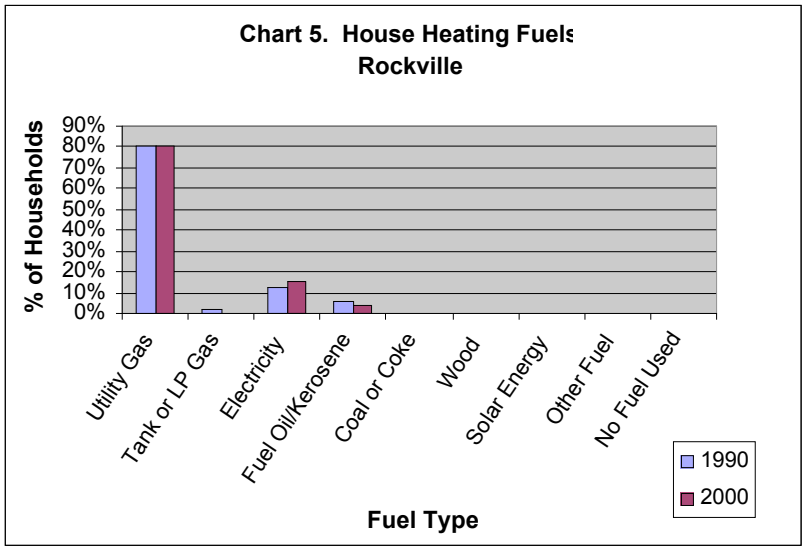
Years	Dollars Per Cubic Feet
1990	6.92
2000	11.66
2001	12.42
2002	11.04
2003	12.49
2004	14.38

Source: EIA – Maryland Natural Gas Residential Price, 8/30/05



Year	Cents per kWh
2000	7.95
2001	7.70
2002	7.71
2003	7.73
2004	8.00

Source: Maryland Electricity Residential Price, 8/30/05

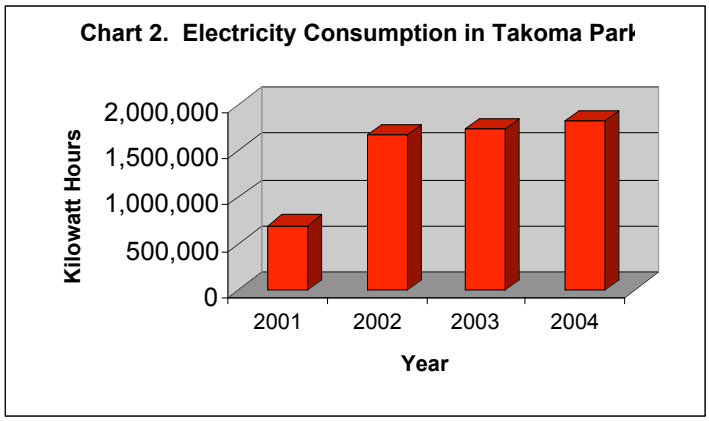


Year	Number of Households
1990	15,660
2000	17,245
% Increase	10%

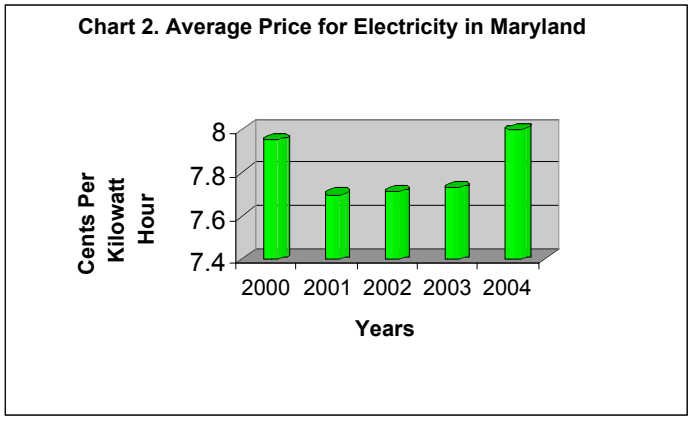
Source: U. S. Census 1990 and 2000

Type of Fuel	1990	2000
Utility Gas	80.70%	80.10%
Tank or LP Gas	1.60%	0.40%
Electricity	12.20%	15.20%
Fuel Oil/Kerosene	5.30%	4.00%
Coal or Coke	0.00%	0.00%
Wood	0.20%	0.00%
Solar Energy	0.00%	0.00%
Other Fuel	0.10%	0.10%
No Fuel Used	0.00%	0.10%

TAKOMA PARK - RESIDENTIAL ENERGY PROFILE



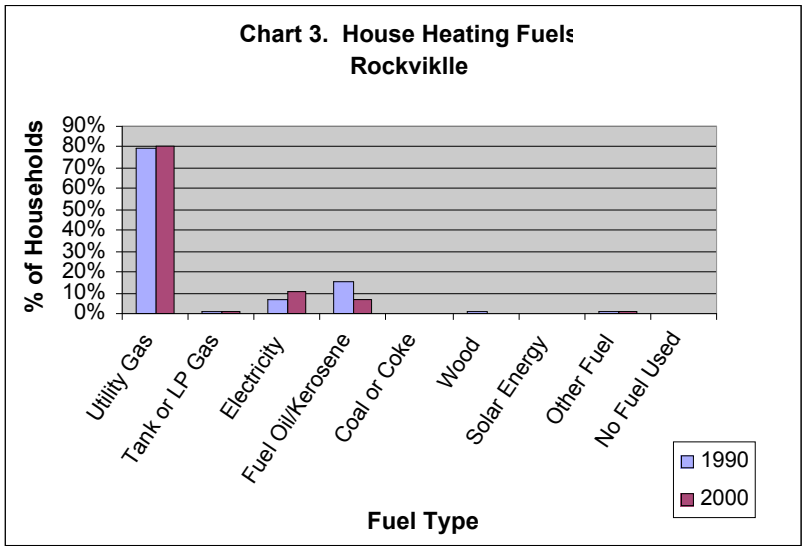
Year	Cents per kWh	Source/ Suppliers
2001	698,391	PEPCO
2002	1,668,532	PEPCO
2003	1,745,308	PEPCO
2004	1,826,711	PEPCO



