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State of Delaware

Energy Efficiency Resource Standards

Workgroup Report

This report was prepared by the Energy Efficiency Resource Standards Workgroup and submitted to the DNREC Secretary with consensus vote of participating Workgroup members on June 14, 2011. A sincere thanks to Workgroup members and staff for their time and efforts contributed to this important process.

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1.0 Executive Summary

As directed by Delaware Statute, Title 26, Chapter 15, the Energy Efficiency Resource Standards ("EERS") Workgroup submits this report to the Secretary of Natural Resources for consideration of various energy efficiency issues identified in the statute. The Workgroup appreciates the opportunity to provide this report and to help implement an effective EERS for Delaware.

The Energy Efficiency Resource Standards Act of 2009 ("the Act") establishes energy efficiency as a priority energy supply resource for the State, recognizing that energy efficiency is among the least expensive ways to meet the growing energy demands of the State. The Act establishes aggressive targets of 15% reduction in electricity consumption, 15% reduction in peak electricity demand, and 10% reduction in natural gas consumption by 2015. The Act places Delaware among the leading states helping their energy consumers to benefit from both the economic and environmental impacts of reduced energy usage.

1.1 EERS Saving Targets

The Workgroup contemplated three different definitions of the savings targets and agreed to the following interpretation of the statute's targets: "Targeted electricity consumption and peak demand savings would be 15% of the 2007 actual consumption and peak demand (10% for natural gas consumption)." This definition results in the following EERS savings targets based off 2007 actual performance:

- 2011 electric consumption savings target is 237,376 megawatt-hours ("MWh")
- 2015 electric consumption savings target is 1,780,322 MWh
- 2011 electric demand reduction savings target is 52 megawatts ("MW")
- 2015 electric demand reduction savings target is 392 MW
- 2011 natural gas consumption savings target is 253,695 thousand cubic feet ("Mcf")
- 2015 natural gas consumption savings target is 2,536,587 Mcf

1.2 EERS Feasibility

The statute sets mandatory savings targets, time limits, and efficiency charge limits for the accomplishment of the statute directive. The Workgroup finds that Delaware is unlikely to achieve the legislated efficiency targets given the current and prospective funding levels and the high participation rates that would be necessary to meet such a short timeline. Modifications are required in some or all of the following: 1) funding for efficiency investments; 2) efficiency targets; and/or 3) the timeframe to accomplish the targets. See Section 5.0 for more details on the interrelationship of funding, targets, and timelines.

If fully implemented, the efficiency charge is estimated to produce approximately $9 million dollars annually or approximately $45 million over the next five years. Conversely the estimated cost to meet the legislative objectives is $284-849 million (with an average estimate of $481 million) over the next five years.

The Workgroup discussed the types of programs and initiatives that would need to be considered to achieve the legislated targets. The potential policy changes included broadening program offerings and delivery mechanisms, increasing the energy savings measures that could

count toward energy efficiency, creating new, stricter regulations and new pricing structures designed to incentivize energy efficiency, and establishing higher levels of funding to supplement existing programs.

The affected energy providers anticipate that they will be able to achieve the electricity peak reduction targets. As described in Section 5.3.1, reducing peak electric load creates savings for all electric customers.

1.3 Accountability Conflict

The Workgroup has identified that the EERS and SEU statutes, as currently written, have several conflicting directives. The Workgroup recommends that the Legislature make the necessary changes to the legislation to clarify the accountability structure.

Titles 26 and Titles 29 of the Delaware Code provide for conflicting responsibility for implementing EERS requirements. Title 26, Chapter 15 requires each affected energy provider to achieve the savings specified in the statute.[1]For the cooperative and municipals, Section 1505(b) states that each individual affected energy provider may determine how best to fund activities necessary to achieve the energy savings goals within its service territory and implement programs as it sees fit.

However, Delaware Title 29, Chapter 80, Subchapter II, Section 8059(b) and (c) creates the Sustainable Energy Utility (SEU) and charges the SEU with designing and implementing energy efficiency programs in the state. The Statue directs funding to the SEU to accomplish the energy savings goals under Section 1505(f) and (j).Title 26, Chapter 15, Section 1505(g) goes a step further and prohibits the Public Service Commission from approving any regulated utility cost recovery for programs designed to achieve energy efficiency savings.

The conflicting directives in the statute make it unclear who would be accountable for EERS performance results and how the State could develop enforcement mechanisms. Holding regulated affected energy providers responsible for outcomes without any ability to design and administer efficiency programs may create unintended issues.

1.4 Equivalency

The electric kilowatt-hour, as a measure of consumption, can be related to the natural gas decatherm by virtue of the British Thermal Unit (BTU) heat content measure. One kilowatt-hour ("KWh") of electricity is the equivalent of 3,412 British Thermal Units ("BTUs") of energy. One decatherm of gas is equivalent to 1,000,000 BTUs of energy. Therefore, the Workgroup recommends that efficiency units and credits be redefined to a common BTU scale to enable meaningful cost comparisons and possible trading of electric and gas efficiency credits.

In contrast, 1 kilowatt of electric demand response is a single average measure of demand over a one hour period and has no heat-energy value relationship with efficiency savings. There is no practical way to establish a joint equivalency among all three measures. However, there is the potential for measure overlap where electric energy efficiency programs provide peak reductions and where peak demand reduction programs sometimes contribute toward energy

[1] Title 26, Chapter 15, Section 1502 (a)

efficiency. The Workgroup recommends that demand reduction credits are not traded or viewed as equivalent to any metric of efficiency credits. However, when both demand reduction and base energy efficiency savings can be achieved from the same measure or program, then the Workgroup recommends that the program be awarded credits for both the demand reduction and efficiency savings.

1.5 Economic Impacts

Implementation of the EERS targets should be made with consideration of the impact on the Delaware economy and its citizens. Electric efficiency and demand reduction programs deliver a net savings to electric customers as their reduced energy use and the utility savings from wholesale capacity bids can help lower energy bills. Conversely, only participants of the natural gas efficiency programs will experience the direct benefits of reduced gas bills. The dollar savings from reduced energy costs give residents and businesses more available income to spend and invest in other sectors. Additionally, energy efficiency is the lowest cost option to meet future energy needs in comparison to new energy generation investments.

The energy efficiency targets will create both direct and indirect jobs through growth in the clean energy sector. Energy efficiency investments in homes and businesses help build a local work base and invest dollars back in the community and the state. The job potential based on typical efficiency and peak demand programs is estimated to be anywhere from 10.8 to 12.5 jobs-years per million dollars of investment. Therefore, using the cost estimate range of $284-849 Million to achieve the energy efficiency targets, the estimated total jobs created ranges from 3,000-10,600 job-years (see Section 5).

1.6 Air Pollution and Greenhouse Gas Impacts

The environmental impact of the energy reductions is dependent on the achieved level of energy efficiency and peak demand savings. The achievement of efficiency savings targets will result in a direct savings in greenhouse gas emissions and criteria air pollutants. Based on the achievement of the 15% electric consumption savings target, Delaware would save 4,485 tons of NOx, 15,447 tons of SO_2 and 2.9 million tons of CO_2 over the five year period. Natural gas consumption offers similar direct savings to electric, but at a lower level. Achievement of 2015 10% savings targets results in limited to no SO_2 savings, 23 tons of NOx savings and 29,495 tons of CO_2 savings.

Reduction in peak demand is another issue. While reducing the generation during peak periods also reduces emissions, much of the load reduction is displaced to other periods of time. Peak demand reductions would likely cause a small net increase in emissions due to the greater use of dirtier fuels during off-peak hours. If peak programs target peak shaving versus load shifting, then GHG emission impacts could be more favorable.

1.7 Natural Gas Efficiency

As part of the Workgroup's directive, the legislation asked for comparative review of the full-fuel-cycle measurement (from source to point-of-use) of electricity and natural gas. Significant amounts of energy can be used or lost along the complete energy delivery path, that is, in the extraction, processing, transportation, conversion, and distribution of energy. On a full-fuel-cycle energy basis, taking into consideration the site use efficiencies, the direct use of natural gas in primary residential appliances is the most efficient energy source compared to

electricity, propane, and fuel oil on an MMBtu basis. The full-fuel-cycle energy requirement for an average home using natural gas is approximately 27% less than for a similar home using electricity, 11% less than the similar fuel oil home, and 3% less than the similar propane home. The full-fuel-cycle energy analysis indicates that natural gas is the most efficient energy source taking into consideration the idea that electricity is the most efficient when only considering the energy requirements on site at the home.

Given the benefits of natural gas and the potential energy savings on a full-fuel-cycle basis, the Workgroup supports the expansion of gas service in all areas of the state and recommends inclusion of fuel switching and gas fired combined heat and power systems (CHP) toward energy efficiency savings.

1.8 Eligible Programs

Traditional energy efficiency programs have been limited to replacing or improving equipment performance, changing consumer behavior or both. Reducing energy consumption by converting to cleaner fuels or installing CHP, each of which save significant energy, has not always been counted as efficiency. Section 1504(a)(3)(a) provides the Secretary with the discretion to determine by regulation the types of energy efficiency and energy conservation measures that can be counted toward the savings targets. The Workgroup recommends a broad use of that discretion to include fuel switching, peak-shaving renewable energy systems, CHP, transmission and distribution upgrades, higher efficiency generation technologies, and building energy standards.

