

# Energy Saved, Dollars Earned

Real-World Examples of How Energy Efficiency  
Can Benefit Maryland Consumers

Maryland PIRG Foundation





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# Executive Summary

**M**aryland is at an energy cross-road—facing a crisis, but also an opportunity.

Marylanders are paying more to light and heat their homes, run their businesses, and to get where they need to be. In five years, electricity and natural gas prices have jumped more than 50 percent, even after adjusting for inflation. Millions of dollars are leaving the state to pay for fuel imports, draining our local economy. Moreover, the Public Service Commission says unless we take action, Maryland will likely face rolling electric blackouts as early as 2011.

The fastest, cheapest and cleanest way to address this crisis is to turn what is now wasted energy into a useful resource to power our homes, offices and factories. Right now, Maryland has the opportunity to increase energy efficiency, so that we can get more heat, light, and work from the energy we already use. Rather than spend billions on new power plants, transmission lines and higher rates, we can invest in energy-efficient technologies—saving significant amounts of electricity and natural gas, and saving every homeowner and business money on their energy bills.

For guidance, Maryland can look to states across the country that have adopted strategies to increase energy efficiency. These programs deliver dollar savings for the citizens, businesses and institutions that participate. Moreover, they reduce costs, improve the reliability of the energy system, delay the need to build new power plants, slow rising energy prices, create jobs, and strengthen the economy for society as a whole.

**Energy efficiency programs can help homeowners tap into vast potential energy savings, offsetting up-front costs and delivering long-term savings on energy bills. For example:**

- Through public education and targeted rebates, New York encourages homeowners to replace outdated and inefficient appliances with energy-saving models. Participating families save an average of \$600 per year in energy costs.
- New Jersey offers rebates to homeowners who purchase efficient furnaces or air conditioners. Tens of

thousands of New Jersey households have participated and now save an average of \$63 per year on heating and cooling.

- A Minnesota gas utility offers low-cost home energy audits to help identify areas where more efficient insulation and weatherization can save significant amounts on energy bills. For the more than 20,000 homeowners who have participated, the program has helped to blunt the impact of recent spikes in the cost of natural gas.
- California utilities provide discounts on compact fluorescent light bulbs, which deliver the same levels of light as incandescent bulbs while using 75 percent less electricity and lasting up to 10 times as long. Pacific Gas & Electric estimates that in 2007, its customers installed about 25 million efficient bulbs—which will yield on the order of \$300 million in electricity savings over time.
- Vermont educates home-builders about energy-efficient design and building techniques, increasing the quality of home construction. In 2006, 22 percent of all new homes in the state met Energy Star performance



standards, with energy bills at least 30 percent lower than a typical home.

- Pennsylvania helps low-income customers reduce their energy bills through free home energy audits and weatherization. In 2004, the program saved the average low-income family about \$300 per year, or 2 percent of their annual income.

**Energy efficiency programs can help businesses, industry, local government and institutions achieve new competitiveness by managing energy use. For example:**

- In Massachusetts, a utility offers free energy audits for small business customers, plus financial incentives toward the installation of efficient equipment—paying up to 70 percent of the cost of the new equipment, with interest-free financing on the rest. Participating businesses typically see a 30 percent reduction in their energy use.
- New York offers a program that helps schools, hospitals, businesses, factories and local governments incorporate energy efficient design and install efficient equipment at the time of construction, when it is most cost-effective. The program offers up to \$55,000 in design assistance, free ongoing advice from trained architects and engineers, incentives for the purchase of energy efficient technologies, and rewards of up to \$15,000 for achieving high energy performance.
- Minnesota's largest electric utility helps businesses identify opportunities to reduce lighting costs and provides rebates to facilities that install energy-efficient lighting. From 2001 to 2003, the program saved businesses and



institutions in Minnesota nearly \$16 million on electricity—savings that will last many years.

- Connecticut offers a program that helps businesses to replace outdated equipment with energy-efficient models—covering the entire additional cost of efficient equipment over standard versions.
- Wisconsin created a program to help manufacturers and industrial facilities reduce energy use, providing technical advice, training, information, and financial incentives. In 2006, Wisconsin businesses saved more than \$17 million through energy efficiency.

**In addition to helping individual homeowners and businesses, energy efficiency programs benefit society as a whole.**

- Energy efficiency can be deployed quickly to help avert an energy crisis. For example, when California was facing ongoing electric blackouts in the summer of 2000, state leaders worked to educate Californians on how to use energy and resources more efficiently. Within 12 months, electricity demand declined by 14 percent—equivalent to the output of 10 large power plants.
- Energy savings function like virtual power plants or virtual natural gas pipelines—but without the need to build costly infrastructure. For example, efficiency measures deployed in Connecticut from 2000 to 2006 will, over time, save the equivalent of the electricity needs of more than 2 million Maryland homes for a year; and between 2001 and 2005, New Jersey's efficiency programs reduced electricity demand enough to replace a medium-sized power plant (450 megawatts).

- Efficiency programs reduce energy prices for everyone. For example, every 1 percent reduction in natural gas demand reduces market prices by 0.8 to 2 percent below forecast levels.
- Energy efficiency is extremely cost effective. For example, every dollar spent on efficiency in Connecticut yields about \$4 in consumer savings over time.
- Efficiency resources cost less than new energy facilities. For example, in 2005, efficiency programs in Wisconsin saved electricity for 3 cents per kWh and natural gas for 18 cents per therm—60 to 80 percent less than average retail prices.
- Efficiency programs create jobs and grow the economy. For example, New York's Energy Smart programs have created 4,200 jobs since 2002, and Wisconsin's Focus on Energy program is expected to increase disposable income for Wisconsin residents by more than \$4 billion over 25 years.

**With deregulation of its electricity market, Maryland stopped funding its energy efficiency programs.**

- Before the deregulation of the electricity market, Maryland required its utilities to offer energy efficiency services. However, in the years leading up to deregulation in 2000, utility spending on efficiency plummeted from near \$100 million per year (in 2007 dollars) to almost nothing.
- In contrast, states with excellent energy efficiency programs all have policies requiring utilities to set aside money specifically for energy efficiency, or meet specific targets for energy savings.

**Maryland can once again realize the benefits of energy efficiency by establishing a comprehensive energy efficiency program. The state should:**

- Reduce statewide per-capita electricity consumption 15 percent below 2007 levels by 2015.
- Set energy savings targets for 2020 and beyond, aiming to capture all cost-effective energy-saving opportunities.
- Establish a public benefits fund to

promote energy efficiency, including programs targeted at residential, low-income, and small business customers.

- Establish a parallel goal of reducing peak electricity demand 15 percent by 2015, reducing the need to build new power plants.
- Finally, the state should act to create a similar energy efficiency goals aimed at reducing consumption of natural gas and heating oil.

# Introduction

Maryland is sitting on a vast reserve of energy, waiting to be used. This energy lies in Maryland's homes, businesses, institutions, and industrial facilities. It offers a cost-effective and simple opportunity to solve the state's biggest energy challenges. And at the same time, it offers large potential for citizens and businesses to save on energy bills.

Maryland can tap into this vast resource simply by getting more useful work out of the energy we already use—through improved energy efficiency.

When other states have looked for efficiency opportunities, they have found them everywhere. By deploying energy efficiency programs designed to capture these unused resources, other states are saving substantial amounts of electricity and natural gas, while also saving consumers money, reducing energy prices, preventing the need to build expensive new power plants or gas lines, creating jobs, and improving their economies.

To offer Maryland a picture of how other states are capturing their energy efficiency resources, this report presents case studies of some of the nation's most effective energy efficiency programs.

All of these programs are stable, well funded, and part of a comprehensive, statewide effort to conserve energy. All of these programs are supported by state policy requiring utilities to meet specific energy savings targets, or to set aside funding specifically for efficiency programs—typically supported by a special charge on customers' energy bills. All of these programs deliver substantial, tangible benefits—directly for individuals and businesses that participate, and indirectly for every energy customer statewide.

Maryland already has the technology and the know-how to dramatically reduce our energy consumption. Deploying this know-how can ease pressure on limited fossil fuel supplies, insulate our economy from supply disruptions and price spikes, and help put Maryland back on the right track.

Now is the time to develop and implement a comprehensive energy efficiency program in Maryland. Taking this step, Maryland can place efficient technologies and practices in the hands of individuals and businesses across the state, where they can make the largest difference in solving our energy crisis.

# The Role of Efficiency in Solving Maryland's Energy Challenges

Our daily lives and Maryland's economy depend on a reliable supply of energy. Unfortunately, Maryland is now facing an energy crisis. Electricity and natural gas costs are rising. Moreover, much of the money Marylanders pay for energy ends up leaving the state to pay for fuel imports, draining the local economy.

Energy efficiency is a critical tool Maryland can use to solve our energy challenges. Efficiency is the simplest, fastest and cheapest way to reduce the strain on Maryland's energy system and contain rising costs.

## Maryland's Energy Crisis

Maryland's energy crisis is characterized by increasing demand for limited supplies of electricity, natural gas and heating oil. As a result, energy costs are rising for Maryland residents and businesses. Moreover, experts predict that Maryland could face rolling blackouts as soon as summer 2011 if no action is taken to ease the electricity crunch.

Energy companies are planning to build expensive and dangerous new facilities to provide more energy, including a new nuclear reactor at Calvert Cliffs, a new liquefied natural gas terminal at Sparrow's Point, and giant electricity transmission lines to facilitate the import of electricity from out of state.

## Maryland's Energy Crisis is Driven by Increasing Energy Use

At the heart of Maryland's energy crisis lies ever-increasing demand for energy.

We are using more electricity than we did a decade ago, straining our region's energy infrastructure. Since 1990, total electricity consumption in Maryland has increased by nearly 28 percent.<sup>1</sup> (See Figure 1.) Although large increases in electricity rates have contributed to a downturn in overall electricity consumption since 2005, the long-term trend shows electricity use increasing by about 2 percent per year.

Population growth alone cannot fully account for the increase in electricity use. Maryland homeowners are using 20 percent more electricity per resident today than in 1990.<sup>2</sup>

## Energy Bills Are Rising

Increasing use of limited supplies of energy contributes to higher energy prices. As a result, Marylanders are paying increasing amounts to cover their monthly energy bills.