Year	Cents per kWh
2000	7.95
2001	7.70
2002	7.71
2003	7.73
2004	8.00

Source: EIA – Maryland Electricity Residential Price, 8/30/05

Note: Gas consumption information was not available for Takoma Park.



Type of Fuel	1990	2000
Utility Gas	74.90%	80.60%
Tank or LP Gas	1.30%	1.10%
Electricity	6.30%	10.30%
Fuel Oil/Kerosene	15.70%	6.90%
Coal or Coke	0.00%	0.00%
Wood	0.50%	0.00%
Solar Energy	0.00%	0.00%
Other Fuel	1.10%	0.70%
No Fuel Used	0.30%	0.40%

Year	Number of Households
1990	6,822
2000	6,880
% Increase	0%

APPEN_ 6.E Montgomery County

APPEN_ 6.E Montgomery County Fuel Consumption 2000-2004						
						Percent Change
	2000	2001	2002	2003	2004	2002-2004
CONSUMPTION						
CNG/FAST FILL	8,892	2,551	25,853	18,621	533,826	1965%
CNG/SLOW FILL	101,326		401,599	382,690	162,819	-59%
DIESEL	2,657,698	8,015	2,775,916	3,166,246	2,875,223	4%
ETHANOL		130	9,729	32,985	41,470	326%
UNLEADED	1,716,905	6,543	1,601,921	1,739,650	1,855,273	16%
Total	**4,484,821**	**17,239**	**4,815,018**	**5,340,192**	**5,468,610**	**14%**
EXPENDITURES						
CNG/FAST FILL	$11,388	$5,023	$25,688	$24,002	$924,765	3500%
CNG/SLOW FILL	$107,038		$238,428	$304,571	$135,394	-43%
DIESEL	$3,344,738	$14,404	$2,776,802	$3,763,654	$4,267,517	54%
ETHANOL		$271	$11,981	$46,524	$76,255	536%
UNLEADED	$2,233,680	$11,756	$1,707,147	$2,135,428	$2,790,470	63%
Total	**$5,696,843**	**$31,454**	**$4,760,047**	**$6,274,179**	**$8,194,401**	**72%**
EXPENDITURE/ CONSUMPTION						
CNG/FAST FILL	$1.28	$1.97	$0.99	$1.29	$1.73	74%
CNG/SLOW FILL	$1.06		$0.59	$0.80	$0.83	40%
DIESEL	$1.26	$1.80	$1.00	$1.19	$1.48	48%
ETHANOL		$2.08	$1.23	$1.41	$1.84	49%
UNLEADED	$1.30	$1.80	$1.07	$1.23	$1.50	41%
Source: Montgomery County						

MWCOG Regional Energy Plan

APPENDIX 7

Guide to the Rate Of Return On Purchasing Higher Fuel Efficient Vehicles:

Appen_7_A: Miles Driven: 50,000; Incremental Replacement Costs, $5,000

Appendix 7_A VEHICLE FUEL EFFICIENCY SAVINGS MODEL Miles Driven: 50,000 Incremental Replacement Costs: $5,000												
	Price per Gallon (DC Metro Region)	**15 MPG (Base)**	**Gasoline Costs Per Mile**	**25 MPG (Replacement)**	**Gasoline Costs Per Mile**	**Per Mile Reduction in Gasoline Costs (Savings)**	**Total Vehicle Miles Per Year**	**Annual Reduction in Gasoline Costs (Savings)**	**Incremental Cost of Replacement Vehicle (Investment)**	**Number of Years to Recover Investment**	**Total ROI**	**Annual ROI**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
October 4, 2004	$1.91	15	$0.13	25	$0.08	$0.05	50,000	$2,548	$5,000	1.96	51%	26%
October 5, 2005	$3.09	15	$0.21	25	$0.12	$0.08	50,000	$4,116	$5,000	1.21	82%	68%
Scenario 1	$3.59	15	$0.24	25	$0.14	$0.10	50,000	$4,783	$5,000	1.05	96%	91%
Scenario 2	$4.34	15	$0.29	25	$0.17	$0.12	50,000	$5,783	$5,000	0.86	116%	134%
Scenario 3	$5.34	15	$0.36	25	$0.21	$0.14	50,000	$7,116	$5,000	0.70	142%	203%
Other Measures That Need to Be Considered												
	Non-Gasoline Operating Costs											
	Reduction in Pollution											
	Increased Energy Independence											

Compiled by: Jerome S. Paige & Associates

Appen_7_B: Miles Driven: 50,000; Incremental Replacement Costs, $10,000

Appendix 7_B VEHICLE FUEL EFFICIENCY SAVINGS MODEL Miles Driven: 50,000 Incremental Replacement Costs: $10,000												
October 4, 2004	$1.91	15	$0.13	25	$0.08	$0.05	50,000	$2,548	$10,000	3.92	25%	6%
October 5, 2005	$3.09	15	$0.21	25	$0.12	$0.08	50,000	$4,116	$10,000	2.43	41%	17%
Scenario 1	$3.59	15	$0.24	25	$0.14	$0.10	50,000	$4,783	$10,000	2.09	48%	23%
Scenario 2	$4.34	15	$0.29	25	$0.17	$0.12	50,000	$5,783	$10,000	1.73	58%	33%
Scenario 3	$5.34	15	$0.36	25	$0.21	$0.14	50,000	$7,116	$10,000	1.41	71%	51%
Other Measures That Need to Be Considered												
	Non-Gasoline Operating Costs											
	Reduction in Pollution											
	Increased Energy Independence											