2.0 Delaware's EERS Background

The State of Delaware has long recognized the importance of energy conservation and efficiency. In its 2003 assessment, the Governor's Energy Task Force found that "energy efficiency is Delaware's largest potential energy resource."[2] This finding was further substantiated by the Reducing Delaware's Energy Use Workgroup in January 2009.[3]

On June 16, 2009, Senator Harris McDowell and several co-sponsors introduced Senate Bill 106, AN ACT TO AMEND TITLE 26 OF THE DELAWARE CODE RELATING TO ENERGY EFFICIENCY RESOURCE STANDARDS AND ENERGY EFFICIENCY PLANNING. The Act created Energy Efficiency Resource Standards (EERS) and set goals for reducing electric consumption and peak demand by 15% by 2015 and reducing natural gas consumption by 10% by 2015. The affected energy providers would report performance annually to the State Energy Coordinator. The Act established cost effective energy efficiency as a priority energy supply resource for the State, recognizing that energy efficiency is among the least expensive ways to meet the growing energy demands of the State.

On July 29, 2009, Governor Jack Markell signed Senate Bill 106 enacting Delaware's Energy Efficiency Resource Standards Act of 2009. The adoption of Senate Bill 106 represents an aggressive approach to reduce energy consumption and demand and places Delaware among the leading states helping their energy consumers to benefit from both the economic and environmental impacts of reduced energy usage.

2.1 Statute Background and Objectives

Energy efficiency has long been considered an excellent approach to help consumers save money. Efficiency program recommendations have been an integral part of Delaware's energy planning process. Efficiency goals and a vision for reducing Delaware's energy use were recommended in the 2009 Delaware Energy Plan developed by the Governor's Energy Advisory Council. The Energy Efficiency Resource Standards Act of 2009, introduced by Senator Harris McDowell and strongly supported by the Governor, was the result of a collaborative effort with DNREC, the Senate Energy and Transit Committee, the House of Representatives Energy Committee and Delaware utilities.

Energy Efficiency Resource Standards ("EERS") are similar in concept to a Renewable Energy Portfolio Standard ("RPS"). Instead of requiring a certain percentage of energy generation from renewable sources, an EERS requires a percentage reduction in energy use from energy efficiency and conservation measures. Under Delaware's EERS legislation, affected electric energy providers (electric utilities) are required to attain a 15% consumption savings and a 15% peak demand reduction by 2015 while affected natural gas distribution companies (natural gas utilities) are directed to meet a 10% consumption savings target by 2015. The majority of electricity and natural gas energy savings are expected to come from energy efficiency and conservation programs administered by the Sustainable Energy Utility. These savings will be

[2] Governor's Energy Task Force, State of Delaware, Final Report, September 2003, p. 46

[3] Report to the Governor's Energy Advisory Council, Reducing Delaware's Energy Use Workgroup, January 7, 2009, Page 4.

supplemented by additional savings from the State's Weatherization Assistance Program. Electricity peak load reductions will be achieved through electric utility demand response programs.

Energy efficiency resources can provide the least expensive approach to meet the growing energy demands of the State and have been helping to reduce Delaware's energy costs since the early 1980s. Early programs were developed and implemented by utilities prior to restructuring. The creation of Delaware's Sustainable Energy Utility provided the opportunity to implement new statewide energy savings programs for Delaware consumers in an approach that targets all sectors and all fuels.

Title 26, Chapter 15, specifically established electric and gas energy efficiency saving goals for each affected energy provider in the State, created a diverse Workgroup to review key issues and charged the Workgroup with completing a study to determine the feasibility and impact of pursuing EERS goals for the affected energy providers in Delaware.

Title 26, Chapter 15, Section§ 1502(a)(1) and (2) defined the EERS savings goals as follows:

> "(a) It is the goal of this chapter that each affected energy provider shall achieve a minimum percentage of energy savings as follows:
>
> > (1) For each affected electric energy provider, energy savings that is equivalent to 2% of the provider's 2007 electricity consumption, and coincident peak demand reduction that is equivalent to 2% of the provider's 2007 peak demand by 2011, with both of the foregoing increasing from 2% to 15% by 2015;
> >
> > (2) For each affected natural gas distribution company, energy savings that is equivalent to 1% of the company's 2007 natural gas consumption by 2011, increasing to 10% by 2015."

Title 26, Chapter 15, Section 1502(c)(2) charges the Workgroup to address, at a minimum, the following key issues:

- The appropriateness of the EERS savings percentages for 2011 and 2015 or recommending alternative percentages if warranted
- The impact of implementation and compliance on carbon dioxide and other greenhouse gas emissions
- The potential for unintended consequences resulting from the goals
- Any EERS type goals and programs for natural gas utilities in nearby states and results
- The results of any ongoing natural gas efficiency and conservation programs implemented and administered through the SEU (Sustainable Energy Utility) or any individual gas utility
- The impact of implementation and compliance on customer rates
- The efficiency of the natural gas system relative to other energy alternatives
- The level of energy efficiency charge, if any, needed to fund the measures to meet EERS compliance
- The step load increases or decreases caused by the connection of large new energy consumers

- The impact of implementation and compliance on major farm, commercial and industrial customers
- The appropriate level of equivalency for electricity demand response and energy efficiency measures in achieving compliance
- The appropriate scope of equivalent energy efficiency measures
- Whether the Secretary, by regulation, should permit trading of Energy Efficiency Resource Units (EERUs)
- Any enforcement mechanism(s) to ensure compliance
- The creation of quantitative annual reduction targets in Energy Efficiency Resource Units (EERUs)

2.2 Workgroup Description

As previously noted, the Workgroup was tasked to evaluate various issues and to provide recommendations for the planning and implementation of the policy. The Workgroup was composed of eleven members, chaired by the DNREC State Energy Coordinator and included representation from Delmarva Power, the Delaware Electric Cooperative, Chesapeake Utilities, Municipal Electric Companies, the Public Service Commission, the Public Advocate, the Sustainable Energy Utility, the Weatherization Assistance Program, and two members of the public with experience representing, respectively, low- and moderate- income families and environmental concerns.

Participation in the Workgroup meetings was open to various staff members and the general public. However, the authority for key decisions and recommendations was reserved for the voting member of the Workgroup. The "EERS Workgroup Report" resulted from several months of conversations and presentations. A draft outline was revised and voted upon by the Workgroup, including the topics required by the statute. Different members of the workgroup then drafted different sections of the initial draft report (circulated in November 2010). Subsequently, there have been several rounds of detailed and extensive revisions, long group discussions, and votes that resulted in this final report over six months after the initial draft. The recommendations for the planning and implementation of the policy contained in this report are the result of the Workgroup's efforts and include consideration for the various viewpoints presented during meeting discussions. The Workgroup appreciates the efforts provided by the Workgroup members and the participation of all parties during discussions and presentations.

Section §1502(c)(4) of the statute also requires the Workgroup to meet at least once each year to review the progress in meeting the goals and to recommend changes to the plan for meeting the reduction targets. Section 1502(c)(5) further requires the Secretary of Natural Resources and Environmental Control to reconvene the Workgroup in February 2013 to evaluate progress toward EERS goals. DNREC anticipates coordinating an annual meeting of the Workgroup to monitor policy progress and to provide opportunity for policy review.

2.3 Scope of Workgroup Efforts

The Workgroup efforts were initiated in October 2009 and continued through May 2011. DNREC contracted with the University of Delaware's Center for Energy and Environmental Policy ("CEEP") to provide analyses to the Workgroup. The Workgroup examined various saving target scenarios and reviewed efficiency and conservation programs conducted in other

states to determine the appropriateness and feasibility of the EERS statute requirements. Major effort was devoted to understanding the intent of the EERS Statute and examining alternative approaches to establishing the 15% electric and 10% gas savings targets. The Workgroup held additional discussions around the various issues identified for review in the legislation and provided information for this report.

As the Workgroup began a more in-depth review of certain issues, it became apparent, that outcomes in certain areas were dependent on potential changes in others. For example, determining the appropriate savings targets contemplated by the statute produced three different approaches which could have been the intent of the statute. In addition, the achievement of aggressive savings targets would be dependent on program costs, participation rates and the expansion of programs, which would depend on the availability of funding resources. Hence, the determination of the appropriateness of savings targets became dependent on the costs to provide new and expanded programs. Similarly, identifying any unintended consequences depended on the types of new and expanded programs that would be implemented. The interrelated nature of the issues required the Workgroup to make certain assumptions as it worked through each of the issues requested for review.

A single major charge for the Workgroup was to support and confirm "the energy savings percentages identified for 2011 and 2015 or recommending alternative energy savings percentages if warranted."[4] Within that context, the Workgroup was required to address a series of key issues related to energy efficiency and the proposed standards. This report represents the Workgroup's determinations and provides guidance to the Secretary for formulating policy changes and necessary regulations.

[4] Title 26, Chapter 15, Section 1502(c)(2)(a)

3.0 Current Status of Energy Savings Efforts

Delaware, along with at least 24 other states is pursuing aggressive energy savings goals. Delaware's 15%/10% energy savings in five years is an aggressive state target and will require significant new programs and funding sources to achieve.