Electricity rates have spiked significantly since 2002. (See Figure 2). When Maryland leaders were debating whether to restructure the electricity market in late 1998, many companies in the electricity industry promised that increased competition would deliver lower rates. In fact, the opposite has occurred. Following the removal of rate caps in 2006, the price of electricity more than doubled, increasing retail electricity bills by as much as 72 percent, or \$743 a year.<sup>4</sup>

At the same time, natural gas has become increasingly expensive as demand inches closer toward available supply—driven in part by the increased use of gas for electricity generation nationwide. Natural gas prices have risen by more than 50 percent since 2002, increasing the cost of heating our homes and fueling our industries.<sup>6</sup> The residential sector has been particularly hard-hit. (See Figure 3.)

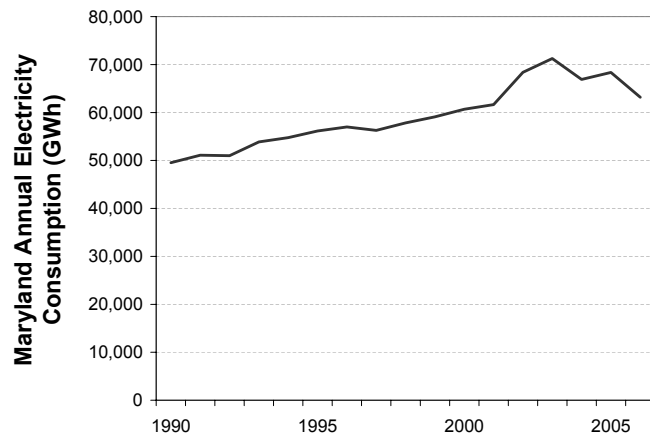
Moreover, Marylanders pay more for natural gas than consumers in other parts of America. In June 2007, the average residential price of gas in Maryland was 21 percent higher than the national average.<sup>7</sup>

Families that rely upon heating oil (an estimated 1 in 7 Maryland homes) have suffered even more.<sup>8</sup> After adjusting for inflation, home heating oil prices nearly tripled from January 2002 to January 2008.<sup>9</sup> (See Figure 4.)

Increasing energy costs have spelled higher monthly bills for the average Marylander.

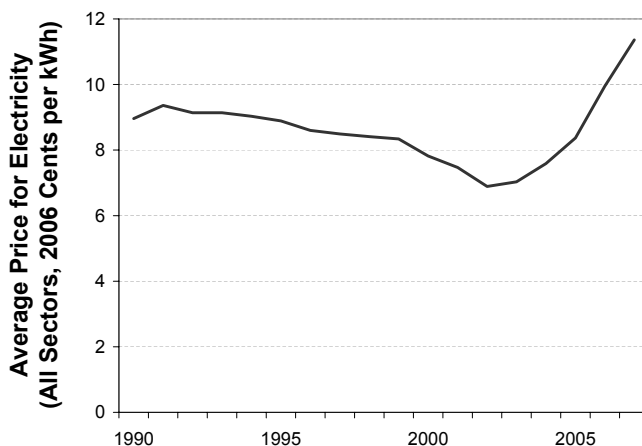
Even after adjusting for inflation, the average Maryland resident paid 18 percent more on monthly electricity bills in 2006 than in 2001.<sup>12</sup> Moreover, the average resident paid 15 percent more on gas bills.

**Figure 1: Increasing Consumption of Electricity<sup>3</sup>**



*From 1990 to 2005, electricity consumption in Maryland increased by nearly 28 percent.*

**Figure 2: Electricity Rates Have Increased Dramatically Since 2002<sup>5</sup>**



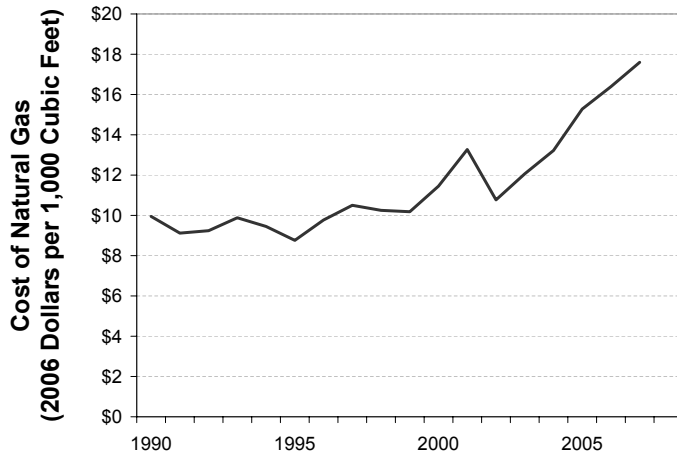
*Electricity rates in Maryland have spiked significantly since 2002, even after adjusting for inflation.*

Altogether, the typical Maryland family is paying about \$330 more per year (after inflation) for electricity and natural gas now compared to 2001. Homeowners dependent upon heating oil for warmth are paying about \$400 more per year for heating oil alone.<sup>13</sup>

In 2006, consumers reduced their consumption of electricity and natural gas

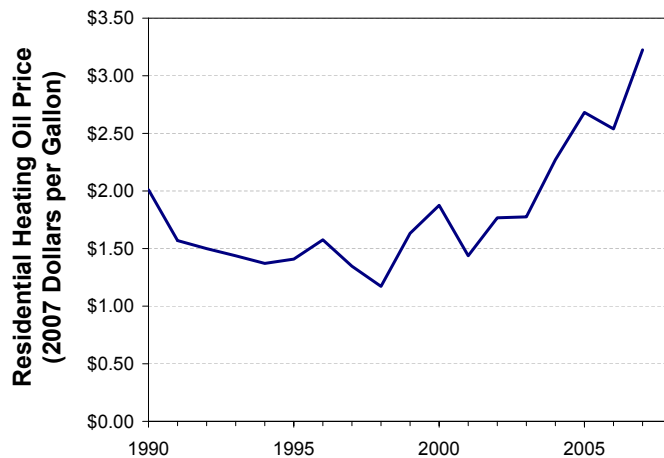
compared to the two years before—motivated in part to save money, but also by a relatively mild winter. Had electricity and gas use remained as high, the impact on energy bills would have been much larger.

**Figure 3: Residential Natural Gas Prices on the Rise in Maryland<sup>10</sup>**



*The cost of natural gas increased 50 percent from 2002 to 2008, after adjusting for inflation.*

**Figure 4: Climbing Residential Heating Oil Prices<sup>11</sup>**



*After adjusting for inflation, home heating oil prices nearly tripled from January 2002 to January 2008.*

## Importing Fuel Drains Money from Maryland's Economy

Energy is a major expense in Maryland's economy. And because Maryland imports much of its energy supplies from out of state, energy expenses represent a significant drain on the local economy.

In 2006, Marylanders spent \$6.25 billion on electricity for residential, commercial, and industrial uses.<sup>14</sup> Residents spent another \$2.4 billion on natural gas.<sup>15</sup> This is equal to about 3.5 percent of Maryland's gross state product, the total value of all goods and services produced in the state for the year.<sup>16</sup>

Maryland imports all of its natural gas, petroleum and uranium supplies. In addition, although mines in Western Maryland produce coal, most of the state's coal-fired power plants burn coal shipped from West Virginia.<sup>17</sup> As a result, Maryland sends more than \$3 billion annually to other states and countries to purchase natural gas and fuels for power plants alone.<sup>18</sup>

Additionally, Maryland imports about 30 percent of its electricity from out of state—sending additional money out of the local economy.<sup>19</sup>

## Concern About the Reliability of the Electric System is Growing

According to the Maryland Energy Administration, the state is facing an electricity supply shortage that could result in rolling blackouts as early as summer 2011 if no action is taken.<sup>20</sup>

In order to import 30 percent of its electricity, Maryland requires adequate transmission infrastructure connecting consumers to generators out of state. However, transmission bottlenecks are developing—especially on the Delmarva Peninsula and into the Baltimore/Washington metropolitan area—contributing to higher electricity prices and reliability concerns.<sup>21</sup>

## Energy Companies Are Proposing To Build Expensive and Dangerous Energy Facilities

To address the crisis, energy companies are proposing to build additional facilities to supply more energy for Maryland. Proposed projects include an additional nuclear reactor at Calvert Cliffs, another offshore liquefied natural gas terminal at Sparrow's Point, and large transmission lines connecting Maryland to power plants in Virginia.

### *Calvert Cliffs*

Forecasts for electricity consumption to continue to increase in Maryland have led Constellation Energy to conclude that more power plants are necessary to maintain the reliability of the electricity system. Constellation has proposed constructing a 1,600 MW nuclear reactor next to the existing reactors at Calvert Cliffs. If built, this facility would be the largest nuclear reactor in the United States.<sup>22</sup>

Nuclear power is an extremely expensive resource. Constellation estimates that designing and building the plant will cost \$2.5 to \$3.0 billion.<sup>23</sup> However, this is likely an underestimate. As of January 2008, more than 30 new nuclear reactors are on the drawing boards nationwide—along with many other power projects worldwide. As a result, the cost of concrete, steel, copper, labor, and reactor technology has dramatically increased.<sup>24</sup> Moody's investor service estimated in October 2007 that reactors could cost as much as \$6,000 per kW of capacity to build.<sup>25</sup> At this price, Constellation's reactor would cost \$9.6 billion.

Areva, a French-government owned company and Constellation's partner in the proposed third reactor, has fallen about two years behind on the construction of the prototype for the new Calvert Cliffs reactor, located in Finland. Delays have mounted due to "flawed welds for

the reactor's steel liner, unusable water-coolant pipes and suspect concrete in the foundation [...]."<sup>26</sup> Some analysts estimate that the delays have added \$2.2 billion to the cost of the plant (or 1.5 million Euros)—which is 50 percent above original estimates.<sup>27</sup> The total cost of the reactor could now exceed \$6 billion.<sup>28</sup>

Local and federal taxpayers will bear much of the cost of this new reactor. Calvert County has already promised \$300 million in tax breaks to Constellation if the company builds a new reactor at Calvert Cliffs. This is equal to \$4,500 per taxpayer in Calvert County. The new plant will add 450 full-time jobs in the county, but at a cost to taxpayers of approximately \$750,000 per job.<sup>29</sup>

Building a reactor requires many years of planning and construction. If Constellation goes ahead with reactor construction, it could be up to a decade before the plant is available to contribute to Maryland's electricity system.