Compiled by: Jerome S. Paige & Associates

Appen_7_C: Miles Driven: 75,000; Incremental Replacement Costs, $5,000

Appendix 7_C VEHICLE FUEL EFFICIENCY SAVINGS MODEL Miles Driven: 75,000 Incremental Replacement Costs: $5,000												
	Price per Gallon (DC Metro Region)	**15 MPG (Base)**	**Gasoline Costs Per Mile**	**25 MPG (Replace-ment)**	**Gasoline Costs Per Mile**	**Per Mile Reduction in Gasoline Costs (Savings)**	**Total Vehicle Miles Per Year**	**Annual Reduction in Gasoline Costs (Savings)**	**Incremental Cost of Replacement Vehicle (Investment)**	**Number of Years to Recover Investment**	**Total ROI**	**Annual ROI**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
October 4, 2004	$1.91	15	$0.13	25	$0.08	$0.05	75,000	$3,822	$5,000	1.31	76%	58%
October 5, 2005	$3.09	15	$0.21	25	$0.12	$0.08	75,000	$6,174	$5,000	0.81	123%	152%
Scenario 1	$3.59	15	$0.24	25	$0.14	$0.10	75,000	$7,174	$5,000	0.70	143%	206%
Scenario 2	$4.34	15	$0.29	25	$0.17	$0.12	75,000	$8,674	$5,000	0.58	173%	301%
Scenario 3	$5.34	15	$0.36	25	$0.21	$0.14	75,000	$10,674	$5,000	0.47	213%	456%
Other Measures That Need to Be Considered												
	Non-Gasoline Operating Costs											
	Reduction in Pollution											
	Increased Energy Independence											

Compiled by: Jerome S. Paige & Associates

Appen_7_D: Miles Driven: 75,000; Incremental Replacement Costs, $10,000

Appendix 7_D VEHICLE FUEL EFFICIENCY SAVINGS MODEL Miles Driven: 75,000 Incremental Replacement Costs: $10,000												
	Price per Gallon (DC Metro Region)	15 MPG (Base)	Gasoline Costs Per Mile	25 MPG (Replace-ment)	Gasoline Costs Per Mile	Per Mile Reduction in Gasoline Costs (Savings)	Total Vehicle Miles Per Year	Annual Reduction in Gasoline Costs (Savings)	Incremental Cost of Replacement Vehicle (Investment)	Number of Years to Recover Investment	Total ROI	Annual ROI
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
October 4, 2004	$1.91	15	$0.13	25	$0.08	$0.05	75,000	$3,822	$10,000	2.62	38%	15%
October 5, 2005	$3.09	15	$0.21	25	$0.12	$0.08	75,000	$6,174	$10,000	1.62	62%	38%
Scenario 1	$3.59	15	$0.24	25	$0.14	$0.10	75,000	$7,174	$10,000	1.39	72%	51%
Scenario 2	$4.34	15	$0.29	25	$0.17	$0.12	75,000	$8,674	$10,000	1.15	87%	75%
Scenario 3	$5.34	15	$0.36	25	$0.21	$0.14	75,000	$10,674	$10,000	0.94	107%	114%
Other Measures That Need to Be Considered												
	Non-Gasoline Operating Costs											
	Reduction in Pollution											
	Increased Energy Independence											

Compiled by: Jerome S. Paige & Associates

MWCOG Regional Energy Plan

APPENDIX 9

APPEN_ 9.A – EIA Sector Definitions

Commercial sector: An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. Note: This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.

Industrial sector: An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31-33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. Note: This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

Residential sector: An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.

Transportation sector: An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use.

Source: Energy Information Administration Web Site Glossary
http://www.eia.doe.gov/glossary/index.html

APPEN_ 9.B - Non-Government Sector Gas and Electric Service Suppliers

State	Jurisdiction	Electric Suppliers	Gas Suppliers
VIRGINIA	City of Alexandria	Dominion Virginia Power	Washington Gas
	Fairfax County	Dominion Virginia Power NOVEC (Northern Virginia Electric Cooperative)	Columbia Gas of Virginia Washington Gas
	Loudoun County	Dominion Virginia Power NOVEC	Columbia Gas of Virginia Washington Gas
	Arlington County	Dominion Virginia Power	Washington Gas
	City of Falls Church	Dominion Virginia Power	Washington Gas
	Prince William County	Dominion Virginia Power NOVEC	Columbia Gas of Virginia Washington Gas
	City of Fairfax	Dominion Virginia Power	Washington Gas
	City of Manassas	City of Manassas Utilities	Columbia Gas of Virginia Washington Gas
	City of Manassas Park	NOVEC	Columbia Gas of Virginia Washington Gas
MARYLAND	City of Bowie	Pepco Energy Services BGE Home Products & Services	Washington Gas
	City of Gaithersburg	Pepco Energy Services	Washington Gas
	Prince George's County	Pepco Energy Services BGE Home Products & Services	Washington Gas
	City of College Park	Pepco Energy Services	Washington Gas
	City of Greenbelt	Pepco Energy Services	Washington Gas
	Montgomery County	Allegheny Power Pepco Energy Services BGE Home Products & Services	Washington Gas
	City of Rockville	Pepco Energy Services	Washington Gas
	City of Takoma Park	Pepco Energy Services	Washington Gas
	Frederick County	Allegheny Power	Washington Gas
DISTRICT OF COLUMBIA		Pepco Energy Services	Washington Gas ECONnergy**

**** A** request for energy consumption and price information was sent to ECONnergy. Although the firm is licensed to serve the District of Columbia, no services are currently offered.
Compiled by: Jerome S. Paige & Associates

APPEN_ 9.C Sample Request

Dear Ms. Bacon:

Thank you for promptly returning my call and your willingness to follow up with the appropriate personnel in your firm on our request. Background information, as well as the data we are requesting, follow.