3.1 The Delaware Approach

Retail electric service in Delaware is provided by Delmarva Power, an investor owned utility, the Delaware Electric Cooperative and nine Municipal utilities: Newark, New Castle, Middletown, Clayton, Smyrna, Dover, Milford, Seaford and Lewes. Many of the municipal utilities' energy responsibilities, including demand response, are managed by the Delaware Municipal Electric Corporation (DEMEC), a joint action agency. Delmarva Power is the only electric utility regulated by the State's Public Service Commission. The Cooperative and Municipal utilities are responsible to their Boards and Commissions, respectively. With respect to EERS requirements, Delaware utilities are responsible for both energy efficiency and demand reduction savings, but some utilities only have authority for the implementation of demand reduction programs. Electric utilities in Delaware have concentrated most of their efforts on reducing peak demand to help save customer energy costs.

Retail natural gas in Delaware is provided by Chesapeake Utilities in the central and southern part of the State and Delmarva Power in the northern area. Delaware gas utilities have not historically offered efficiency programs, perhaps because the direct use of fuel such as gas in homes is inherently more efficient then the generation and delivery of electrical energy. Gas companies have typically stressed expansion of gas services and marketing of conversions from other fuels such as propane and oil. Chesapeake Utilities has pursued expansion of gas service throughout southern Delaware and has marketed gas service for new developments and conversions in existing neighborhoods. For larger customers, both Chesapeake Utilities and Delmarva Power offer interruptible service to help hold down overall gas costs. At current natural gas prices, there are substantial savings compared to other energy alternatives for firm service customers as well. Delmarva Power also offers a peak management rider for larger gas customers.

Delaware is one of the few states to adopt a Sustainable Energy Utility (SEU) which places the responsibility for the development of statewide energy efficiency programs and the funding for the implementation of those programs within one statewide entity.[5] The SEU does not distinguish between energy sources or providers and offers programs to all Delaware energy consumers. While, pursuant to the statute, affected energy providers are responsible for both consumption and peak demand reduction programs, they must coordinate with the Sustainable Energy Utility to achieve the electric and gas energy consumption savings or create utility specific independent programs. A key concern of the Workgroup is that the statute holds the affected energy providers (utilities) responsible for energy efficiency program results, but gives

[5] The Sustainable Energy Utility was established by law in 2007. The SEU is a non-profit organization charged with the design and delivery of programs offering comprehensive end-user energy efficiency and customer-sited renewable energy services to Delaware's households and businesses.
http://delcode.delaware.gov/title29/c080/sc02/index.shtml

regulated energy providers no authority or cost recovery ability to achieve expected performance.[6] A second, but no less important concern related to energy efficiency, is the need to ensure that there is no duplication in energy efficiency programs or related funding without additional customer benefit.

Delaware's Weatherization Assistance Program (WAP) reduces the energy costs for low-income households (below 200% of the poverty line) by increasing the energy efficiency of their homes. In addition, the program makes people's homes healthier, safer, and more comfortable. The Federal Department of Energy (DOE) estimates that the average household saves $437 per year on their energy costs after receiving weatherization services. WAP provides an opportunity to significantly reduce the fuel assistance needed by low-income households, who spend over 14% of their total annual income on energy costs alone. Weatherization is a highly cost-effective investment: for every $1 invested in the program, WAP returns an estimated $2.5 to the household and society.[7] Delaware's program is funded by a variety of state funds (utility surcharge and Regional Greenhouse Gas Initiative funds) and federal funds (DOE WAP annual grants and 10% of the Federal Department of Health and Human Services (HHS) Low Income Home Energy Assistance Program (LIHEAP) annual grant).

3.2 Delaware's Current Electric and Gas Energy Efficiency Programs

The Delaware Sustainable Energy Utility (SEU) is responsible for administering energy efficiency programs for all fuels within the State of Delaware. Currently, the SEU offers rebates and financing options for a variety of energy efficiency investments for the residential, commercial, industrial, and institutional sectors. SEU Programs are funded by 65% of the Regional Greenhouse Gas Initiative (RGGI) auction revenues and $20 Million from Delaware's State Energy Program American Recovery and Reinvestment Act Grant (SEP ARRA 2009-2012). Both funding sources are overseen by DNREC. Additional revenue streams will come from Green Energy Savings Bonds, which are comprised of tax exempt and taxable bonds leveraged from public sector funds and private sector-based capital.[8]

The currently offered SEU programs are as follows:

3.2.1 Residential Lighting Upstream Rebate Program Summary

The program provides mark downs for compact fluorescent light bulbs (CFLs) at the point of sale to encourage Delaware residents to replace their inefficient light bulbs with energy efficient CFLs. The mark down program includes coupons for smaller retail stores that do not have sophisticated point-of-sale systems.

While this program seeks to capture savings from the market for CFLs in the residential sector, it is also provides an important opportunity to promote other SEU programs to consumers. The opportunity arises from the fact that this program is implemented within retail stores, and specifically targets consumers who choose an energy efficient product. A broader

[6] Title 26, Chapter 15, Section 1505(g)

[7] For more information, see DOE's website: http://www.waptac.org/WAP-Basics.aspx

[8] Center for Energy and Environmental Policy, "Delaware's Energy Efficiency Potential and Program Scenarios to Meet Its Energy Efficiency Resource Standard," Draft Report, November 2010; p 44

marketing campaign uses the Residential Lighting Upstream Rebate program to educate and promote programs to consumers in the residential sector.

The target market for this program is residential consumers across the State. Although CFLs are commonly recognized and widely available, estimates indicate that only 15 percent of the potential residential market has been tapped.

Savings average 45 kWh per year per CFL, assuming 3 hours of use per lamp per day. Total impacts will depend on the number of lamps sold. Depending on final markdown negotiations with participating retailers, the program will target approximately 1,000,000 lamps. Annual energy savings will therefore be around 48,473 MWh with saving over the life of the bulbs in the 460,000 MWh range.

The total program budget target is approximately $1.2 million and will operate for 12 months from an initial launch in July 2010. The budget excludes the anticipated broader marketing program. Markdowns are up to $1.00 for standard individual CFLs, and up to $1.50 for specialty CFLs. Multi-lamp packages receive slightly lower markdowns. The funding source is SEP ARRA funds.

3.2.2 Residential Appliance Rebate Program Summary

Although currently closed, this program provided rebates for energy efficient residential appliances purchased for Delaware homes from September 2009 through September 2010. Delaware residents purchasing new residential appliances were incented to move up to Energy Star appliances over less efficient models.

The target market for this program was residential consumers across the State. The appliances in the scope of this program included refrigerators, freezers, dehumidifiers and washing machines. The savings levels were calculated on the difference between the standard appliance energy use and the Energy Star certified energy use. The US DOE SEEARP program deemed savings values were used for all appliances except for dehumidifiers which utilized the DEER database. Actual energy savings through November 15, 2010 are 1,936,813 kWh, and 33,732 therms of Natural Gas resulting in a net savings of over $366,849 in annual electrical bill savings for Delaware residents, and the avoidance of almost 3,832,782 lbs of greenhouse gasses. One final invoice of final rebates is pending and will increase these impacts slightly.

The implementation contractor responsible for in-store marketing, retailer recruitment, signup, and outreach was Applied Proactive Technologies (APT). Rebate processing and fulfillment was performed by Ohana Companies, a Delaware based firm.

The total program incentive budget spent through the date listed above is $1,087,500. Rebates were funded by a combination of State Energy Efficient Appliance Rebate Program (SEEARP), SEP ARRA, and RGGI funds. The program closed to new purchases August 31, 2010 and final rebate processing was completed in December, 2010.

3.2.3 Residential Energy Efficiency and Renewables Program Summary

The Residential Energy Efficiency and Renewable Energy Program targets existing owner-occupied homes, regardless of heating fuel type. The program is a two-step process which starts with a comprehensive Home Assessment (energy audit) with specific recommendations followed by the implementation of those recommendations. Customers are eligible for incentives and financing to make the energy efficiency improvements more

affordable. Many of the recommendations will provide enough energy bill savings to cover the cost of the improvement over the life of the financing.

This program is modeled after the proposed Federal Home Star program. The program has two potential paths: a Standard Path and a Performance Path, both requiring an energy audit. The Standard Path has a list of prescriptive incentives for specific energy efficiency measures using a "deemed savings" approach. Measures include installed insulations, air sealing, doors, windows, energy efficient water heaters, etc. The Performance Path measures are supported by home energy modeling and incentives are based on the projected savings as calculated by the home energy modeling. Renewable energy measures are eligible for financing only.

Estimated energy savings are expected to roughly 60,000 MMBTU from fuels per year and approximately 2,600 MWh per year for the program. Participation will depend on incentives, financing rates, marketing and other factors. Based on experience with similar programs in New York, New Jersey and Pennsylvania, participation is likely to start at 200 to 300 homes per year, and increase over time. However participation in the first four months of the program has exceeded approximately 500 homes, although for focused HVAC retrofits.

The implementation contractor ICF International was selected based on their experience in currently operating Home Performance with ENERGY STAR programs. The implementation is well into the second phase as outlined above. HPwES programs are driven heavily by trade allies – the auditors, residential and renovations contractors who will perform the work. The implementation contractor will be used to perform trade ally network development, application processing, mentoring and quality assurance of BPI-certified auditors and accredited contractors, post installation inspections, and reporting.