Moreover, the new reactor at Calvert Cliffs could generate an estimated 1,375 tons of radioactive waste during its 40 years of operation.<sup>30</sup> This waste will be stored indefinitely at the site, where it presents an attractive target for potential terrorist attacks.

Finally, population in southern Maryland is growing rapidly. As a result, required evacuation routes are more likely to become overloaded and ineffective in the case of an accident at the nuclear facility.

### *AES Sparrows Point*

AES Corporation, a global power-supply company, proposed in 2005 to build a liquefied natural gas (LNG) facility on Sparrows Point, along Maryland's coastline. This has resulted in a 2-year-long legal battle with the state as to the legality of the proposed project; many are concerned about the negative environmental impacts the plant would have on the Chesapeake Bay.

Natural gas liquefaction is an expensive and dangerous process. Before it can be shipped, natural gas must be super-cooled to -259°F to turn it into a liquid. At its destination, LNG is re-gasified before being delivered into a natural gas pipeline; this process is very costly.<sup>31</sup> The Baltimore County LNG Task Force identified 20 specific objections to the proposed plant at Sparrows Point, many of them highlighting safety risks: mainly, there is no adequate evacuation plan or infrastructure in the event of a worst-case disaster, which could result in a “vapor cloud” flash fire extending more than 7 miles from the facility.<sup>32</sup>

Moreover, there has been ongoing litigation about the expansion of the LNG facilities owned by Dominion at Cove Point in Prince George’s County.<sup>33</sup> Injection of LNG from this terminal into the gas distribution system has coincided with increased system leaks. Leaks pose public safety hazards and increase the cost of gas delivery.<sup>34</sup>

### *New Power Lines*

Several transmission and distribution utilities have proposed building high-voltage power lines to transmit electricity into and through Maryland—enabling more power to be imported into the region from out-of-state power plants.

Currently proposed lines include:<sup>35</sup>

- A power line proposed by Pepco Holdings, that would stretch 230 miles from Northern Virginia, through Maryland (and potentially under the Chesapeake Bay), to Delaware, ending in southern New Jersey;
- A power line proposed by American Electric Power and Allegheny Energy that would start in West Virginia and end near Kemptown and the Montgomery County border in Maryland, and

- A power line proposed by Dominion Virginia Power that would travel through Loudoun and Prince William Counties in Northern Virginia.

The Pepco power line could cost about \$1 billion—a cost that would be distributed among Pepco’s customers in Virginia, Maryland, Delaware, New Jersey and Washington, D.C.<sup>36</sup>

The power lines pose further economic risks beyond the cost of construction. The lines will enable more power to be imported into Maryland from out-of-state, much of it from fossil-fired power plants. Power from these plants could increase in price as a result of future global warming regulations requiring reduced carbon dioxide emissions, or as a result of volatility in the price of fuel.

The transmission lines will also take many years to construct. As a result, they will not be able to deliver energy to Maryland within the near-term, limiting their usefulness in addressing the immediate energy crisis.





The Federal Energy Regulatory Commission (FERC) and the U.S. Department of Energy (DOE) encourage the construction of transmission lines through incentive payments, as well as through a provision in the 2005 Energy Policy Act which enables DOE to designate “National Interest Transmission Corridors.” In October 2007, DOE labeled more than 116,000 square miles of the mid-Atlantic with this designation, allowing FERC to determine the route of the transmission line if the state fails to act within a specified time frame.<sup>37</sup>

## Solving the Energy Crisis with Increased Efficiency

By focusing on increasing energy supply, companies are overlooking the simplest way to solve Maryland’s energy problems. Increased energy efficiency can reduce or even eliminate growth in energy consumption, easing the pressure on limited supplies of fuel. Moreover, energy efficiency is cheaper than building new nuclear reactors, offshore natural gas terminals, or high-voltage transmission lines—and can be deployed much more rapidly. Finally, energy efficiency can save consumers money, create jobs and improve Maryland’s economy.

### Maryland Is Rich in Potential Energy Savings

Maryland is rich in the potential to get more work done with the electricity and natural gas that we already use.

Vast pools of potential energy savings exist within Maryland’s homes, businesses and industrial facilities. For example, many light fixtures give off excess heat; air fans

operate without the benefit of efficient motors; weaknesses in building insulation allow indoor heat to escape. By correcting these problems, we can effectively increase Maryland’s energy resources.

Reviewing a set of leading studies on achievable efficiency potential in the electricity sector nationwide, the American Council for an Energy Efficient Economy (ACEEE) concludes that the typical state could reduce electricity consumption by 24 percent below forecast levels within 20 years.<sup>38</sup> In other words, the typical state could halt growth in electricity demand with a well-designed efficiency program, and save money doing it.

Similar efficiency potential exists for natural gas consumption. ACEEE, reviewing a set of leading studies on natural gas efficiency potential in 2004, found that the typical state had cost-effective potential to reduce gas consumption by 22 percent. Given gas prices at the time, the study concluded that the median achievable potential was 9 percent savings.<sup>39</sup> However, given the large increases in natural gas prices that have occurred over the last four years, a greater number of energy efficiency measures likely make economic sense today, and achievable potential in Maryland is likely higher.

### Energy Efficiency Is Cheaper than Building New Energy Facilities

Efficiency measures are much cheaper than generating and delivering electricity. In 2002, energy efficiency programs supported by public benefit funds in New England produced energy savings at an average lifetime cost of 2.4 cents per kWh.<sup>40</sup> Northeast Energy Efficiency Partnerships estimates that capturing all remaining achievable energy efficiency potential in New England would cost just 3.1 cents per kWh.<sup>41</sup> A study of potential efficiency measures in the Southwest identified energy

efficiency measures across all sectors of the economy that could result in electricity savings at an average cost of 2 cents per kWh (year 2000 dollars). The study concluded that the benefits of the efficiency measures exceeded their costs by more than 400 percent.<sup>42</sup>

In comparison, the cost of generating electricity from many different types of technology has increased in the past few years as demand for power infrastructure increases worldwide. For example, the California Energy Commission estimates that the cost of generating electricity from a new nuclear power plant (owned by a merchant generating company such as Constellation Energy) would equal 11.8 cents per kWh (2007 dollars).<sup>43</sup> In other words, efficiency measures are on the order of three times as cost-effective as building a new nuclear reactor. For further comparison, transmission and distribution costs are on the order of 2.7 cents per kWh for residential customers in Maryland—and another 10 cents per kWh for power generation—for a total of more than 12 cents per kWh.<sup>44</sup>

Similarly, energy efficiency is cheaper than procuring new supplies of natural gas. For example, energy efficiency measures in Wisconsin save natural gas at a cost of about 19 cents per therm.<sup>45</sup> In comparison, retail natural gas prices are more than four times higher.<sup>46</sup>

## **Economic Benefits of Efficiency**

Increased energy efficiency and economic growth go hand in hand.

In the late 1970s in America, a mix of higher energy prices and government programs such as tighter appliance and automobile efficiency standards created conditions for both reduced energy consumption and robust economic growth. From 1979 to 1982, total energy use in the U.S. consistently declined, and energy

consumption did not surpass its 1979 level again until 1988.<sup>47</sup> Over that nine-year period of 1979 to 1988, the nation's inflation-adjusted gross domestic product (GDP) increased by 30 percent.<sup>48</sup>

The nationwide trend continues today. Over the past two decades, America has consistently used less energy to produce more economic wealth. In 1980, the U.S. used 15,000 BTU for every dollar in gross domestic product; by 2006, we were using only 8,750 BTU—a drop of more than one-third.<sup>49</sup>

However, the United States still remains a profligate user of energy compared to many of our peers in the industrialized world. America's economy remains 50 percent more energy-intensive than that of the United Kingdom and more than twice as energy-intensive as that of Japan.<sup>50</sup> On a per-capita basis, the United States uses more energy than the vast majority of industrialized countries, surpassed only by Norway, Luxembourg, Iceland and Canada.<sup>51</sup>

By improving energy efficiency, we could achieve more economic benefits, including cheaper energy, more jobs, and improved economic stability.

### ***Energy Cost Savings***

Energy efficiency saves consumers money on their electricity and gas bills. Energy efficiency programs help consumers use less energy, which directly translates into monetary savings.

Investments in efficiency can also make energy cheaper—not just for those who make the investments, but for the entire economy. By reducing demand, energy efficiency programs can put downward pressure on the price of electricity and natural gas.

Recent studies estimate that for every 1 percent reduction in national natural gas demand, natural gas prices fall by 0.8 percent to 2 percent below forecast levels.<sup>52</sup> Researchers at the Lawrence Berkeley

National Laboratory estimate that a national energy efficiency effort (coupled with a renewable energy standard) could produce natural gas savings with an estimated net present value as high as \$73 billion from 2003 to 2020.<sup>53</sup>

Energy efficiency can have a rapid effect on energy prices. The American Council for an Energy-Efficient Economy estimates that a policy path that reduces U.S. natural gas demand by 4 percent in five years would slash wholesale natural gas prices by one quarter, saving the American economy \$100 billion in return for a \$30 billion government and private-sector investment.<sup>54</sup>

### ***Jobs and Economic Growth***

In addition to saving money on energy, investments in efficiency will generate jobs for Maryland workers and economic development for Maryland communities. The reason is simple: energy efficiency gives people extra money to spend, which can stimulate Maryland's economy and create jobs. Investments in efficiency also replace expenditures for fuel (much of which is imported from out of state) with expenditures for labor and materials produced at home.

Energy efficiency investments also create jobs directly. Workers are necessary to improve insulation and sealing of homes; skilled architects and builders are required to perform energy efficient new construction and remodeling; and trained manufacturing workers are needed to build energy-efficient appliances.

One 2005 study estimates that a national clean energy strategy, coupled with a shifting of federal energy subsidies to renewables and efficiency, could create as many as 154,000 new jobs in the United States and increase net wages by \$6.8 billion.<sup>55</sup>

### ***Improved Economic Stability***

Energy efficiency would reduce Maryland's exposure to price spikes, supply disruptions and other repercussions of our reliance on fossil fuels.

Rate increases, such as those that have affected Maryland's electricity consumers in the past few years, would have smaller consequences in a highly efficient system. Energy efficiency could also insulate Maryland from the impacts of unpredictable events, like the damage Hurricane Katrina caused to natural gas drilling infrastructure in the Gulf of Mexico in 2005.