Background

The Metropolitan Washington Council of Governments (MWCOG) has tasked Jerome S. Paige & Associates, LLC to establish a consumption, price and expenditure energy profile for the 19 jurisdictions that compose MWCOG. Their last comprehensive energy assessment was done in 1982. Our firm specializes in the areas of forensic economics, business and economic analysis and organizational change. We also provide organizational support services in the areas of strategic planning, performance measurement/management, business manage ment and change management. You will find more information about our firm at www.PaigeAndAssociates.com ..

Our primary MWCOG contact is Mr. George Nichols and he ca n be reached at 202 -962-3355 or gnichols@mwcog.org . You can view more information about MWCOG at www.mwcog.org .

Our Request

We contacted you after confirming with Ms. Julia Hutchins at Energy Information Administration (EIA) that the consumption, price and expenditure information provided at the state level could not be disaggregated to the jurisdictional level. In order to develop the MWCOG database to parallel the EIA information at the state level, we need to go to the same source and that is each of the energy suppliers.
Hence, my call earlier today. We need to know how much electricity (in million kilowatt hours) and average price (if available), was delivered in **1990, 2000, 2001, 2002, 2003** and **2004** for the jurisdictions listed below and by sector (residential, commerical, industrial, transportation and all other) for each of these jurisdictions.

Virginia:
City of Alexandria
Fairfax County
Loudoun County
Arlington County
City of Falls church
Prince William County
City of Fairfax
City of Manassas
City of Manassas Park

Maryland:
City of Bowie
City of Gaithersburg
Prince George's County
City of College P ark
City of Greenbelt
City of Rockville
Montgomery County
City of Takoma Park
Frederick County

District of Columbia: Please note, we do not need information for the District of Columbia but we include it here to show the 19 MWCOG jurisdictions and for f uture reference as we are looking to establish a methodology to keep the MWCOG energy profile updated.

Date Needed

We would appreciate receiving the requested information on or before March 30, 2005.

APPEN_ 9.D - Summary of Gas and Electric Supplier Research

Utility Company or Jurisdiction	Request Sent	Company Response	Consump. Info.	Price Info.	Periods Covered	Sector Defined Same as EIA	Other
Allegheny Power	4/5/05	5/20/05	Yes	Yes	2000 - 2004	Yes	
BGE	3/21/05	3/29/05	Yes	Yes	1999 - 2004	Yes	Limited service to MWCOG jurisdictions; in Montgomery County, a few small towns just below Potomac River and Laurel in PG County. Cannot disaggregate consumption without account numbers.
City of Manassas Utilities	4/15/05	7/22/05	Yes	Yes	1990, 2000 - 2004	Yes	.
Columbia Gas of Virginia	3/23/05	7/18/05	Yes	No	2000 - 2004	Yes	Cannot disaggregate consumption information nor can they sort their files by zip code. Serves parts of Fairfax, Loudoun and Prince William Counties as well as Manassas and Manassas Park.
Dominion Vir ginia Power	3/18/05	7/8/05	Yes	Yes	2000 - 2004	Yes	Residential data not available for 1990, 2000 and 2001.
Montgomery County		4/13/05	Yes	No	2002 - 2004	N/A	Information kept by two categories, residential and non - residential.
Northern Virginia Electric Cor poration (NOVEC)	3/21/05						Can supply information for $10,000. NOVEC serves portions of Fairfax, Loudoun and Prince William Counties and Manassas Park
Pepco Energy Service	3/18/05	8/12/05	Yes	No	2000 - 2004	N/A	
Washington Gas	3/17/05	8/3/05	Yes	No	1990, 2000 - 2004	Yes	

Compiled by: Jerome S. Paige & Associates

APPEN_9E Maryland Jurisdiction Zip Code Data

MARYLAND JURISDICTION ZIP CODES

Frederick County	Montgomery County	Prince George's County	Bowie County	College Park County	Gaithersburg County	Greenbelt County	Rockville County	Takoma County
20842	20088	20601	20715	20740	20877	20768	20847	20912
20871	20707	20607	20716	20742	20878	20770	20848	20913
21701	20783	20608	20717		20879	20771	20849	
21702	20787	20613	20718		20882		20850	
21703	20812	20623	20719		20884		20851	
21704	20813	20703	20720		20885		20852	
21710	20814	20705	20721		20886		20853	
21714	20815	20706					20854	
21716	20816	20707					20855	
21717	20817	20708					20859	
21718	20818	20709						
21719	20824	20710						
21727	20825	20712						
21754	20827	20715						
21755	20830	20716						
21757	20832	20717						
21758	20833	20718						
21759	20837	20719						
21762	20838	20720						
21769	20839	20721						
21770	20841	20722						
21771	20842	20731						
21773	20847	20735						
21774	20848	20737						
21775	20849	20738						
21776	20850	20740						
21777	20851	20742						
21778	20852	20743						
21780	20853	20744						
21783	20854	20745						
21787	20855	20746						
21788	20859	20747						
21790	20860	20748						
21791	20861	20749						
21792	20862	20750						
21793	20866	20752						
21798	20868	20753						
	20871	20757						
	20872	20762						
	20874	20768						
	20875	20769						
	20876	20770						
	20877	20771						
	20878	20772						
	20880	20774						
	20882	20775						
	20884	20780						
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	20911							
	20912							