3.2.4 Non-Residential Energy Efficiency and Renewables Program Summary

This program provides a combination of incentives and low interest loans for qualifying energy efficiency and renewable energy measures. Incentives are available for prescriptive and custom measures. SEU financing in amounts from $10,000 to $250,000 are available for terms of up to 10 years to qualified borrowers. Financing will be leveraged with local institutions where possible. Incentives and financing are generally paid to the customer, although direct payment to the installation contractor may be allowed with permission from the customer.

The Commercial and Industrial Energy Efficiency and Renewable Energy Program targets facilities and projects in the following initial market segments:

- Non-profit, 501(c)(3) organizations
- Municipal, School, University, and Hospital (MUSH) projects that are not large enough to fit into the SEU's performance contracting program
- Non-residential private sector commercial and industrial sector businesses
- Multi-family rental housing with four or more units in the same building

Owner-occupied housing units are not eligible for this program.

For applicants seeking financing, regardless of whether the proposed measures are prescriptive or custom, an energy audit will be required. Selected measures must provide enough energy bill savings to exceed the cost of the improvements over the life of the loan. An audit is

not required for applicants seeking custom or prescriptive incentives, but these applicants will be encouraged to have an audit performed, and audit incentives will be available.

Estimated savings per participant vary widely in C/I programs, and participation will depend on incentives, financing rates, the availability of co-lenders, marketing and other factors. A preliminary estimate, based on the availability of SEU financing only, is that there will be approximately 80 participants per year, and total annual savings per participant will be approximately 182 MMBTU per year from all sources. Total annual savings will be approximately 14,000 to 15,000 MMBTU per year from all sources. The availability of co-lending will increase these savings by allowing more participation.

An implementation contractor is being used to expand trade ally network development, application processing, post installation inspections, and reporting.

3.2.5 Low Income Housing Construction Financing Program

To support the development and renovation of affordable, energy efficient multi-family housing, the SEU wishes to achieve the following goals:

- Increase the energy efficiency of multi-family housing units constructed or rehabilitated through the Low Income Housing Tax Credit Program by moving towards Energy Star performance levels.
- Increase the availability of affordable, energy-efficient, multi-family housing by providing low cost construction financing targeting the components that have the largest influence on energy consumption.

The Delaware State Housing Authority's (DSHA) Low Income Housing Tax Credit Program (LIHTC) currently has minimum construction and rehabilitation standards for energy efficiency. In 2010, DSHA added a requirement that to the greatest extent practicable projects shall install energy efficient components, HVAC equipment and appliances that are Energy Star rated. The SEU is encouraging design and installation practices that will increase multi-unit energy efficiency beyond individual component performance.

The SEU has defined criteria that help to move towards Energy Star ratings. To facilitate this process, the SEU is offering construction financing for qualifying measures described in this document. In most cases, the qualifying measures are the same as measures included in DSHA's Qualified Allocation Plan (QAP) and are given the same point values. In addition, the SEU is offering an expanded list of energy efficiency measures that would allow enhanced energy efficiency for both rehabilitation and new construction.

Energy impacts will be calculated against two benchmarks:

1. For renovations to existing multi-family housing, energy savings will be calculated against current building and equipment configurations.
2. For new construction, energy savings will be calculated against current minimum equipment performance requirements. In most cases, minimum performance will be defined by the current version of residential energy efficiency code (currently IECC 2009).

The SEU's implementation strategy is tied to the DSHA's annual LIHTC application and underwriting process. The SEU will prepare an applications package designed to pre-qualify

energy efficiency measures and will issue a letter offering financing. Applicants must be selected for Low Income Housing Tax Credits in order to be eligible for SEU financing.

In most cases, the SEU's financing will be tied to DSHA's underwriting criteria. Since tax credits may be issued with or without DSHA financing, under certain circumstances, the SEU may develop its own underwriting criteria or utilize the underwriting criteria of other project lenders.

3.2.6 Performance Contracting

This program provides financing through tax-exempt bonds and other tax-exempt sources for energy efficiency upgrades at municipal, university, school and hospital (MUSH) facilities. Work will be accomplished under performance contracts with pre-qualified energy services companies (ESCOs).

Performance contracting projects start with an investment grade audit performed by an ESCO. The audit forms the scope of work in a Guaranteed Energy Savings Agreement (GESA). Once work is completed, energy savings are used to repay the financing. The aggregated project savings must provide enough energy bill savings to exceed the cost of the improvements over the life of the financing.

Estimated savings per participant vary widely and there are no specific projections. Savings will be generated by measures that will reduce both electricity and fuel consumption. Water, waste water and other savings may also be included. However, one indicator is the expected level of investment. In the first year of the program, an investment of at least $30,000,000 is expected under performance contracts in public facilities. Electricity savings from this level of investment are expected to be between 15,000 and 20,000 MWh/year; fuel savings are expected to be between 150,000 and 200,000 MMBTU/year. These savings assume approximately half of the savings will come from electricity and an approximate average pay back of 7 years.

The SEU currently has 11 pre-qualified ESCOs, and investment grade audits are under way in various state agencies, municipalities and school districts across the state.

ARRA funding is not used for this program. Project funding is provided only through bonds and other private sources. The funding will vary directly with the level of investment activity, although at least $25 to $30 million per year of energy efficiency investment through this program is targeted.

3.2.7 Green Financing and Other Innovative Programs

A key feature of Delaware's SEU framework is green financing. Financing programs offer public and private sector participants with the opportunity to invest in efficiency by removing the upfront capital needs. The investment costs are paid through a shared savings model where participants pay back the loan over time through their energy cost savings. Additionally, Green Energy Savings Bonds (GESB) from guaranteed energy savings agreements enable investment in comprehensive projects at lower interest rates that in turn are anticipated to yield higher savings per participant. The aggregation of guaranteed energy savings in a comprehensive SEU framework can potentially lower the cost of administration and financing opportunities.

SEU programs will utilize several funding vehicles including tax-exempt public bonds, private investments and bank lending in order to continue programs as federal stimulus funds are spent or committed for financing, helping to make SEU programs self-sustaining.[9]

3.3 Delaware's Electricity Peak Demand Reduction Programs

Peak demand reduction program responsibility remains with the Delaware electric utilities. Each utility is pursuing peak demand reductions in unique and positive ways.

3.3.1 Delmarva Power

Delmarva Power has continued its Energy For Tomorrow program, originally offered as part of its Challenge 2000 programs for residential customers and offers a Peak Management Pricing Tariff for commercial and industrial customers that can help reduce peak demands. The Energy for Tomorrow Program provides for peak load interruption of water heater and air conditioning loads for approximately 70,000 customers.

In its 2010 Integrated Resource Plan, Delmarva projected three specific programs to help meet its 2015 EERS peak demand reduction savings targets.

- A residential air conditioner direct load control program consisting of a choice of smart thermostats or outdoor switches
- A small commercial customer packaged air conditioner direct load control program consisting of a choice of smart thermostats or outdoor switches
- Advanced Metering Infrastructure enabled dynamic pricing for customers served under standard offer service that provides an incentive to reduce electricity use during announced critical event periods.

Delmarva anticipates that these programs, coupled with on-going efforts should reduce peak demand by 275 megawatts in 2015, and are enough to achieve the targeted 15% reduction.[10]

3.3.2 Delaware Electric Cooperative

The Delaware Electric Cooperative offers many different programs, all designed to lower peak demand and consumer energy costs. Current offerings include:

- The voluntary Beat the Peak program whereby upon notification, customers can reduce usage during peak demand periods and help all customers save on energy costs.
- The voluntary Switch and Save program with direct load control over 20,000 customer's water heaters and air conditioning units.
- A voluntary irrigation demand off peak (IR-DOP) for agricultural businesses to reduce costs.

[9] Center for Energy and Environmental Policy, "Delaware's Energy Efficiency Potential and Program Scenarios to Meet Its Energy Efficiency Resource Standard," Draft Report, November 2010; 2010 Delmarva Power and Light Integrated Resource Plan, p. 44.

[10] All Delmarva Power programs need to be approved by the Delaware Public Service Commission. Potential delays of programs due to administration, technology, or regulations could impact the achievement of these targets.

- Large commercial controlled load programs primarily for poultry operations.

In 2007, the Cooperative had programs in place that reduced their peak demand by over 32 megawatts. In 2008 that rose to over 35 megawatts and in 2009 over 50 megawatts. The Cooperative continues to look for potential new program offerings and anticipates achieving the 2015 savings targets and reducing its peak demand by 52 megawatts.

3.3.3 Delaware Municipal Electric Corporation

The Delaware Municipal Electric Corporation, which manages energy supply for the nine municipal electric companies, encourages and promotes energy efficiency through load control, customer education, training programs and platforms such as:

- Energy Depot, a web based program, offering free online tools and resources designed to help consumers conserve energy and manage their home electric use
- Energy Audits
- CFL Campaigns

DEMEC is currently working with consultants to improve customer demand side management participation for all the municipal utilities. DEMEC plans to have a load control pilot program up and running by Spring of 2011.

DEMEC is currently designing community-wide energy efficiency programs such as LED street lighting conversions in all communities.

3.4 Electric Efficiency Programs in Other States

State energy efficiency and conservation goals and their related benefits have caused states and their utilities to consider efficiency programs and to set aggressive goals to help achieve the economic, environmental and societal benefits. Nearby states, including New Jersey, Pennsylvania, Maryland and Virginia, have established energy efficiency goals, although by different mechanisms. Table 1 shows the approaches that several states have taken to promote energy savings.