### ***Other Benefits***

Energy efficiency would reduce many of the indirect costs imposed on society by energy production and consumption. Investments in energy efficiency, for example, would likely reduce the need for additional transmission infrastructure for Maryland's electric system—saving hundreds of millions of dollars in the process. Reductions in power plant pollution would likely result in reduced public health costs for the treatment of asthma and other diseases that are triggered by air pollutants, including mercury. Efficiency could help slow the generation of highly radioactive nuclear waste at the Calvert Cliffs nuclear facility, improving public safety. And, energy efficiency will help reduce the cost of compliance with programs aimed at reducing Maryland's contribution to global warming, such as the Regional Greenhouse Gas Initiative.

Finally, energy efficiency measures often improve the quality of indoor environments or equipment design—improving home comfort and indoor air quality; reducing waste and increasing employee productivity; and reducing maintenance expenses while increasing property values.

# Real-World Examples of Energy Efficiency at Work

**M**ore than 30 states across the country provide funding for electricity and gas utilities or other entities to run energy efficiency programs. The best energy efficiency programs systematically drive the penetration of efficient technologies and practices into the marketplace where they can make the greatest difference.

These programs reduce electricity and natural gas consumption through a variety of strategies, including:

- Educating consumers about energy efficiency;
- Providing discounts or incentives for the purchase of highly efficient products and equipment;
- Offering energy audits and weatherization assistance to homeowners;
- Consulting with businesses and industry on energy efficient practices; and
- Improving the efficiency of design and materials in new schools and commercial buildings.

The following case studies present brief snapshots of a few of the nation's most effective energy efficiency programs. Each story outlines how the program works; describes how the utility or efficiency service provider interacts with homeowners, businesses or industry; and examines the benefits the program offers for participants and society as a whole.

These case studies offer a glimpse of the types of activities and benefits that could happen in Maryland, if the state once again chose to invest in energy efficiency.

## Efficiency Programs Help Homeowners Tap Into The Energy Savings Potential Within Their Homes

Maryland's homes are packed with energy saving opportunities. Energy efficiency programs can help homeowners unlock this potential.

For example, New York encourages homeowners to replace outdated and inefficient

appliances with energy-saving alternatives, through public education and targeted financial rebates. New Jersey offers rebates to homeowners who purchase efficient furnaces or air conditioners. A Minnesota gas utility offers subsidized home energy audits to help identify promising areas for weatherization improvements.

California utilities provide discounts on highly efficient compact fluorescent light bulbs, available from thousands of local retailers. Vermont educates homebuilders about energy-efficient design and building techniques. And Pennsylvania helps targeted low-income customers reduce their energy bills through free home energy audits and weatherization.

All of these efficiency programs serve to save individual homeowners money and increase the comfort of their homes. At the same time, these programs reduce statewide demand for electricity and natural gas, keeping costs low for all energy consumers.

### **Replacing Outdated Appliances with Efficient Alternatives**

Donna and Mark Denley of Albany, NY, bought their dream home in December 2003. It had all the charm of an older house, and its 1,600 square feet included three bedrooms and one and a half baths. But with old appliances, air leaks, and poor insulation, it also presented a real problem: after moving into the house in January, the Denley's first energy bill was a nightmarish \$400.

They turned to the New York State Energy and Research Development Authority (NYSERDA) for help. They received a home energy audit and identified potential

improvements. They chose to install an Energy Star-certified boiler and refrigerator, added attic insulation, and performed air sealing and duct work. NYSERDA financed the improvements through a low-interest loan. By installing energy-efficient products, the Denleys cut their typical monthly energy consumption by 40 to 50 percent, saving \$1,847 a year.<sup>56</sup>

The project was quite cost-effective, both from the Denleys perspective and from NYSERDA's point of view. For every dollar spent on the project, the family saves \$2.56 in energy costs.<sup>57</sup>

NYSERDA reaches New Yorkers like the Denleys through its New York Energy Smart Products program. The program reaches out to a broad audience, building awareness about energy efficient products and providing funding options for energy efficiency upgrades.

Energy Star appliances are a focal point of the Energy Smart Products program. Energy Star appliances are much more efficient than their conventional counterparts. For example, an Energy Star refrigerator can reduce electricity costs by up to \$100 per year. And an Energy Star clothes washer can cut electricity and water use by as much as 50 percent.<sup>58</sup>

To encourage New Yorkers to purchase appliances bearing the Energy Star label, the Energy Smart Products program runs public service campaigns, including print and television advertisements, magazine articles, store displays, and utility bill insert flyers.

The program also provides substantial financial incentives. Energy Smart Products reduces loan rates for homeowners who wish to perform renovations recommended by certified energy auditors. These renovations may include more

**An Energy Star clothes washer can cut electricity and water use by as much as 50 percent.**

While high-efficiency appliances make up only 4 to 5 percent of the national heating and cooling market, in New Jersey they account for 30 percent.

efficient appliances, heat and air conditioning systems, lighting, windows, hot-water systems, or insulation and weatherization improvements.<sup>59</sup> After completing an application, a homeowner can receive an interest rate reduction of up to 4 percent below market.

The Energy Smart Products program has logged important successes. In 2006, more than 2000 new Energy Star certified homes were built. More than 3,200 homes performed Energy Star upgrade projects, saving families an average of \$600 per year.<sup>60</sup> And efficient appliances play an important role in these savings: NYSERDA reports annual savings of 600 kWh per home resulting from upgrades to more energy-efficient appliances alone.<sup>61</sup>

Altogether, New York's Energy Smart programs currently save about 3.1 billion kWh of electricity per year—equivalent to the needs of nearly 250,000 Maryland homes.<sup>62</sup> Energy Smart programs have also reduced peak electricity demand in New York by 1,214 MW—equivalent to the output of a very large power plant.<sup>63</sup>

Energy Smart is funded by a system benefits charge paid by all utility users.<sup>64</sup> The charge, established in 1996, now requires utilities to collect a sum equal to 1.42 percent of the utility's 2004 revenue and submit it to NYSERDA. About half of this funding goes to pay for Energy Smart programs.<sup>65</sup> According to a very conservative cost-benefit analysis performed by NYSERDA, program benefits exceed costs by 2.1 times.<sup>66</sup>

The program helps to conserve electricity and gas, reducing demand on New York's energy infrastructure. As a result, utilities can delay the construction of new

power plants, gas lines and power lines, saving all utility customers money and increasing the reliability of service.

### **Choosing Efficient Furnaces and Air Conditioners**

When Steve Angelucci moved into his South Jersey home, it came with electric baseboard heat and leaky windows. It also came with a massive heating bill.<sup>67</sup> To reduce the amount of money he was burning up every winter, he replaced leaky windows and converted to a multi-zone natural gas heating system.<sup>68</sup>

Many homeowners across New Jersey find themselves in the same position that Mr. Angelucci was in when he bought his house. Because furnaces, air conditioners and ventilation systems are relatively expensive to replace, many homeowners tolerate inefficient home heating and cooling—and the high energy bills that result.

To help homeowners make the leap to replace old and inefficient furnaces and air conditioners with new, highly efficient models, the state of New Jersey started two programs, called CoolAdvantage and WarmAdvantage, in 1999.

The programs offer cash incentives to homeowners, ranging from \$300 to \$450. Higher-efficiency products earn higher rebates, and the program flexibly adjusts its efficiency standards over time as better technologies arrive on the market.<sup>69</sup>

CoolAdvantage and WarmAdvantage also require air conditioner and furnace replacements to be installed by certified technicians. The technicians ensure that the appliance is appropriate for the home's

size, and that it is properly installed.<sup>70</sup> These requirements maximize the equipment's efficiency.

The programs reach out to individuals like Steve Angelucci through broad education campaigns, but also pay attention to retailers and contractors—two groups essential to strong appliance efficiency programs. Retailers learn how to grow the market share of energy-efficient products, and contractors are trained on how to install the equipment and promote it to their customers.<sup>71</sup>

New Jersey further uses Cool and WarmAdvantage to encourage development in “smart growth” areas, according to the state growth plan. For newly constructed homes, rebate dollars are available only to homeowners who decide to build inside the zones New Jersey has designated for residential growth.<sup>72</sup> Regulated growth contributes to the state's overall push for efficiency, because dense communities are more efficient than sprawling development, offering savings in energy, carbon emissions, and water consumption.<sup>73</sup>

In 2005, Cool and WarmAdvantage signed on 27,510 participants, who averaged annual savings of 546 kWh and \$62.95 each—for a total savings of more than \$1.7 million.<sup>74</sup> The program has also significantly built the market share of high-efficiency products. While high-efficiency appliances make up only 4 to 5 percent of the national heating and cooling market, in New Jersey they account for 30 percent.<sup>75</sup>

These results are possible because New Jerseyans invest a little money through their energy bills each month. Each customer pays a small system benefits charge, which funds the New Jersey Clean Energy Program, including efforts like Cool and WarmAdvantage.

Efficiency measures installed as a result of the New Jersey Clean Energy Program during 2005 will save 4 billion kWh of electricity and 120 million therms

of natural gas over their entire lifetimes. Altogether, New Jersey's Clean Energy Program achieved these results at a net cost of \$0.024 per kWh and \$0.22 per therm—less than 25 percent of prevailing retail costs for energy. As a result of the programs, New Jerseyans will save \$520 million on their energy bills over time.

From inception in 2001 through 2005, New Jersey's energy efficiency programs produced annual electricity savings sufficient to power nearly 100,000 Maryland homes, and annual natural gas savings sufficient to supply 31,000 Maryland homes.

New Jersey's efficiency programs also cut peak electricity demand by 450 MW, reducing the need to site, build, and operate expensive new power plants—saving money for all energy consumers in New Jersey.<sup>76</sup>

## Identifying Opportunities to Improve Weatherization

Between 1999 and 2005, natural gas prices rose by more than 300 percent in Minnesota.<sup>77</sup> For a typical family of four living in Minneapolis, that translates to an increase of nearly \$750 in annual home heating costs, pinching the family budget.<sup>78</sup>

To help alleviate the pressure on home-

Auditors identify steps homeowners can take to conserve energy, including adjusting temperature settings for appliances; installing energy-saving light bulbs, changing furnace filters where necessary, and installing better insulation or air sealing.

owners, Minnesota's natural gas utility company, CenterPoint Energy, runs a home energy efficiency audit program. Homeowners have the opportunity to participate at varying levels of detail and cost, choosing between a basic and an advanced home energy audit.