APPEN_9.F Virginia Jurisdiction Zip Code Data

VIRGINIA JURISDICTION ZIP CODES

Arlington County	Fairfax County	Loudoun County	Prince William County	Alexandria County	Fairfax City County	Falls Church County	Manassas City County	Manassas Park City
22201	20120	20101	20109	22301	22030	22040	20108	20111
22202	20121	20102	20110	22302	22031	22041	20109	20113
22203	20122	20103	20111	22304	22032	22042	20110	
22204	20124	20104	20112	22305	22033	22043	20112	
22205	20151	20105	20136	22311	22034	22044		
22206	20153	20107	20137	22313	22036	22046		
22207	20170	20117	20143	22314	22037			
22209	20171	20118	20155	22320	22038			
22210	20172	20129	20156	22331	22039			
22211	20190	20131	20168	22332				
22213	20191	20132	20169	22333				
22214	20192	20134	20181	22334				
22215	20193	20135	20182	22336				
22216	20194	20141	22026					
22217	20195	20142	22125					
22219	20196	20146	22134					
22222	22003	20147	22172					
22226	22009	20148	22191					
22227	22015	20152	22192					
22229	22027	20158	22193					
22230	22030	20159	22194					
22234	22031	20160	22195					
22240	22032	20163						
22242	22033	20164						
22243	22034	20165						
22244	22035	20166						
22245	22036	20167						
22246	22037	20175						
	22039	20176						
	22041	20177						
	22042	20178						
	22043	20180						
	22044	20184						
	22046	20189						
	22060	20197						
	22066							
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APPENDIX_10.A

Energy & Urgency: The Metropolitan Washington Council of Governments' Guide to Energy Policy

Energy & Urgency Outline

- Energy & Urgency
- What Local Policymakers Will Have to Focus on
- Transitioning to a New Energy Era
- Proposed Regional Energy Goals
- Transitioning to a New Energy Era: Vehicles, Appliances, Buildings & Behavior
- Key Recommendations
  - Adopting a Regional Energy Information System
  - Setting Regional Energy Savings Targets
  - Expanding Education & Outreach
  - Monitoring & Updating Energy Policy & Planning

Energy and Urgency: Why A Fresh Look By Local Governments-1

- Hurricane Isabel and the local electricity interruptions
- Hurricanes Katrina and Rita, interrupting our liquid fuels and causing prices to skyrocket
- The Northeast Blackout of 2003
- High costs of energy for residents, businesses, and governments

Energy and Urgency: Why A Fresh Look By Local Governments-2

- Energy use is the source of most pollution (local/regional air pollution, climate destabilization)
- Energy is an essential lifeline for health and comfort
- Energy helps fuel economic growth
- Energy flows can be interrupted by nature (weather) or humans (terrorism, poor planning or mismanagement)

What Local Policymakers Will Have to Focus on:

- Keeping dollars from flowing out of the regional economy
- Reducing the effects of supply disruptions
- Enhancing "homeland security"
- Assisting low and moderate income households
- Maintaining public service delivery amidst rising energy costs
- Improving the environment
- Promoting energy efficient living and working locations

Proposed Regional Energy Policy Goal

- Energy Independence for
  - Sustained Economic Growth
  - Enhanced Energy Affordability
  - Increased Energy Security & Stability
  - Improved Environmental Quality

Transitioning to a New Energy Era: Vehicles, Appliances, Buildings & Behavior

- New Energy Era Defined: Rising global energy demand, tight energy supplies & high and rapidly fluctuating energy prices
- Focusing of Thinking
  - Vehicles
  - Appliances
  - Buildings
  - Behaviors

Transitioning to a New Energy Era: Vehicles, Appliances, Buildings & Behavior

- Key Recommendations Cover Four Areas:
  - Adopting a Regional Energy Information System
  - Setting Regional Energy Savings Targets
  - Expanding Education & Outreach
  - Monitoring & Updating Energy Policy & Planning

Adopting a Regional Energy Information System

Focus Area-1

Recommendation K-1.1: Develop a "*Data and Information Collection and Analysis System*" that will provide an understanding of economic and social implications of energy consumption, sources, and supply for the MWCOG Region

- ***Initiative 1:*** Create a working group among energy suppliers (electric, gas, petroleum, and alternative) to develop at the regional level a system of reporting similar to the system used by the Energy Information Agency to determine the scope and feasibility of system development
- ***Initiative 2:*** Develop an executive level scorecard for MWCOG that keeps policy makers apprised at how the Region is managing in the new energy era
- ***Initiative 3:*** Publish Semi-Annual Report
- ***Initiative 4***: Report any alerts and results to EPAC and CAOs

Setting Regional Energy Savings Targets

Focus Area-2

Recommendation K-2.1: Develop targets to reduce the rate of growth in the consumption of non-renewable energy and expand the use of renewable energy

- ***Initiative 1***: Adopt a set of goals, objectives, and best practices that will promote energy independence for the MWCOG region
- ***Initiative 2:*** Adopt a regional goal to increase the share of regional energy provided from alternative and renewable resources
- ***Initiative 3***: Encourage each jurisdiction to develop an RPS using the District of Columbia and Montgomery County as models
- ***Initiative 4:*** Encourage each member jurisdiction to reduce energy consumption by a specific rate, e.g.; reducing energy consumption by 1 percent each year