Table1: Energy Efficiency Targets in Other States

State Jurisdiction	Energy Efficiency Goals	Comment
New Jersey	Executive Order 54, June 2007 authorized, but did not require, the BPU to adopt an EEPS. Permitted savings targets up to 20% by 2020.	Target is relative to projected 2020 consumption and not yet implemented.
Pennsylvania	PA Act 129, October, 2008, 1% of 2009-2010 retail sales by May 2011 and 3% by May 2013. Peak Demand reduction of 4.5% by May 2013	Applicable to each distribution company with over 100,000 customers. PSC sets targets beyond 2013. Penalties not less than $1 million and not more than $20 million. Companies need 8%

		renewables after 15 years.
Maryland	Senate Bill 205 in March 2008 15% per capita consumption and peak demand reduction by 2015, based on 2007 data	PSC to adopt by regulation or order. Each utility must provide 10% with State Energy Office responsible for 5%.
Virginia	House Bill 3068 provides for 10% voluntary reduction 2006 thru 2022.	For renewable energy, VA adds a 2% return premium on achieving a 12% by 2022 renewable energy goal.
District of Columbia	D.C. Energy Act in June 2008 Created Sustainable Energy Trust Fund and authorized SEU with 5 year contract to reduce peak demand and per capita consumption	No specific targets have been established.
New York	EEPS requiring 15% reduction by 2015. Administered by State's IOUs and NYSERDA. Gas targets are 4.34 Bcf thru 2011 and 3.45 Bcf annual thereafter	Goal is relative to projected use and funded by System Benefit Charge
California	Legislation Sept 2004 requiring 23 billion kWh and 4.9 million kW savings through 2013. Revised in 2007 to 1,500 MW peak and 7,000 Gigawatt-hour savings over 3 years. Natural Gas goal is to save 150 million therms.	Latest targets equivalent to 2.6% of retail sales.
Texas	First State in 1999 to set EERS targets of 10% reduction. 2007 increased targets to 15% by 2008 and 20% by 2009.	Provides for utility incentive for outperforming targets.
Connecticut	June 2005 added a Class III RPS requirement of 1% 2007, 2% 2008, 3% 2009, and 4% 2010.	Class III renewables include Energy Efficiency and Combined Heat and Power.
Oregon	Energy Trust of Oregon has energy savings goals between 2010 and 2014 of 256 average megawatts (2,242.6 GWh) of electricity and 22.5 million annual therms of natural gas.	Electric targets are equivalent to 0.8 percent of 2009 electric sales in 2010, ramping up to 1% in 2013 and 2014. The natural gas targets ramp up from 0.2 percent of 2007 natural gas sales to 0.4 percent in 2014.

Depending on the particular state goals and the resources available, achievement of state energy savings goals has varied from below expectations to some significant progress in states such as Vermont, New York and Oregon. Maryland's programs, occurring predominantly

through the Investor Owned Utilities (IOUs), have reported recent performance below expectations, but utility efforts were only recently started (early 2010) and program rollout has been slower than anticipated. Maryland's utilities will file revised program proposals with the Maryland Commission this fall seeking to accelerate energy reductions. Pennsylvania has relatively lower savings targets, but helps to demonstrate how the relationship between savings targets and compliance payments can have significant impact on achievement of savings targets. Similarly, performance incentives can also have significant impact on achieving targets within a specific timeframe, as seen in Vermont and California. According to the American Council for an Energy Efficient Economy, twenty-four states, double the number from 2006, have long-term energy efficiency targets and are promoting new energy efficiency programs. Those twenty-four states deliver over half the retail electricity produced in the U.S. and under current policies should save nearly 6% of total retail sales by 2020.[11]

3.4.1 Efficiency Vermont

In terms of energy efficiency achievement, Efficiency Vermont stands out as a premier example of what can be accomplished with programs effectively designed to help consumers save energy and lower costs. Efficiency Vermont was the first ratepayer-funded electric energy efficiency utility providing energy efficiency services statewide. Efficiency Vermont is operated as a private nonprofit organization under contract to the Vermont Public Service Board. It works directly with business operators, homeowners and renters to reduce energy costs while also working with retailers, architects, builders and contractors to provide energy efficient products and services. Started in 2000, Efficiency Vermont has saved participating businesses and homeowners more than 660 million kilowatt-hours of energy.[12]

Efficiency Vermont has specific energy (kWh) and peak demand (kW) savings targets. In its contract for 2009-2011, energy savings goals are 360,000 MWh savings, 51.2 total summer peak MW savings, and 54 total winter peak MW savings. The projected MWh savings amount to 5.6% of 2008 sales.[13]

According to the 2009 Annual Report, Efficiency Vermont and its customers have created 660,000 MWh of electric savings or approximately 11% of its 2007 retail sales. The cost for these savings has been estimated at around $0.035 per kWh, considerably less than Vermont's $0.125 average residential energy charge. These efforts have been funded by a percent of sales energy efficiency charge that currently provides approximately $35 million annually. The benefit charge structure approved for 2011 by the Vermont Public Service Board is variable by customer class, kilowatt-hour sales, and demand charges.[14] Residential customers pay $0.00918/kWh; Commercial customers pay $0.00808/kWh; and Industrial customers pay$0.00665/kWh.[15] A typical 800 kWh residential customer will see an approximate $7.34 per month charge on their bill, versus the maximum average residential charge of $0.58 per month permitted by Delaware's EERS statute.

[11] American Council for an Energy-Efficient Economy, "Spotlight on State and Communities," August 18, 2010.
[12] Efficiency Vermont, http://www.efficiencyvermont.com/pages/Common/AboutUs/
[13] ACEEE State Energy Efficiency Database. http://www.aceee.org/sector/state-policy/vermont#Energy%20Efficiency%20Resource%20Standards
[14] Vermont Public Service Board, http://psb.vermont.gov/utilityindustries/eeu/generalinfo/currentEECrates
[15] http://psb.vermont.gov/utilityindustries/eeu/generalinfo/currentEECrates

3.4.2 Efficiency Maine

Efficiency Maine is another example of an independent administrator of state efficiency programs. And while not similarly situated to Delaware, most recently, Maine approved a three year $188 million budget to meet 6.6% of the state's 30% savings target over the next ten years. As part of that program, Efficiency Maine proposed a gradual funding increase to $0.08 per day, or about $30.00 per year per residential customer. Prior to that, according to a recent ACEEE review Efficiency Maine had an annual budget of $20.8 million funded by RGGI, stimulus dollars and a system benefit charge averaging $0.0003 per kWh. In prior years an average 800 kWh per month customer would have paid about $3.00 per year

Efficiency Maine's budget for natural gas efficiency was approximately $400,000. Maine does not have specific demand reduction targets, but includes demand reduction strategies in its conservation programs as a means of reducing electricity costs for consumers.

3.5 Natural Gas Efficiency Programs in Other States

According to the American Gas Association ("AGA"), there are currently thirty-eight states in the U.S. where some form of natural gas energy efficiency programs exist. Of the natural gas energy efficiency programs in existence today, over half of the programs have been in service or existence for less than ten years. Despite this trend and unlike the growth trend in electric demand, the average natural gas use per residential customer has been trending down in the U.S. for over thirty years. While the most active and robust natural gas demand side management ("DSM") programs have been in the Northeast, California, and the Northwest, increasingly, natural gas energy efficiency programs are being expanded in the Midwest due to the passage of energy efficiency resource standards in several states.

As with electric DSM portfolios, natural gas DSM portfolios address savings opportunities for the residential, commercial and industrial sectors, and in many jurisdictions are delivered in a combined joint-delivery offering, thereby presenting to customers both electric and natural gas savings opportunities. Predominant end-uses addressed through natural gas DSM measures include space heating, water heating, weatherization measures, food-service, commercial processes, etc. Like electric DSM programs, natural gas programs are generally required to pass either the total resource cost test, or a variant (e.g. societal cost test, utility cost test). Generally speaking, it is more expensive and difficult for natural gas utilities to achieve DSM savings, compared to electric utilities seeking electric savings. This is especially relevant given today's low natural gas prices, which reduce the available list of cost-effective DSM measures. As such, energy efficiency standards for gas utilities have historically been lower than electric energy efficiency standards.

A benchmarking study of natural gas energy efficiency programs of fourteen Northeast and Midwest programs (2007) completed for the Maine Public Utilities Commission (issued in January 2010) highlights comparative program delivery costs and savings. [16]

[16]Gunn & Galvin, 2009. Summary Report of Recently Completed Potential Studies and Recommendations for Maine's Energy Efficiency Programs. Submitted to The Maine Public Utilities Commission (January 22, 2010). Prepared by Summit Blue Consulting, LLC.