After a homeowner requests a basic audit, CenterPoint dispatches a certified auditor to review the home's heating efficiency and gas consumption history. The auditor then recommends steps the homeowner can take to conserve energy, including adjusting temperature settings for hot water, air conditioning, and laundry; suggesting energy-saving lighting methods; changing furnace filters where necessary; and installing better insulation or air sealing. The homeowner can then choose to follow up on the auditor's recommendations.

CenterPoint charges only \$25 for a basic audit, and offsets the cost by giving a \$25 weatherization kit to the homeowner for free. The weatherization kit includes tools for weather-stripping windows and doors, spray cans of foam insulation, and insulation for pipes. For customers below a minimum income level, CenterPoint waives all fees.<sup>79</sup>

A homeowner that requests an advanced energy audit receives more detailed and technical attention. First, a certified auditor performs a blower door test to check for air leaks, an infrared scan to identify areas of heat loss, and a combustion safety test of the heating system. The auditor compiles information from these tests on a CD-ROM, providing the home owner a visual representation of the house's energy use. Instead of simply identifying the location of energy sinks, the Home Performance Audit also specifically measures the amount of air leaking in or out and details the amount of moisture in the home.

Finally, the auditor provides the homeowner with Minnesota Department of Commerce information on licensed

contractors and service providers close to the homeowner's community. Contractors can use the CD-ROM to tailor renovation plans to most-effectively improve home heating efficiency.

CenterPoint Energy covers \$200 of the advanced audit cost, while homeowners contribute the remaining \$100 as a co-pay. However, homeowners receive a full rebate of the co-pay from CenterPoint if a licensed contractor installs insulation following the audit. CenterPoint also gives homeowners a free weatherization kit, just as in the standard energy audit program.

The Minnesota Public Utilities Commission requires CenterPoint to set targets for participation. CenterPoint works to recruit participants with advertisements in local publications, on public radio, through a website, and with printed fact sheets.<sup>80</sup> In its first 11 years, the CenterPoint program performed 19,368 residential audits.<sup>81</sup> An additional 1,785 audits were performed in 2006.<sup>82</sup> Post-audit surveys reveal that 72 percent of Home Audit customers installed insulation, caulking or weatherstripping, compared to 32 percent of non-audit customers. Fourteen percent of Home Audit customers additionally installed new windows or doors, as opposed to zero percent of non-audit customers.<sup>83</sup>

The home audit service is a direct result of state policy. Under a Minnesota statute, investor-owned gas utilities like CenterPoint are required to spend 0.05 percent of their gross operating revenues per year on conservation.<sup>84</sup> The conservation programs must be approved in advance by the Minnesota Department of Commerce, which also allows utilities to recover conservation expenses through rate increases.<sup>85</sup> This allocation funds the CenterPoint audit program. And it has paid off for homeowners with lower energy bills and higher-performance homes. It has also helped to reduce statewide demand for natural gas, reducing upward pressure on the price of this limited resource.



Compact fluorescent light bulbs produce the same amount of light as traditional incandescent bulbs, but use up to 75 percent less energy and last up to 10 times as long.

### **Increasing the Use of Energy-Efficient Lighting**

In 2001, an energy crisis caused rolling blackouts to sweep across California. In addition to many dark evenings, this crisis provided a unique opportunity to promote greater efficiency across the state.

In response to the energy crisis, California policymakers allocated over \$900 million to energy efficiency programs.<sup>86</sup> The state reserved part of the funding specifically for residential energy efficiency improvements, particularly in lighting.

With this funding, the Pacific Gas and Electric Company (PG&E) established the Upstream Residential Lighting Program, aimed at increasing the market share of highly efficient compact fluorescent light bulbs (CFLs) sold to residents of California. CFLs produce the same amount of light as traditional incandescent bulbs, but use up to 75 percent less energy and last up to 10 times as long.

PG&E partnered with retailers and manufacturers to offer CFLs at a discounted price. By the end of 2001, the program had encouraged residents to purchase over 7 million CFLs—20 times more than sales in any previous year.<sup>87</sup>

Today, California continues to fund the lighting program through a Public Goods Charge, in which utilities charge ratepayers a small amount on their electric utility bills. The state pools the resulting money and spends it on services and programs, like the Upstream Residential Lighting Program, deemed to be in the public interest.<sup>88</sup>

Through the Upstream Residential Lighting Program, PG&E transfers funds to providers of CFLs, who are then able

to offer large discounts on energy efficient lighting.<sup>89</sup> Customers receive the discount automatically, with no need for coupons, forms, or any waiting period.<sup>90</sup>

The Upstream Residential Lighting Program has been enormously successful in increasing the market penetration of CFL lighting. During the second quarter of 2001, the market share of CFLs increased from less than 1 percent to 8 percent, while incandescent bulb sales dropped 22 percent.<sup>91</sup> Two years after the program's roll-out, more than 1,000 lighting retailers were participating.

For the more than 1.35 million customers of PG&E who have taken advantage of the Upstream Residential Lighting Program, the scenario is win-win: cheaper light bulbs and lower energy costs.<sup>92</sup> Through the program, retailers have sold more than 30 million CFLs through 2006. During their useful lives, these bulbs will save nearly 2.4 billion kWh, translating into enormous monetary savings for individual consumers.<sup>93</sup> In 2007 alone, PG&E estimates that 25 million CFLs were installed in its service area, cumulatively saving approximately 1.8 billion kWh of electricity.<sup>94</sup> In other words, lightbulbs installed through 2007 will save electricity in amounts equivalent to the needs of more than 330,000 Maryland homes for one year.

The exceptional success of PG&E's Upstream Residential Lighting Program is attributable to the fact that it requires almost no effort on the part of consumers: by working with retailers and manufacturers, the utility is able to create direct savings for residents of California.

Moreover, the benefits extend to everyone who uses California's electricity grid. By reducing demand for electricity, the Upstream Residential Lighting Program reduces strain on California's energy infrastructure, reducing the likelihood of rolling blackouts in the future.

### **Building New Homes to Be Efficient from the Start**

Energy Star homes use more than 30 percent less energy than a typical new home and offer significant dollar savings on monthly energy bills. Energy Star homes also offer lower maintenance costs, better indoor air quality, greater comfort, and higher resale value.<sup>95</sup>

To increase the penetration of Energy Star construction into the new home market, the Vermont Energy Star Homes program connects developers and individual families to Energy Star qualified builders and provides free assistance throughout the process of building a home. The program is operated by Efficiency Vermont, an independent organization that offers a variety of energy efficiency services to utility customers in the state.

Before construction begins, Efficiency Vermont reviews a home's design plans. Based on choices in lighting, insulating, heating, and appliances, Efficiency Vermont's experts estimate how much the owner will spend on energy. They also make recommendations about ways to improve these choices, and offer cash rebates as incentive to install more energy-efficient

appliances.<sup>96</sup> Once a house is built, Efficiency Vermont makes sure it is air-tight, to minimize energy loss through drafts and gaps in insulation. Once a home meets minimum energy efficiency standards, Efficiency Vermont certifies it as an Energy Star home.<sup>97</sup>

In 2006, Efficiency Vermont offered assistance with more than 2,000 home construction projects. The program certified 586 homes, or 22 percent of Vermont's new home market, as Energy Star Homes.<sup>98</sup> The average participating home reduced electricity consumption by 2,000 kWh per year, saving on the order of \$200 per year on electricity bills. Altogether, the program's activities in 2006 will conserve 39 million kWh of electricity, enough to power 3,100 Maryland homes for a year. The program also reduced peak demand for electricity by more than 0.4 MW.<sup>99</sup>

In addition to the Energy Star Homes program, Efficiency Vermont operates more than a dozen other energy efficiency initiatives. Altogether, in 2006, Efficiency Vermont's activities produced 56 million kWh of annual electricity savings—equivalent to the needs of about 5,000 Maryland homes. Cumulatively, efficiency measures promoted by the organization account for more than 5 percent of the state's electricity demand. In recent years, these efficiency measures have reduced the annual rate of growth in electricity demand by two-thirds.<sup>100</sup>

Efficiency Vermont and the Vermont Energy Star Homes program are possible because Vermonters pay a systems benefit charge on their utility bills. The money goes to an independent non-profit organization, which created Efficiency Vermont in 2000 to administer the state's energy efficiency programs.<sup>101</sup>

By reducing electricity demand, Efficiency Vermont reduces the need for utilities to deploy their most expensive electricity resources, saving all electricity consumers money. At the same time,

Energy Star homes use more than 30 percent less energy than a typical new home and offer significant dollar savings on monthly energy bills.

## Low-income gas and electric customers in the Philadelphia region have the opportunity to lower their energy usage and utility bills—for free.

efficiency resources produce savings at a cost of 3.6 cents per kWh—about a third of what it would cost to generate electricity at a new power plant. Vermont recognizes that energy efficiency is the cheapest electricity resource—and thus has created effective programs to capture available savings potential.

### Helping Low-Income Families Cut Their Energy Costs

When it comes to energy prices, low-income families bear a greater burden. During 2005, low-income families spent a median of nearly 10 percent of their yearly earnings on energy to heat, cool, and light their homes.<sup>102</sup>

In Pennsylvania, as in many states around the country, sharply rising natural gas prices have made this burden particularly hard to bear. Between 1995 and 2005, Pennsylvania's natural gas prices doubled, rising from \$7.16 per thousand cubic feet to \$14.21.<sup>103</sup>

In the face of this financial strain, low-income PECO gas and electric customers in the Philadelphia region have the opportunity to lower their energy usage and utility bills—for free. Through its Low-Income Usage Reduction Program (LIURP), PECO provides energy efficiency audits, advice, and follow-up to targeted customers.