Expanding Education & Outreach

Focus Area-3

Recommendation K-3.1: Coordinate state and local energy education programs to insure a regional message is developed, as well as the state and local messages

- ***Initiative 1:*** Develop regional energy message materials
- ***Initiative 2****:* Convene energy public relations staffs of state and local officials to promote develop and coordination of message
- ***Initiative 3:*** Increase outreach efforts to remind drivers to use and maintain their vehicles so they operate efficiently, to use public transportation, to purchase fuel-efficient vehicles, and to make wise energy choices
- ***Initiative 4:*** Among the jurisdictions, jointly coordinate energy efficiency and green building initiatives that are useful for the residential sector
- ***Initiative 5:*** Promote cooperation among state energy offices to develop public awareness synergies from programs that address similar audiences and deliver similar messages

Recommendation K-3.2: Advocate existing policies related to the energy efficiency of vehicles, appliances, and buildings meet or exceed federal standards

- ***Initiative 1***: **Vehicles** -- Join existing federal and local programs underway that advocate energy efficiency standards, e.g., Clean Cities and Plug in Partners
- ***Initiative 2***: **Appliances** -- Join existing federal and local programs underway that advocate energy efficiency standards, e.g., Energy Star Refrigerator Program
- ***Initiative 3:*** **Building**s -- Join existing federal and local programs underway that advocate energy efficiency standards, e.g., One Million Solar Roofs, Energy Smart Schools, Green Building and LEED Standards, and Building Codes

Monitoring & Updating Energy Policy, Planning & Best Practices

Focus Area-4

Recommendation K-4.1: Review and update the "Metropolitan Washington Gas Supply Emergency Alert Plan" July 1985 (review completed January 1988)and the "Metropolitan Washington Power Emergency Alert Plan" July 1985(revised February 1988)

- ***Initiative 1:*** Implement any suggested changes in the Gas Emergency Alert Plan per Regional Emergency Plan Update, 2005 by September 2006
- ***Initiative 2:*** Implement any suggested changes in the Power Emergency Alert Plan per Regional Emergency Plan Update, 2005 by September 2006
- ***Initiative 3:*** Examine electric transmission and natural gas delivery capacity as it affects the long-term electricity and gas security and prices in the region and include any findings or recommendations in the appropriate emergency plans

Recommendation K-4.2: Review and update the "Washington Metropolitan Tri-State Energy Emergency Coordination Agreement" dated March 21, 1979

- ***Initiative 1:*** Implement any suggested changes Revise Tri-State Emergency Coordination Agreement by June 2006
- ***Initiative 2:*** Have COG Staff coordinate and facilitate ratification processes at state executive level

Recommendation K-4.3: Leverage private sector investment funds to finance public sector energy improvements

- ***Initiative 1***: Compile a list of performance contracts used by MWCOG jurisdictions in Virginia, Maryland and the District of Columbia
- ***Initiative 2:*** Share best practices and report on the extent to which regional governments are using alternative financing techniques to achieve public sector energy savings
- ***Initiative 3:*** Prepare a large-scale demonstration project -- for example, promote the development of an energy efficient and technologically advanced major public school facility -- to illustrate the most recent advancements in ways private sector financing can be leveraged

Recommendation K-4.4: Leverage jurisdictional purchasing power to ensure and promote the use of alternative fuels and energy security

- ***Initiative 1:*** Compile best practices in purchasing and aggregation agreements
- ***Initiative 2:*** Prepare a large-scale demonstration project -- for example bringing together groups that might benefit from an aggregation agreement -- to promote the increase in the number of aggregation agreements in the region

Recommendation K-4.5: Monitor the regulations of the Energy Policy Act of 2005 to maximize the benefits of the Act to the Region

- ***Initiative 1:*** Request annual data from states on use of provisions in EPACT 2005, e.g. tax credits on alternative, clean fuel vehicles, on bio-diesel fuels, and on renewable energy
- ***Initiative 2:*** Prepare a "benefits sheet" that illustrates the additional financial and energy savings and air quality improvements that can be gained by taking full advantage of the provisions in the law

Recommendation K-4.6: Develop implementation strategies for practices in energy efficiency and conservation at the regional level

- ***Initiative 1:*** Create a data base of BMPs
- ***Initiative 2***: Develop and conduct an annual energy sector peer-to-peer exchange forum to help enhance the rate at which BMP's are adopted throughout the region

Recommendation K-4.7: Explore current motor fuel pricing and taxing policies to assess their effectiveness in promoting energy efficiency and conservation and preserving the economic competitiveness of the Region

- ***Initiative 1***: Establish a task force of experts in economics, public budgeting and finance, social welfare policy, and energy policy to evaluate the pricing and regional taxing polices and to make recommendations as they relate to:
  - Reducing the outflow from the region of money spent on energy
  - Increasing funds to finance regional energy improvements, and
  - Assisting low and moderate income households and small and medium-sized business adjust to the new energy environment

Next Steps

- Finalize Policy Recommendations For Review by Chief Administrative Officers
- Finalize Policy Recommendations for Approval by Council of Governments' Board
- Prepare Abbreviated Version of Energy Policy Guide
- Distribute Abbreviated Version of Energy Policy Guide Along With Board-Adopted Recommendations
- Promote Implementation of Board-Adopted Recommendations

Jerome S. Paige
& Associates, L.L.C.