Table 2: Benchmarked Natural Gas DSM Programs

Utility/Agency	State
Northeast	
Berkshire Gas	VT
Connecticut Energy Efficiency Fund (CEEF)	CT
National Grid	MA
Northern Utilities	NH
NSTAR	MA
Unitil	ME
Vermont Gas	VT

Utility/Agency	State
Midwest	
Black Hills Energy (formerly Aquila)	IA
CenterPoint Energy	MN
Interstate Power & Light	IA
Interstate Power & Light	MN
MidAmerican Energy	IA
Wisconsin Focus on Energy	WI
Xcel Energy	MN

The median result for natural gas DSM spending, savings, costs, and energy costs over all customer sectors was reviewed for organizations based on calendar year 2007 results. The cost to achieve commercial first year savings (annual savings/first year cost), is approximately $18/Mcf for commercial programs and approximately double for residential programs at $39/Mcf, which generally highlights that more cost-effective opportunities for natural gas savings exist primarily in the commercial sector. For the Investor Owned Utilities (IOUs) and agencies reviewed, the scatter plot in Figure 1 below illustrates where each organization falls relative to median natural gas savings and median costs.

Figure 1: 2007 Natural Gas Savings as % of Sales and First Year Costs ($/MCF)

In contrast, in 2009, the American Council for an Energy-Efficient Economy (ACEEE) reported the utility cost to save energy in natural gas utility programs as an average of $0.37 per therm ($0.27 to $0.55 per therm), based on a six state study.[17]

While there are some natural gas utilities achieving greater than one-percent (1%) savings as a percent of sales on an annual basis, the benchmarking study indicates only those utilities with years of experience and significant ramp-up time achieve these higher savings results.

For the most part, gas efficiency programs are ancillary to electric energy efficiency programs. As for nearby state programs, the ACEEE website notes little direct gas activity. The Maryland Legislature charged the PSC to incorporate gas efficiency as part of the EmPower Maryland strategy, but left the approach open until 2012. BGE and Washington Gas provide service throughout the major metropolitan area and both offer standard programs around

[17]Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs, ACEEE Report U092, by Katherine Friedrich, Maggie Eldridge, Dan York, Patti Witte, and Marty Kushler, September 2009, page 4. http://www.aceee.org/search/node/cost%20of%20energy%20efficiency

weatherization, EnergyStar® appliances and some commercial retrofit programs. New Jersey's Clean Energy Program boasts of 489,724 decatherms savings in 2008, but savings are the result of similar weatherization and appliance programs as well as promotions for CHP installations. Outside of the normal energy efficiency programs, there were no gas specific programs that the Workgroup could identify in nearby states.

3.6 Electric Efficiency Provides Demand Response

Energy efficiency is defined by statute as, "a decrease in consumption of electric energy or natural gas or a decrease in consumption of electric energy or natural gas on a per unit of production basis or equivalent energy efficiency measures that do not cause a reduction in the quality or level of service provided to the energy customer achieved through measures or programs that target consumer behavior, or replace or improve the performance of equipment, processes, or devices. …."[18] Since the efficiency reduction in energy use sometimes takes place during peak energy use hours, the efficiency may contribute to reducing peak demand during those times. The Center for Energy and Environmental Policy reviewed various sources of information, including a 2009 report from the Energy Information Administration and provided the following data on demand reduction resulting from utility-administered energy efficiency programs.

Table 3: Estimated Demand Reductions from Energy Efficiency

Utility	Demand Savings Ratio (MW per GWh)
Pacific Gas & Electric Co	0.16
Southern California Edison Co	**0.2**
Connecticut Power & Light Co	0.16
United Illuminating Co	**0.16**
Long Island Power Authority	0.15
PacifiCorp	**0.19**
Northern States Power Co	0.3
City of Seattle	**0.12**
Austin Energy	0.37
MidAmerican Energy Co	**0.21**
Interstate Power and Light Co	0.25
Nevada Power Co	**0.26**
Sierra Pacific Power Co	0.3
Mean	**0.22**

[19]

[18] Title 26, Chapter 15, Subchapter 1501 (18)

[19] Adapted from "Delaware's Energy Efficiency Potential and Program Scenarios to Meet its Energy Efficiency Resource Standards", Dr. Lado Kurdgelashvili, January 12, 2011, Slide 26. Sources: ASES 2007, ACEEE 2007, ACEEE 2008, ACEEE 2009, ACEEE 2010a

Assuming achievement of the 2011 and 2015 energy efficiency goals and a range of 0.12 to 0.37 megawatts of demand reduction per gigawatt-hour, the spillover effect from efficiency to peak demand savings could range from 28 megawatts to 87 megawatts in 2011 and 213 megawatts to 658 megawatts in 2015[20]. The EERS peak demand reduction goals are 52 megawatts and 392 megawatts in 2011 and 2015, respectively; Delaware's concentrated efforts on energy efficiency programs could achieve between half to more than the full targeted peak demand savings without any further expenditures on demand reduction program.

[20] 2011 reduction goal of 237 GWh x 0.12 peak shaving/GWh = 28 MW

4.0 Delaware's Energy Efficiency Resource Standards Savings Targets

Title 26, Chapter 15 of the Delaware Code, also known as "The Energy Efficiency Resource Standards Act," established electric and gas energy savings goals for each affected energy provider in the State, created a diverse Workgroup to review key issues, and charged the Workgroup to complete a study to determine the feasibility and impact of pursuing EERS goals for the affected energy providers in Delaware. This chapter of the report identifies the savings targets required by the statute.

4.1 Target Definition

The statute specifically requires that each affected energy provider[21] shall achieve a minimum percentage of energy savings according to the following requirements.

> (1)"For each affected electric energy provider, energy savings that is equivalent to 2% of the provider's 2007 electricity consumption, and coincident peak demand reduction that is equivalent to 2% of the provider's 2007 peak demand by 2011, with both of the foregoing increasing from 2% to 15% by 2015."[22]
>
> (2)"For each affected natural gas distribution company, energy savings that is equivalent to 1% of the company's 2007 natural gas consumption by 2011, increasing to 10% by 2015."[23]

The Workgroup identified three different ways to interpret the statute requirements:

1. Targeted electricity consumption and peak demand savings would be 15% of the 2007 actual consumption and peak demand (10% for natural gas consumption).
2. Targeted electricity consumption and peak demand savings would be 15% of the projected 2015 electric consumption and peak demand (10% for natural gas consumption).
3. Targeted electricity consumption and peak demand savings would be those savings that are necessary to hold electricity consumption and peak demand 15% below the actual 2007 consumption and peak demand. (10% for natural gas consumption).

Each of these proposed approaches resulted in different savings targets and both two and three would be heavily dependent on the expected energy growth patterns through 2015. In addition, the statute permits adjustments "to account for changes in weather, population

[21] Affected Energy Providers include electric distribution companies, rural electric cooperatives, municipal electric companies and natural gas distribution companies serving Delaware customers. Del. C. Title 29, Chapter 15, §1501(2).

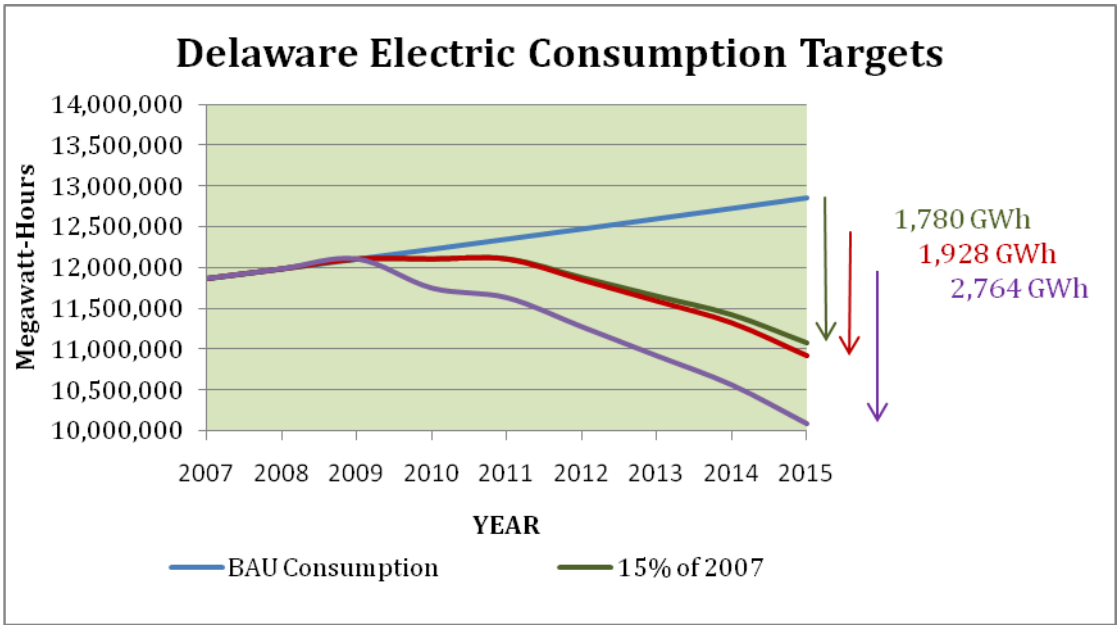
[22] Ibid, §1502(1).

[23] Ibid.§1502(2)

previously enacted and deployed demand side management and energy efficient programs by an affected energy provider since the 2007 base year, or other variables."[24]

Figure 2, below, shows the potential savings targets for Delaware electric consumption under the three approaches. Under a Business-As-Usual (BAU) case, reflecting a 1% growth rate, Delaware electric consumption would be expected to grow to 12,852 GWh by 2015. Under Option 1 and regardless of the expected growth rate, a targeted savings reduction equal to 15% of 2007 actual consumption would require an energy savings of 1,780 GWh. Option 2, a 15% reduction of projected 2015 consumption, would require a savings of 1,928 GWh. Option 3, a savings to hold consumption at 15% below 2007 levels would require 2,764 GWh of savings.