PECO prioritizes assistance for households most in need of LIURP services: families with the highest energy use and who are farthest behind in payments.<sup>104</sup> Households earning as much as 200 percent

of the Federal Poverty Level—or \$38,700 gross annual income—are eligible for participation.<sup>105</sup>

Customers that agree to receive assistance are visited by an auditor, who evaluates home energy use, identifies potential improvements, and offers energy-saving tips and tools. For targeted customers, PECO arranges for a contractor to provide a variety of services, including caulking and weather-stripping, water heater and pipe insulation, appliance swaps, more efficient lighting, and thermostat replacement.<sup>106</sup>

For one year after energy-conservation improvements are made, PECO monitors each LIURP customer's energy use and mails monthly reports and seasonal energy-saving hints. If there is no change after the audit, PECO calls the customer, and will even ask an auditor to conduct a house visit if consumption remains unchanged.<sup>107</sup>

In 2005, PECO spent \$6,475,000 on LIURP and improved the energy efficiency of 7,695 households.<sup>108</sup> The typical home heated by electricity reduced energy use by 7.4 percent, while the typical home with gas heat cut gas consumption by 14 percent. These savings helped reduce energy costs for participants by about 3 percent—despite large increases in the price of electricity and natural gas during the year.<sup>109</sup>

This represents important savings for the average LIURP family, which earns \$14,677 a year.<sup>110</sup> In 2004, LIURP savings increased the disposable income of the average family by \$200 to \$400 dollars per year—roughly 2 percent of annual income.

And the efficiency measures continue to pay dividends, saving consumers energy and money for as long as 15 years.<sup>111</sup>

LIURP services are not limited to the PECO service area. Instead, they extend to low-income families statewide, funded by a fee charged to all utility ratepayers. This benefit is the direct result of state policy: LIURP programs were mandated by the legislature in a 1993 law.<sup>112</sup>

LIURP is cost-effective as well. Efficiency measures installed in 2005 achieved savings at a rough cost of 5 cents per kWh of electricity and \$1.37 per therm of natural gas, well below retail rates.

## Efficiency Programs Help Businesses, Industry and Institutions Manage Energy Costs

Businesses and industries in Maryland can improve their competitiveness by managing their energy costs. And schools, hospitals, local governments and other institutions in Maryland can devote more resources to their core missions by keeping their energy bills in check. Energy efficiency programs can help to identify opportunities to save energy and finance improvements.

For example, a utility in Massachusetts works to reduce electricity costs for small business customers by encouraging the installation of energy efficient equipment

Small businesses that participate in the program typically see a 30 percent reduction in energy use.

with free energy audits and financial incentives. New York offers a program that assists schools, hospitals, businesses, factories and local governments to incorporate energy efficient design and install efficient equipment at the time of construction, when it is most cost-effective. Minnesota's largest electric utility helps businesses identify opportunities to reduce lighting costs and provides rebates to facilities that install energy-efficient lighting.

Connecticut provides technical and financial assistance for businesses to replace outdated equipment with energy-efficient models. Wisconsin provides technical advice, training, information, and financial incentives to promote energy efficiency in manufacturing and industrial processes. And California runs a highly visible consumer education campaign, promoting rapid reductions in energy demand to mitigate or prevent potential energy crises—preventing billions of dollars of lost productivity during power outages.

All of these efficiency programs reduce energy costs for individual businesses and institutions. At the same time, these programs provide benefits for all of society, by reducing strain on energy infrastructure and preventing the need to invest in new energy facilities.

### Helping Small Businesses Install Efficient Equipment

As a wholesale distributor of fresh flowers, Andy Hattub knows how important it is to keep flowers at the right temperature. Hattub manages Fall River Florist Supply in Fall River, Massachusetts—a business that depends on the ability to deliver cut flowers that are as fresh as possible.

The success of the business also depends on keeping costs down to remain competitive. Realizing that electric energy is a major expense at the flower warehouse, Hattub turned to National Grid's

Small Business Services Program for help with reducing energy costs.

National Grid, an electric utility servicing parts of Massachusetts, identified the facility cooling system as a good place to find potential energy savings. Program staff advised Hattub to install energy efficient cooler controls, and then provided \$21,559 to help pay for the upgrade. With the efficient controls, Hattub conserves 52,094 kWh of electricity annually, saving \$4,584 in energy costs per year.<sup>113</sup>

The Small Business Services Program, run by National Grid, is aimed at reducing electricity costs for small business customers by encouraging the installation of energy efficient equipment.<sup>114</sup>

Small businesses are often reluctant or unable to pay the up-front costs of energy efficiency improvements, even if they make financial sense in the long term.<sup>115</sup> To overcome market barriers preventing the spread of energy-efficient technology, the Small Business Services Program offers:

- Free energy audits;
- Financial incentives for the installation of efficient equipment, totaling up to 70 percent of the installation cost;
- Further incentives, including interest-free financing for the remaining 30 percent of the installation cost for 24 months, or a 15 percent discount if payment is made in one lump sum.<sup>116</sup>

The program offers a variety of cost-cutting, energy-saving equipment, including lighting upgrades, energy efficient time-clocks, photovoltaic cells for outdoor lighting, programmable thermostats, and walk-in coolers.<sup>117</sup>

National Grid's Small Business Services Program has been successful in promoting energy efficiency in a hard-to-reach market because it makes the process so easy

for participating facilities: the program performs the audit, makes recommendations, deals with the contractors, and even cleans up the waste afterwards. Additionally, the Small Business Services Program has done an excellent job of pushing the latest technological improvements in efficiency, and therefore remains vital after nearly 20 years in operation.

Since the program's inception in 1989, it has worked with 40,000 participants, cumulatively saving more than 160 million kWh of electricity (equivalent to the needs of 13,000 Maryland homes in one year).<sup>118</sup> Participating small businesses typically see a 30 percent reduction in energy use, cumulatively saving more than \$30 million on electricity bills.<sup>119</sup>

The program is extremely cost effective. National Grid achieved these savings with an investment of less than \$7 million—with benefits exceeding costs by more than 400 percent.<sup>120</sup>

The project has been so effective in delivering energy savings that after utilities in Massachusetts deregulated in 1998, policymakers continued to invest in it. The Massachusetts Legislature established a systems benefit charge, which utility customers pay on their utility bills, to fund energy efficiency programs in the state—such as National Grid's Small Business Services Program.<sup>121</sup>

The program provides tangible benefits for participating businesses and for Massachusetts as a whole. By conserving electricity, the program helps maintain the reliability of the electricity system, protecting customers against price spikes, and reducing electricity costs statewide.

## Building and Expanding with Energy Smart Design

Hendy Avenue Elementary School in Elmira, New York, was originally built in 1929. Recently, administrators found that

## The improvements save the school \$21,622 annually—roughly equivalent to the salary of a part-time teacher.

the facility was becoming outdated and was no longer large enough to meet the needs of the school district. Administrators decided to renovate the existing building and build a 46,700 square foot addition.

Hendy Avenue administrators realized that the construction project presented a good opportunity to improve the energy efficiency of the school, reducing energy costs and making more money available for the core mission of the school: education. They applied for design and construction assistance from the New York State Energy and Research Development Authority (NYSERDA), which operates a New Construction Program aimed at improving building energy efficiency.

New Construction Program staff evaluated construction plans and identified cost-effective energy efficiency improvements. Staff recommended that the school install a high-efficiency system for heating, ventilating and cooling the building; premium efficiency pumps and motors; and low-energy fluorescent lighting and automatic controls.

The New Construction Program then provided financial incentives to the school district for these improvements, totaling \$58,907. The improvements reduced the school's energy consumption by 155,000 kWh of electricity per year and save the school \$21,622 annually—roughly equivalent to the salary of a part-time teacher.<sup>122</sup>

The Energy Smart New Construction Program provides assistance to schools, hospitals, offices, retail centers, local governments, and other institutional or commercial energy users across New York.

During the design phase, the New Construction Program provides technical advice on energy-saving opportunities

and designs. The program covers the first \$5,000 in technical assistance costs, then half of all additional costs up to \$100,000. As the building is being designed, the program rewards designers according to the number of kWh the building will save, up to a maximum reward of \$15,000.

During construction, the New Construction Program provides monetary incentives to acquire energy-efficient technology. The program also offers incentives for buildings that meet Leadership in Energy and Environmental Design (LEED) standards, which include minimum requirements for energy efficiency.<sup>123</sup> Additionally, the program offers the ongoing advice of trained architects and engineers hired by NYSERDA.<sup>124</sup>

Between July and December 2006 alone, the Energy Smart Focus Program assisted with 550 commercial or institutional construction projects.<sup>125</sup> Since 2002, the broader Energy Smart program has saved consumers \$198 million and created 4,200 jobs.<sup>126</sup>

The Energy Smart New Construction Program is supported by a systems benefit charge paid by utility customers in the state. New York's Public Service Commission created the systems benefit charge in 1998, in order to ensure that energy efficiency programs continued during and beyond the state's transition to a restructured electricity market. Money raised through the charge supports a portfolio of 38 programs, including the New Construction Program, that work to overcome market barriers and stimulate demand for energy efficient products and services. As a result, Energy Smart serves to make energy more affordable and reliable for all New Yorkers.

## Cutting Energy Costs through Highly Efficient Lighting

Caterpillar Paving Products, Inc. manufactures heavy duty vehicles for road construction at a facility in Minneapolis, Minnesota. At the facility, more than 500 employees work in two 10-hour shifts to cut and assemble parts into huge vehicles. Within the manufacturing facility, the lights are almost always on.

When facility managers learned about the availability of high-efficiency overhead lighting systems that could reduce electricity and maintenance costs, they became interested in a lighting upgrade for the facility. The fact that Xcel Energy, the regional electric utility, offered a rebate to help fund the lighting upgrade, made the deal too good to pass up.<sup>127</sup>

Working with the Lighting Efficiency Program of Xcel Energy, Caterpillar Paving Products replaced more than 950 lighting fixtures with highly efficient T8 fluorescent lamps. Xcel provided a rebate of \$34,000, equivalent to about 20 percent of the overall project cost.<sup>128</sup>

The benefits were immediately apparent. The new lighting reduced electricity consumption at the factory by about 45 percent, while providing equivalent or better lighting. The upgrade reduced annual electricity consumption by 1.5 million kWh annually, and reduced peak electricity demand by more than 0.17 MW.<sup>129</sup>

Electricity savings translate directly into cost savings. The upgrade cut \$80,000 off of the facility's annual electricity bill. Additionally, the new lamps save \$14,000 per year in reduced maintenance costs. The lamps also emit less heat, reducing the need for air conditioning on hot summer days, providing further savings. With the rebate from Xcel, the project paid for itself in under a year and a half.<sup>130</sup>

For most businesses, lighting is a major expense, accounting for up to 44 percent of monthly energy costs.<sup>131</sup> Improving

lighting efficiency, however, is one of the easiest and most cost-effective ways of reducing these costs. To address this, in 1985 Xcel Energy of Minnesota established its Lighting Efficiency Program.