JEROME S. PAIGE & ASSOCIATES (JSP & Associates) is a professional services firm that specializes in the areas of pubic policy research, business and economic analysis, forensic economics and organizational change. Dr. Paige, and his team, with regular and easy access to Washington, D. C., has extensive experience in public policy infrastructure, with an emphasis on understanding the implications of such policy. Consistently, JSP & Associates has provided governments and businesses with decision making tools that yield the desired results.

Dr. Paige and his associates routinely analyze business, economic and public policy issues for state governments, regional associations, federal agencies, academic institutions, legal communities, and non-profit organizations.
Associates at the firm translate complicated governmental and business issues into sound recommendations and solid initiatives.

Additionally, JSP & Associates provides organizational support services in the areas of strategic planning, business development, performance measurement, performance management and change management. The firm's mission is to help its clients provide convincing evidence, make critical decisions, and improve organizational effectiveness. JSP & Associates is recognized as a leader in economic, business and organizational solutions.

The team assembled to work on the 2005 MWCOG Regional Energy Plan includes Jerome S. Paige, Joyce E. Henderson, Lenneal Henderson, Felicia McDade, Don Milsten, and David Terry. Detailed biographies follow.

JEROME S. PAIGE, PH.D.

Dr. Paige, who holds a Ph.D. in economics, is a principal in his firm, Jerome S. Paige & Associates, LLC -- an economic consulting firm that specializes in the areas of pubic policy research, business and economic analysis, forensic economics and organizational change. In addition to leading the development of the Metropolitan Washington Council of Government's Regional Energy Plan 2005, Dr. Paige led the development of two comprehensive energy planning teams for the DC Energy Office. He is currently providing consulting services to the DC Energy Office in the areas of performance measurement and management, and leadership and change management.

Dr. Paige has been involved in energy-related issues since the late 1970s when he was founding member of the DC Consumer Utility Board. He has provided expert testimony on behalf of the DC Office of the People's Counsel before the DC Public Service Commission. In addition to his work in the energy policy arena, Dr. Paige provides expert testimony in civil litigation and administrative matters in the areas of economics, finance, accounting and insurance.

Dr. Paige has been a full-time and part-time professor and an academic administrator at several educational institutions – National Defense University (NDU), University of Baltimore (UB), and the University of the District of Columbia (UDC). In addition to standard courses in economics, he has taught courses in regulatory economics and in economic policy.

While on leave from UDC (1986-1988), Dr. Paige served as the Deputy Director of the Mayor's Policy Office in the District of Columbia. Also while at UDC, Dr. Paige served as interim Director of the Institute for District Affairs (IDA) and a Senior Research Scholar at IDA's successor, the Center for Urban Policy and Research (CARUP), where he participated in and/or directed studies related to housing, neighborhood revitalization, cable television, economic development, tourism, supermarket demand, and politics in the District of Columbia.

Dr. Paige currently holds adjunct faculty positions at The School of Information Studies, Syracuse University (information studies) and The George Washington University Organizational Sciences Program (managerial economics).

Dr. Paige received his Ph.D and Master's degrees in economics from American University and his B.A. degree in economics from Howard University.

JOYCE E. HENDERSON, MBA

Ms. Henderson has 25 plus years of domestic and international experience in general management with specific experiences in strategic planning, organization planning and development, market research, marketing, process and product engineering, project and product management, customer service and organization planning and development. Ms. Henderson spent most of her years in management working for two major Fortune 500 companies, Westinghouse Electric Corporation and The Equitable Life Assurance Society (aka as AXA Financial). Over the past six years, she has been a subcontractor to other firms working as a consultant with emphasis on needs assessment, market analysis and strategic planning in energy and other business areas. Ms. Henderson previously worked along with Jerome Paige and Associates and others on the 2002 Comprehensive Energy Plan the District of Columbia.

Ms. Henderson's career began as a systems analyst developing automated solutions to improve productivity in the workforce. She has since managed both technical and non-technical projects and organizations ranging in size from 20 to 100 plus people, product lines in excess of $100 million and project budgets up to $30 million. She has conducted business in 14 countries and has served as interim President for a Japanese/American joint venture company. Ms. Henderson has developed strategic plans for businesses as well as non-profits, turned loss businesses into profitable businesses and significantly improved operational

performance by restructuring organizations, implementing effective human resource programs and sound information management systems, and transitioned organizations to state-of-the-art technology.

Ms. Henderson earned a BS degree in Business Administration from Virginia State University in 1965 and a MBA, in Management from Pace University in 1975. She has supplemented her education with numerous courses in management, marketing, strategic planning and leadership, the latest being the Oxford Strategic Leadership Program sponsored by Oxford University in November 2001.

LENNEAL HENDERSON, PH.D.

Dr. Lenneal Henderson is a Senior Consultant with Jerome S. Paige & Associates. He is also currently a Distinguished Professor of Government and Public Administration and Senior Fellow at the William Donald Schaefer Center for Public Policy and a Senior Fellow in the Hoffberger Center for Professional Ethics at the University of Baltimore where he was formerly a Henry C. Welcome Fellow.