Figure 2: Potential Electricity Savings Targets



After much discussion and review, the Workgroup recommended Option 1 as the best interpretation of the statute. Option 1 was a literal interpretation of the statute and provided a fixed savings target for which efficiency and peak demand programs could be developed. Option 2 and 3 savings targets would vary depending on actual growth levels, would require affected energy providers to achieve a moving savings target, and would be much more difficult for program planning. While the 1,780 GWh savings target is the lowest amount of the three options, it provides transparency and regulatory certainty by being independent of projected energy consumption growth rates.

4.1.1 Delaware's Baseline

In 2007, Delaware electric consumption was 11,868,810 megawatt-hours.[25] Delaware's electric peak demand was 2,613 megawatts. Delaware's natural gas consumption was

[24] Ibid, §1504 (a)(3)(b)

18,014,795 Mcf (thousand cubic feet).[26] Using these consumption and peak demand numbers as a baseline, the statute's percent savings goals could be established. The percentage goals could be allocated to each company based on their individual 2007 performance.

4.1.2 Baseline Adjustments

The Statute provides that the Secretary, with the cooperation of the affected energy providers, may make adjustments to the 2007 base year to account for weather, population or previously enacted programs.[27] The Workgroup generally agreed that base year 2007 adjustments were not needed to calculate the expected savings targets.

4.2 Electric Energy Efficiency Savings Targets

Reducing energy consumption to meet targeted savings will require added emphasis on existing and new energy efficiency programs. Based on actual 2007 electric consumption, the affected energy providers would have the following savings targets.

Table 4: Electricity Efficiency Resource Standards Targets

ELECTRICITY EFFICIENCY RESOURCE STANDARDS TARGETS			
ELECTRIC SERVICE PROVIDER	2007 CONSUMPTION MEGAWATT-HOURS	2011 - TWO PERCENT GOAL REDUCTION MEGAWATT-HOURS	2015 -FIFTEEN PERCENT GOAL REDUCTION MEGAWATT-HOURS
Delmarva Power & Light Co.	8,860,357	177,207	1,329,054
Delaware Electric Cooperative	1,162,644	23,253	174,397
Delaware Municipal Electric Corporation	1,845,809	36,916	276,871
TOTAL	11,868,810	237,376	1,780,322

The Delaware Municipal Electric Corporation includes the Town of Clayton, City of Dover, Lewes, Middletown, Milford, New Castle, Newark, Seaford and Smyrna.

4.3 Natural Gas Energy Efficiency Targets

Natural gas energy efficiency programs have historically concentrated on weatherization and appliance efficiency upgrades; however, programs that encourage switching from electric, propane or fuel oil to natural gas offer significant efficiency and environmental benefits. To

[25] Delmarva Power, Delaware Electric Cooperative, Chesapeake Utilities data as provided by the Utilities, Municipal data provided from the Energy Information Administration, EIA data,

[26] Ibid, Utilities and EIA data.

[27] Title 26, Chapter 15, Section 1504(a)(3)

achieve the targeted savings, natural gas service providers may have to broaden program offerings to include fuel switching and CHP savings.

Based on 2007 consumption, excluding Eastern Shore Natural Gas wholesale transport and gas consumed to generate electric power, the affected energy providers would have the following savings targets.

Table 5: Natural Gas Efficiency Resource Standards Targets

NATURAL GAS EFFICIENCY RESOURCE STANDARDS TARGETS			
GAS SERVICE PROVIDER	**2007 CONSUMPTION 1000 CUBIC FEET (Mcf)**	**2011 - ONE PERCENT GOAL REDUCTION 1000 CUBIC FEET (Mcf)**	**2015 -TEN PERCENT GOAL REDUCTION 1000 CUBIC FEET (Mcf)**
Chesapeake Utilities	4,652,207	46,522	465,220
Delmarva Power	20,713,658	207,137	2,071,3,66
TOTAL	25,365,865	253,659	2,536,587

4.4 Electric Peak Demand Reduction Targets

Almost all utilities have had peak demand programs in place before deregulation. In the 2007 base year, most utilities had some level of peak demand reduction in operation during the summer timeframe and 2007 actual consumption data reflect the utilities' peak demand as reduced by the programs (restricted demand). Based on actual 2007 electric peak (restricted demand), the affected energy providers would have the following savings targets.

Table 6: EERS Peak Demand Targets

PEAK DEMAND RESOURCE STANDARDS TARGETS			
ELECTRIC SERVICE PROVIDER	**2007 PEAK DEMAND MEGAWATTS**	**2011 - TWO PERCENT GOAL REDUCTION MEGAWATTS**	**2015 -FIFTEEN PERCENT GOAL REDUCTION MEGAWATTS**
Delmarva Power & Light Company	1892	38	284
Delaware Electric Cooperative	345	7	52
Delaware Municipal Electric Corporation	376	8	56
TOTAL	2,613	52	392

For the smaller municipal electric companies, managing peak demand is a function guided by the Delaware Municipal Electric Corporation (DEMEC). DEMEC is a joint action agency and an electric utility that represents and serves the utilities of nine Delaware cities and towns: Newark, New Castle, Middletown, Clayton, Smyrna, Dover, Milford, Seaford and Lewes. Collectively they serve over 100,000 residents and businesses in their respective communities. To avoid placing an undue hardship on the individual municipal utilities and in an effort to allow the municipal utilities to benefit from some of the same economies of scale which Delmarva Power and Light and the Delaware Electric Cooperative currently enjoy, DEMEC, not the individual municipal utilities, should be considered a single aggregated municipal utility for purposes of reducing peak demand. With DEMEC as the designated aggregate utility, the municipals can work more efficiently toward supporting the state goal while minimizing the costs to the ratepayers. The Workgroup agreed that DEMEC should be the affected energy provider for its members.

4.5 EERS Target Summary

The statute specifies the need to "create quantitative annual reduction targets in EERUs, which are consistent with the percentage reduction goals of the EERS."[28] EERUs or Energy Efficiency Resource Units are defined in the statute as "1 kilowatt-hour of electricity demand reduction relating to demand side management programs, 1 kilowatt of electricity demand response, or 1 decatherm of reduced natural gas consumption, or an equivalent energy efficiency measure."[29] Based on the definitions in the statute, the 15%/10% savings goals can also be described in energy efficiency resource units and would be consistent with the statutorily defined savings targets.

Table 7: EERS Targets Expressed in Energy Efficiency Resource Units

Energy Efficiency Resource Units (EERUs)			
	Electric Consumption	**Peak Demand Reduction**	**Natural Gas Consumption**
2011 Energy Target	237,376 MWh	52MW	253,659 Mcf
2011 EERU Target	237,376,000 EERUs	52,000 EERUs	260,254 EERUs*
2015 Energy Target	1,780,322 MWh	392 MW	2,536,587 Mcf
2015 EERU Target	1,780,322,000 EERUs	392,000 EERUs	2,604,289 EERUs*

* 1 Mcf = 1.02669 Decatherms @ 1,026 BTU per cubic foot

Creating quantitative reduction targets for 2011 and 2015, based on definition, complies only partially with the statute requirements. The statute requests "annual" reduction targets, but

[28] Title 29, Chapter 15, §1502(c)(3)

[29] Title 29, Chapter 15, §1501(13)

the Workgroup was reluctant to set annual targets, instead relying on the specified 2011 and 2015 statute targets. The Workgroup felt annual savings targets created artificial goals that could be over or under in any given timeframe and it would be better to concentrate on the specific statute targets than manage to an annual level.

5.0 Estimating the Costs, Benefits, and Available Funding for the EERS Targets

5.1 Estimates of the Necessary Investments to Meet the EERS Targets

5.1.1 Cost estimates

The implementation investments necessary to achieve the EERS targets remain uncertain. Estimated implementation costs are highly dependent upon assumptions and market design. There are two useful definitions of cost that are used to estimate the cost of energy efficiency programs. One is the total upfront investment necessary to achieve a given efficiency reduction ("total spending"). Another commonly used definition in the energy utility industry is the "levelized cost of energy," which is the level of annual payment necessary to recover the total investment and interest payments over the life of a measure. The American Council for an Energy-Efficient Economy (ACEEE) terms this "Cost of Saved Energy" (Friedrich et al. 2009[30]). The levelized cost of energy enables the direct cost comparison of energy efficiency with other energy sources. It is important to determine the total spending needed for efficiency programs to see what upfront funding is needed, but equally important to compare the cost effectiveness of energy efficiency with other traditional sources.

Two recent ACEEE reports analyze and compare energy efficiency programs studies of 14 states (Friedrich et al. 2009[31]; Kushler et al. 2009[32]). ACEEE gathered data on electric energy efficiency program costs from 14 states — California, Connecticut, Iowa, Massachusetts, Minnesota, Nevada, New Mexico, New Jersey, New York, Oregon, Rhode Island, Texas, Vermont, and Wisconsin. ACEEE also gathered data on natural gas energy efficiency program costs from 6 states — California, Connecticut, Iowa, New Jersey, Oregon, and Wisconsin.