Lighting Efficiency is a conservation program directed at commercial and industrial energy customers. Through the program, Xcel Energy provides rebates to commercial and industrial facilities that purchase and install qualifying lighting equipment, including fluorescent lamps, compact fluorescent fixtures, and LED signs.<sup>132</sup> In addition, Lighting Efficiency provides rebates on lighting retrofits to upgrade aging facilities, and funds lighting redesign studies that help businesses assess ways that they can reduce their lighting costs.<sup>133</sup>

The Lighting Efficiency program is funded through the state of Minnesota's public benefits fund, which requires that Xcel spend 2 percent of its gross operating revenue on energy efficiency programs. To support the program, Xcel ratepayers pay a Conservation Improvement Program fee.<sup>134</sup>

The average facility that works with Xcel's Lighting Efficiency program reduces its energy costs by 35 percent annually.<sup>135</sup> From 2001 to 2003, the Lighting Efficiency program spurred energy savings of over 200 million kWh—enough energy to power 16,000 Maryland homes for a year. The lighting program saved participants nearly \$16 million over the period, with savings continuing for up to a decade or more. Over the same time period, Lighting Efficiency's budget cost was

The average facility that works with Xcel's Lighting Efficiency program reduces its energy costs by 35 percent annually.

only \$12.2 million, making the program extremely cost effective.<sup>136</sup>

Xcel Energy's Lighting Efficiency program is one of the best of its kind because it reaches out to businesses and industries who might be unaware of the cost savings potential of efficient lighting.

The resultant energy savings are not just a boon to businesses, but also to Minnesota as a whole. The lighting efficiency program helps to reduce the need to operate expensive power plants during periods of high electricity demand. The program also helps to reduce the need to build new power plants and transmission lines by conserving scarce resources. As a result, the lighting efficiency program delivers results for all energy customers, even those that do not participate directly.

### **Upgrading Industrial Facilities with Efficient Equipment**

Schick-Wilkinson Sword manufactures razor blades and component parts for shaving systems at a production facility in Milford, CT. The factory has been operating since the 1950s.

In 2006, Tony Sanzo, plant supervisor, was working to replace aging equipment at the facility while minimizing costs. Through the plant's electric distribution company, United Illuminating, Sanzo discovered that the Connecticut Energy Opportunities Program was available to help.

The Connecticut Energy Opportunities Program helped Sanzo identify outdated equipment that could be replaced with highly efficient alternatives, reducing energy and maintenance costs. The air conditioning system at the facility turned

out to be a major energy sink. United Illuminating staff recommended that Schick replace the system with a smaller but more efficient and equally effective model.

The Connecticut Energy Opportunities Program provided more than \$130,000 in incentives to help replace the air conditioning system. The upgrade saves Schick about \$16,000 per year in electricity costs, reducing consumption by about 143,000 kWh per year (enough electricity to power approximately 11 Maryland homes).<sup>137</sup>

The Schick factory represents just one of many Connecticut industries that have realized energy and dollar savings through the Energy Opportunities Program. The program, a combined effort of United Illuminating, Connecticut Light & Power, and the Connecticut Energy Efficiency Fund, offers incentives for companies willing to replace existing equipment (with at least 25 percent of its useful life remaining) with high-efficiency alternatives.<sup>138</sup> Equipment ranging from motors to chillers to carbon dioxide controls is eligible.

The Energy Opportunities Program provides generous incentives, paying for up to 100 percent of the incremental cost of a project. Funding for the program derives from a conservation surcharge on Connecticut consumers' electricity bills, allocated for energy efficiency projects through the Connecticut Energy Efficiency Fund.

The Connecticut Legislature created the energy efficiency funding system in 1998. Since then, the results have been dramatic. From 2000 through 2006, the Connecticut Energy Efficiency Fund helped install efficiency measures that will yield 27 billion kWh in lifetime electricity savings—enough to power more than 2 million Maryland homes for a year.<sup>139</sup>

**Efficiency measures installed in 2006 will yield an estimated \$4 in savings for every \$1 spent.**



Program managers estimated that efficiency measures installed in 2006 will yield \$4 in savings for every \$1 spent.<sup>140</sup>

The benefits of the program extend beyond consumer savings. Connecticut's energy efficiency programs also enhance the reliability of Connecticut's electricity system and reduce the cost of generating and delivering electricity statewide.

## Designing Energy-Efficient Industrial Processes

American Foods Group processes meat products for distribution at its packing plant in Green Bay, Wisconsin. The facility uses a great deal of electricity to power meat processing equipment, to keep meat cool in refrigeration rooms, and to keep the facility well-lit.

In the past seven years, American Foods Group has been hit hard by increased energy costs. Since 1999, Wisconsin industrial electricity prices have risen by nearly 40 percent, and natural gas prices more than doubled.<sup>141</sup> By 2005, the company was searching for simple and quick strategies to contain its rapidly rising energy costs.

Fortunately, American Foods Group was able to turn to Wisconsin's Focus on Energy Program for help. Focus on Energy offers technical and financial assistance to businesses and homeowners seeking to reduce energy use or develop small-scale renewable energy installations.

Focus on Energy staff helped American Foods Group plan, implement and manage 16 different energy-saving projects. The company spent \$74,000 to purchase and install more efficient technology and adjust operations to improve efficiency. In the first year after the projects were completed, the company saved more than \$140,000 on energy—paying off the initial investment in just six months.

Based on its initial success, the company plans to implement 11 more projects

In the first year after the projects were completed, American Foods Group saved more than \$140,000 on energy—paying off the initial investment in just six months.

to improve efficiency, estimated to save the company an additional \$900,000 per year.<sup>142</sup>

Focus on Energy was created by the Wisconsin Legislature in 1999.<sup>143</sup> The state requires investor-owned electric and natural gas utilities to invest 1.2 percent of their annual revenues into a public benefits fund for energy efficiency, renewable energy and low income household assistance programs.<sup>144</sup> A portion of the money is managed by Focus on Energy, an independent organization, to help individuals and industries across Wisconsin, like American Foods Group, to realize energy savings. Focus on Energy offers a variety of levels of assistance, including:

- **Advisors**, who help companies evaluate existing systems, identify opportunities for greater efficiency, and guide project implementation and management;
- **Training** company employees in practices for improved efficiency;
- **Information and tools** to educate companies on best practices and to help evaluate energy use;
- **Generous rebates and financial incentives** to help defray the cost of installing energy-saving equipment.

While assisting individual businesses, Focus on Energy helps to conserve limited resources and maintain the reliability and

reasonable cost of the electricity and natural gas systems statewide. Overall in 2006, Wisconsin businesses saved over \$17.7 million by participating in Focus on Energy industrial and commercial programs, which represented energy savings of 111.6 million kWh of electricity and 9.7 million therms of natural gas (equivalent to the needs of 9,000 and 15,000 Maryland homes, respectively).<sup>145</sup> The savings account for 0.4 percent of Wisconsin's total industrial electricity use and 0.8 percent of its industrial natural gas use during the year.<sup>146</sup>

Savings through Focus on Energy are extremely cost effective compared to delivering new sources of electricity or natural gas. The program saves electricity at a cost of about 3 cents per kWh—compared to an average retail cost of electricity in 2005 of 7.5 cents per kWh.<sup>147</sup> On the natural gas front, the program yields savings at about 18 cents per therm, while in 2005, delivery of natural gas cost at least 81 cents per therm.<sup>148</sup>

The dollar savings created by Focus on Energy translate into jobs and a stronger economy. The Public Service Commission of Wisconsin estimates that over a period of 25 years, Focus on Energy programs will create at least:<sup>149</sup>

- 60,000 jobs (or person-years of employment),
- \$4 billion in additional disposable income for Wisconsin citizens,
- \$9 billion in additional sales for Wisconsin businesses;
- \$5 billion in added value for the state economy.

By helping businesses achieve energy savings, Focus on Energy reduces strain on Wisconsin's energy infrastructure—delivering savings at the lowest cost of any

available energy resource and helping to grow the state economy.

## Energy Efficiency Can Help Avert an Energy Crisis

Energy efficiency programs can deliver rapid results. Through widespread consumer education, efficiency programs can deliver rapid changes in conservation behavior. At the same time, efficiency programs lay the foundation for long-term changes in the way consumers think about energy use.

### **Saving Energy Quickly to Prevent Rolling Blackouts**

In 2000 and 2001, the California energy crisis forced businesses and residents statewide to accept rolling blackouts—power outages that brought the economy and day-to-day life to a halt.

To bring the electric grid back into working order, policymakers needed to reduce energy demand quickly—on a scale of months rather than years. To address the issue, they devised a program to educate the public on the need to work together to conserve electricity. The “Flex Your Power” campaign was born. Within 12 months, electricity demand declined by 14 percent—equivalent to the output of 10 large power plants (5,900 MW in total).<sup>150</sup>

The Flex Your Power program is focused on educating Californians on how to use energy and resources more efficiently. To reach this goal, Flex Your Power operates a comprehensive website; publishes an electronic newsletter and blog, as well as a variety of educational materials; and runs a highly visible television and radio campaign.

Flex Your Power educates Californians about opportunities to save energy in their homes, from adjusting the thermostat to improving insulation.<sup>151</sup> Additionally, Flex Your Power offers information on how to obtain rebates and incentives for energy efficient appliances and services.<sup>152</sup>

The program is best known in California for its ubiquitous television, radio, and newspaper advertisements that emphasize the efficient use of power. Messages of past Flex Your Power media campaigns highlight the need for collective action, including, “Conserve, and it’s not even hard,” “Together we can get through this,” and “Global warming is a choice.” These campaigns have achieved an overwhelmingly positive reaction and brand identification with the state’s residents.<sup>153</sup>

Flex Your Power’s media campaigns have been quite successful in educating the public on the benefits of energy efficiency: following the roll-out of the television, newspaper, and radio advertisements, more people believed conservation can solve an energy crisis. Moreover, people who were aware of the Flex Your Power campaign were more likely to take active steps to conserve energy.<sup>154</sup>

Energy efficiency measures, including the Flex Your Power campaign, have yielded huge energy and cost savings for residents of California. Since Flex Your Power’s inception, per-capita energy use has dropped by more than 6 percent, ranking California among the top five most energy-efficient states nationwide.<sup>155</sup> Energy savings in 2001 alone saved Californians

Within 12 months, electricity demand declined by 14 percent—equivalent to the output of 10 large power plants.

an estimated \$660 million on their electricity bills, and helped avoid up to \$20 billion in projected costs of summertime blackouts.<sup>156</sup> Estimates suggest that every dollar that California invests in energy efficiency will generate more than two dollars in consumer savings.<sup>157</sup>

The Flex Your Power campaign is funded through California’s Public Goods Charge, in which utilities charge ratepayers a small amount on their electric utility bills, which is pooled and spent on services and programs in the public interest.<sup>158</sup>

California’s Flex Your Power campaign is one of the country’s best public education programs on energy conservation and efficiency because it is broad in scope, has a simple and accessible message, and is well funded. As a result, the program, and others like it, have been able to transform California from a state mired in an energy crisis to a leader in energy efficiency. Citizens who take the Flex Your Power message to heart and work to reduce their energy use not only save money—they ensure the reliability and reasonable cost of the electricity and gas infrastructure for all Californians in the years to come.