For 2001-2007, he served as the Daniel T. Blue Endowed Professor of Political Science at North Carolina Central University in Durham, North Carolina. He was also recently selected as a Fulbright Senior Specialist. In November 2005, he was elected a Fellow of the National Academy of Public Administration.
He served as a Policy Analyst in the Office of the Assistant Secretary for Policy and Evaluation at the United States Department of Energy from 1977-79 working on both the International Energy Agency and on small scale renewal energy projects in Guyana, Trinidad-Tobago, Barbados and Jamaica; and as Vice President for Energy Management and, subsequently, Vice President for Science and Technology at the Ronson Management Corporation of Alexandria, Virginia, managing contracts with the Bonneville Power Administration, the U.S. Department of Energy and the U.S. Agency for International Development. Since 1990, he has served as a Part Time Scientist at the Argonne National Laboratory conducting and publishing studies on household energy consumption and expenditure, environmental justice and electricity deregulation. He has also served as a consultant to the Edison Electric Institute and to the Tata Energy Research Institute of Bombay and New Delhi, India.

Since 1979, he has served as an expert witness in natural gas and electricity cases before the Maryland and District of Columbia Public Service Commissions and before the Federal Energy Regulatory Commission. He has also testified before the Maryland legislature on electricity deregulation issues. His books include Black Political Life in the United States, Administrative Advocacy: Black Administrators in Urban Bureaucracies, The New Black Politics: The Search for Political Power (Edited with Michael Preston and Paul Puryear), Public Administration and Public Policy: A Minority Perspective (with Lawrence Howard and Deryl Hunt) and, most recently, Dimensions of Learning: Education for Life (with Bernice D. Johnson, Debra Parker and Magnoria Lunsford).

His publications on energy have appeared in Energy Economics, The Journal of Peace, The National Civic Review, The Public Administration Review, the Public Organizational Review: A Global Journal, The Review of Black Political Economy, the Howard Law Journal, The Annals of American Academy of Social and Political Science, The International Journal of Public Administration, The Journal of Social and Behavioral Science, Administrative Theory and Praxis and other publications and he has given papers on issues including energy policy, urban dynamics, organizational theory and racial and ethnic studies in Israel, Sweden, India, Africa, the People's Republic of China and Russia, Jordan, Estonia, Japan and Australia.

He received his A.B., M.A. and Ph.D degrees from the University of California, Berkeley and has conducted additional postdoctoral study at the Paul Nitze School of Advanced International Studies at Johns Hopkins University focused on energy policy in India and Africa and the George Washington University in Science, Technology and Public Policy.

FELICIA MCDADE, MBA

Ms. McDade, an Associate with Jerome S. Paige & Associates, is a proven leader within the media financial services and insurance industries. As an internal consultant, Ms. McDade has specialized in business development, financial modeling, strategic planning, sales negotiations and marketing to Fortune 500 companies. Ms. McDade spent the last 12 years creating strategy execution for companies, such as The Weather Channel, Turner Broadcasting, and The Walt Disney Company. Ms. McDade's focal point is to create sound strategy execution and ancillary revenue streams while creating solid product offerings.

Ms. McDade's career began in the financial services industry as a Corporate Finance Associate with Bank of America and Senior Associate with Mesirow Financial, a private equity boutique firm. During her tenure in financial services, she consulted Fortune 500 companies and small businesses through many projects including building financial models, creating strategy documents, and marketing private placement memorandums.

Ms. McDade received her B.B.A. in Business Administration from The University of North Texas, and completed her M.B.A. at Clark Atlanta University. Ms. McDade also has a certificate in International Business from the University of Thunderbird in Glendale, Arizona. In addition to her routine activities, Ms. McDade is an Adjunct Professor at University of Phoenix, teaching Strategy & Business Development at the graduate level.

DONALD E, MILSTEN, PH.D.

Donald E, Milsten, PH.D**.** was Director of the Maryland Energy Office and Administration for twenty years. He promoted energy efficiency through technical and financial programs, legislative proposals and training. He was Chairman of the Southern Solar Energy Center (Atlanta, GA) for three years and he guided Maryland's response to energy shortages in 1977, 1979, 1989, 1990, and 1992. A founder of the National Association of State Energy Officials (NASEO), he served as Treasurer and Vice-Chairman. He chaired the NASEO Energy Data and Security Committee for 10 years and worked closely with the Energy Information Administration to assure the availability of data for states. In this capacity, he also guided the development of an energy information protocol signed by the Secretary of Energy and NASEO.

As a consultant, he provided energy efficiency and management training to over twenty state energy and Department of Energy (DOE) regional offices and revised energy emergency plans for Arkansas, Georgia, North Carolina, Oklahoma, Maryland and Minnesota. He joined with Jerome Paige Associates and others to prepare the Comprehensive Energy Plan III for the District of Columbia and he worked with NASEO for several years helping to prepare State Energy Assurance Guidelines and supporting energy emergency planning and training in coordination with the DOE Office of Energy Assurance. Dr. Milsten was associated with Edwards & Kelcey, a national transportation engineering firm, for six years assisting clients with alternative transportation fuels issues, marketing, traffic and intelligent transportation systems. He continues to be associated with Williams Associates Engineers, PA, a traffic engineering firm in Severna Park Maryland.

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DAVID TERRY

David Terry is President of Stateline Energy, LLC of Arlington, Virginia, where he leads the firm's energy policy analysis, program planning, and advocacy services. Mr. Terry has 15 years experience in energy efficiency and renewable energy issues and programs, with particular expertise in biofuels and critical energy infrastructure planning. Stateline Energy's clients include the Governors' Ethanol Coalition, Association of State Energy Research and Technology Transfer Institutions, Compressed Air Challenge, D&R International, SRA International, U.S. Department of Energy, U.S. Environmental Protection Agency, and Rutgers University. Before founding the firm, Mr. Terry was the Managing Director of a Washington, DC, based state energy organization focused on appropriations and energy policy advocacy with federal agencies and Congress. Prior this, he worked with several of national research and policy organizations, such as the National Academy of Sciences, examining energy, environmental, and transportation issues.