# Since Deregulation, Maryland's Investment in Energy Efficiency Has Plummeted

As Maryland moved to deregulate its electricity market in the late 1990s, utility spending on energy efficiency plummeted.

In the early 1990s, utility spending on energy efficiency in Maryland reached as high as \$100 million per year (2007 dollars), or 1.8 percent of annual utility revenues. However, after the state restructured the electricity market in an attempt to introduce competition, utility spending on efficiency dropped to negligible levels. (See Figure 6.) The Maryland Legislature chose not to establish a mechanism to ensure continued funding of efficiency after restructuring, and utilities claimed it was no longer their responsibility.

As a result, Maryland now ranks near the bottom among states nationwide in terms of investment in electric energy efficiency.<sup>159</sup> In the American Council for an Energy Efficient Economy's 2006 State Energy Efficiency Scorecard, Maryland ranked 47<sup>th</sup> in the country for per capita spending on overall energy efficiency.<sup>160</sup>

Utility spending on energy efficiency in Maryland's natural gas market is also negligible. In 2006, Maryland's gas utilities spent \$0.8 million on a program to assist

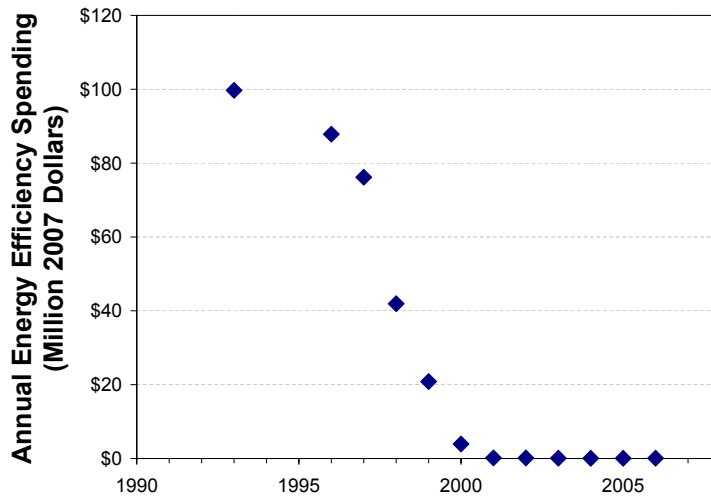
low-income customers pay their bills, but practically nothing on general energy efficiency. As a result, Maryland ranked near the bottom of states for spending on natural gas efficiency programs.<sup>161</sup>

Investment in electric energy efficiency dropped during the debate over restructuring because of uncertainty over changes to the electricity market. Utilities expected that rules governing recovery of money spent on energy efficiency would end and therefore ended their programs.

Many utilities also argued against continuing energy efficiency programs, contending that consumers would make decisions regarding efficiency according to the invisible hand of the market.<sup>163</sup>

However, market forces are not enough to promote energy efficiency alone. A variety of market barriers prevent consumers from taking advantage of all of the cost-effective opportunities to save energy that are available. For example, the person who is the most logical candidate to install energy efficiency improvements is often least likely to benefit from them. Consider landlords, who maintain buildings but whose tenants generally pay the energy bills. Or builders, who, in the absence

**Figure 6: Electric Utility Spending on Energy Efficiency in Maryland (Excluding Load Management Efforts)<sup>162</sup>**



of good consumer benchmarks, face incentives to minimize construction costs rather than make buildings as energy efficient as possible.

Additional market barriers include “sticker shock,” or the tendency for consumers to purchase low-price products, even when they can save money in the long run by purchasing efficient models; lack of knowledge about which products

are truly energy savers; uncertainty over future fuel prices; and the fact that consumers who save energy—thus reducing demand and lowering the cost of energy for everyone—are rarely compensated for the benefits they deliver to the rest of society.

Despite the decline in investment in utility-run energy efficiency programs, the benefits of spending in earlier years continue

## Other Energy Efficiency Measures in Maryland

Although Maryland’s utilities temporarily ceased to invest in energy efficiency programs, Maryland has passed several laws aimed at improving overall energy efficiency. These programs place responsibility on building owners and product manufacturers to meet energy performance standards. These policies include:

- Building energy codes;
- Minimum energy standards for appliances and equipment; and
- Energy efficiency efforts aimed at government-owned buildings.

Including these policies improves Maryland’s ranking in ACEEE’s 2006 State Energy Efficiency Scorecard to 20<sup>th</sup> in the country.<sup>165</sup>

to persist. Maryland's electricity consumption in the early 2000s was reduced on the order of 3 percent because of efficiency programs in place in the early 1990s.<sup>164</sup>

In 2007, electric utilities began to re-invest in energy efficiency programs in response to directives set forth in Senate Bill 1, passed by the Maryland Legislature in a special session in June 2006. The bill, meant to address flaws in the electricity market post-restructuring, instructed the Public Utilities Commission to "require or allow procurement of cost-effective energy efficiency and conservation measures

and services" as part of the process of securing electricity supplies for customers in the state. However, the bill did not set specific spending levels or savings targets.

Given the simultaneous pressures of efforts to slow global warming and rapidly increasing fuel prices, electric utilities became more receptive to energy efficiency. As a result, Baltimore Gas & Electric, PEPSCO and Delmarva prepared energy efficiency and demand management proposals in 2007. The first of these programs began to be implemented toward the end of 2007.

# Policy Recommendations

Efficiency programs are the quickest and cheapest way to address Maryland's energy problems.

By creating new and expanded energy efficiency programs, Maryland can stabilize or even reduce its demand for electricity and natural gas. All energy customers in the state can benefit, whether they participate directly in an efficiency program or not.

Through efficiency, Maryland can reduce the need to build any new nuclear reactors, offshore natural gas terminals or long-distance power lines. Avoiding these investments will not only save money, since they are more expensive than energy efficiency, but also minimize the disruption to communities which can result from siting proposals.

At the same time, Maryland can reduce the need to operate the most expensive power plants during periods of high demand, reducing energy costs statewide. Finally, Maryland can ease the pressure on limited natural gas supplies, mitigating the impact of natural gas price spikes.

Finally, energy efficiency can deliver concrete results for Maryland homeowners, businesses, industries, local governments,

and civic institutions. By reducing energy waste in buildings and infrastructure, energy efficiency programs can deliver substantial energy savings.

In order to capture its potential for energy efficiency, Maryland should create a comprehensive energy program, including the following steps:

**Maryland should reduce per-capita electricity consumption by at least 15 percent below 2007 levels by 2015.**

- The state should establish a series of savings targets that ramp up over time, aiming to reduce per-capita electricity consumption by 15 percent by 2015. For example, an energy efficiency resource standard passed in Illinois in 2007 requires 0.2 percent savings in 2007, ramping up to 2 percent savings per year in 2015 and beyond.
- Utility companies should achieve the bulk of the savings, with strong accountability from the Public Service Commission. The Maryland Energy Administration should help with a market transformation effort, and with

programs that have a longer payback period (such as a low-income weatherization program).

- All customers should participate in funding the energy efficiency effort, and programs should be aimed at all customer classes—residential, commercial and industrial.
- The state should extend the energy savings targets to 2020 and beyond, aiming to capture all cost-effective energy efficiency resources.
- The state should assess and report utility progress in meeting savings targets on an annual basis. To ensure program integrity, assessments should be carried out by independent auditors who have no involvement with program implementation.

- Regulators should reward utilities for going beyond the requirements, and penalize utilities if they fall behind. Also, regulators should reward utilities for deploying the most cost-effective energy efficiency measures first, ensuring the best results for the investment.

**The state should establish a parallel goal for reducing peak electricity demand, reducing the need to build new power plants.**

- The state should aim to reduce peak electricity demand 15 percent by 2015.
- While energy efficiency programs will deliver reductions in peak electricity demand as well as overall energy consumption, targeted load-management programs can further reduce the need to build new power plants, thus saving





consumers money. During times of peak demand, electricity prices are at their highest—and reducing peak demand can thus reduce the need to run the most expensive power generators, lowering the price of electricity.

**The state should act to create a similar energy efficiency goal aimed at reducing consumption of natural gas and heating oil.**

- Energy efficiency programs specifically targeted at conserving natural gas can effectively reduce natural gas prices and insulate consumers from price spikes. As domestic supplies of natural gas decline in the future, natural gas efficiency programs will become an essential part of Maryland’s energy infrastructure. Gas savings can also help to reduce electricity prices, since at periods of peak demand, electricity prices are determined largely by the cost of natural gas-fired generation.
- Efforts to reduce demand for heating oil can similarly reduce the cost of heating for the one in seven Maryland homes that depend upon this fuel.

**In addition, the state should:**

- Require all new construction to meet increasing energy efficiency performance

standards, reducing energy consumption by 30 percent in the near term and aiming for net zero-energy buildings by 2030.

- Improve building energy efficiency inspections.
- Require disclosure of building efficiency when a building is up for sale.
- Move the Federal Weatherization funds from the Department of Housing and Community Development to MEA.
- Open PJM’s regional capacity market to energy efficiency projects, in addition to load management projects (which were allowed to participate in the most recent auction).

**Finally, the state should ensure that skilled workers are available to carry out energy efficiency tasks.**

- By establishing a robust energy efficiency effort, Maryland will be creating a large demand for skilled workers to carry out the necessary tasks to improve energy efficiency, from home weatherization to industrial process optimization. The state should create a workforce training program to ensure that enough skilled workers are locally available to get the job done.

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