The experiences in the 14 states were used to estimate the levelized cost of energy for efficiency programs. Electric energy efficiency has a levelized cost of 1.6¢ to 3.3¢ per kWh, with an average cost of 2.5¢ per kWh. For comparison, Delaware retail electricity customers paid in 2009 on average 14¢ per kWh for residential, 12¢ for commercial, and 9¢ for industrial.[33] Natural gas efficiency has a levelized cost of $2.77 to $5.65 per Mcf with an average of $3.80 per Mcf. For comparison, Delaware retail natural gas customers paid in 2009 on average $18 per

[30] Friedrich, K. *et al.* Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs. American Council for an Energy-Efficient Economy (ACEEE) Report U092. September 2009.
[31] Friedrich et al. 2009
[32] Kushler, M. *et al.* Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency: Examining Key Factors Associated with High Savings. American Council for an Energy-Efficient Economy (ACEEE) Report # U091. March 2009.
[33] U.S. Energy Information Administration (2010).Average Retail Price for Consumers by Sector and State.http://www.eia.gov/cneaf/electricity/esr/table4.html Averages are for data from the year 2009.

Mcf for residential, $16 for commercial, and $14 for industrial.[34] These levelized cost estimates assume a 5% discount rate and observed average lifetimes of measures that range by state from 9 to 15 years for electric efficiency and 18-23 years for natural gas efficiency.

Table 8: EERS Levelized Energy Cost Comparison

Levelized Energy Costs	Energy Efficiency Estimates	DE Residential Retail	DE Commercial Retail	DE Industrial Retail
Electricity	1.6-3.3¢ per kWh (2.5¢ average)	14¢ per kWh	12¢ per kWh	9¢ per kWh
Natural Gas	$2.77-5.65 per Mcf ($3.80 average)	$18 per Mcf	$16 per Mcf	$14 per Mcf

Data from the ACEEE reports can also be used to estimate the total upfront investment necessary to achieve a given efficiency reduction ("total spending"). The total spending in the 14 states can be divided by the observed amount of energy savings in those states to obtain an estimate of total upfront investment necessary to achieve a given annual energy efficiency reduction. We use this methodology with the same data from 14 states that is summarized above in the levelized cost estimates[35]. We have calculated the annual investments for a 5 year period (2010-2015) and for a 10 year period (2010-2020) for illustrative purposes in Table 9.

Table 9: EERS Upfront Investment Costs[36]

Electricity	15% EERS Target	Annual EERS Cost (5yr period)	Annual EERS Cost (10yr period)	Cost per 1% efficiency savings
Low ACEEE Estimate	$196M	$39M	$20M	$13M
Average ACEEE Estimate	$374M	$75M	$38M	$25M
High ACEEE Estimate	$712M	$143M	$71M	$48M

Natural Gas	10% EERS Target	Annual EERS Cost (5yr period)	Annual EERS Cost (10yr period)	Cost per 1% efficiency savings
Low ACEEE Estimate	$88M	$18M	$9M	$9M
Average ACEEE Estimate	$107M	$21M	$11M	$11M

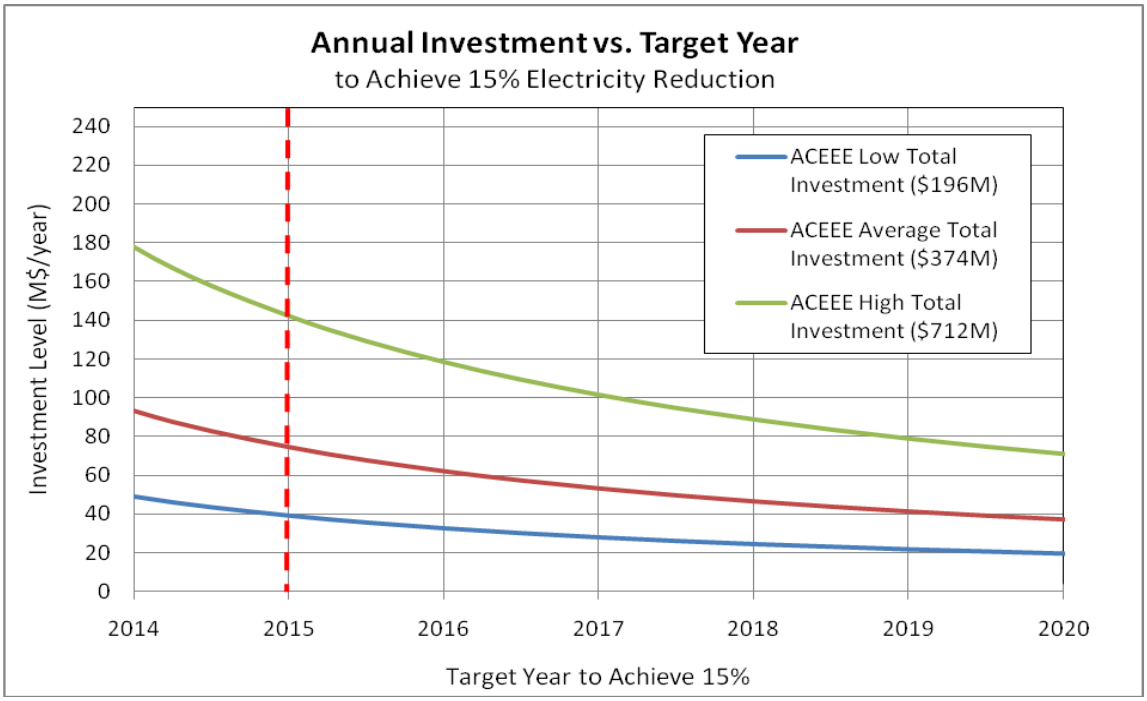
[34]U.S. Energy Information Administration (2010).Average Natural Gas Prices by Sector and State.http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SDE_a.htm Averages are for data from the year 2009.
[35]Kushler et al. 2009; Friedrich et al. 2009
[36] The table identifies the total upfront investment costs to reach the 15 % energy savings target and the cost per year (rounded) if spread over five years (e.g. $196/5 =$39.2) and ten years ($196/10=$19.6).

High Cost Estimate	$137M	$27M	$14M	$14M

Electricity & Natural Gas	**15%/10% EERS Targets (both)**	**Annual EERS Cost (both, 5yr period)**	**Annual EERS Cost (both, 10yr period)**
Low ACEEE Estimate	$284M	$57M	$28M
Average ACEEE Estimate	$481M	$96M	$48M
High ACEEE Estimate	$849M	$170M	$85M

Figure 3 below helps illustrate the tradeoff between implementation costs and time. The figure demonstrates how annual investment varies based on the number of years available to achieve the 15% electricity target.

Figure 3: Annual Investment versus Target Year Achievement



In summary, the total cost of achieving both the 15% electric and 10% natural gas EERS targets is estimated to be in the range of $284-849 Million with an average estimate of $481M. An analysis performed by Dr. Lado Kurdgelashvili from the University of Delaware estimated costs of $337-362 Million, which is within the range observed by the ACEEE analysis of past state experience. To achieve the EERS targets by 2015, the estimated annual investments are $57-170 Million per year, with an average of $96 Million. To achieve the EERS targets by 2020, the estimated annual investments are $28-85 Million per year, with an average of $48 Million.

Another way of summarizing the cost data is that a statistical analysis finds that statewide energy savings of 1%/year necessitate on average an investment of about $18 per person per year or about $1.50 per person per month[37]. The highest rate observed in the analysis was Vermont that saved 1.8% in 2007 with an investment of $37 per person. [38] With Delaware's population, this would be approximately $33M/yr for electricity savings alone to reach the 15% target in 8 years (2018 instead of 2015). This analysis could be repeated for natural gas savings as well, but were not provided in the ACEEE reports.

5.1.2 Uncertainties in the estimates

Cost estimates are highly uncertain. It is important to emphasize that the ACEEE estimates above are based on real life experience of 14 different states over the past several years. Thus, these are not based on assumptions or theories, but rather concrete experience. The lower estimates are not best case, but rather actual experiences of some states. Therefore, it is possible that with better program design and financing, Delaware could achieve energy savings at costs well below the cited "low cost estimate." Moreover, due to the high participation rates required to meet the EERS targets in a short time period, it could also be possible that Delaware would face costs higher than the "high cost estimate." There has been much learned over the last decade of experience with efficiency programs summarized in the ACEEE numbers, and it is reasonable to assume that Delaware will be able to implement the best practices of many of the case study states and thus achieve lower costs than most of the states previously.

Cost estimates are heavily dependent on the financial design of the efficiency programs. For example, direct incentive programs can have much higher costs per energy unit saved than financing programs that are able to leverage private money to achieve energy savings. Green financing is a promising way to achieve lower cost energy savings, and Delaware's Sustainable Energy Utility is uniquely situated to take advantage of this tool. However, to date such mechanisms have been mostly limited to the public sector, and thus a smaller fraction of overall needed energy savings.

Another important point is that promoting and counting fuel switching savings can be a low cost program that can generate significant savings and help defer more expensive programs. The natural gas cost numbers could be significantly reduced due to the counting of fuel switching in the EERS target achievement.

Another uncertainty in cost estimates relates to what types of programs are implemented, in what sectors, and with what participation rates. Often, the high energy saving "low hanging fruit" is achieved early on in programs at lower costs than more expensive or complex energy saving projects that are more marginal in their return on investment ratios. Some of the financing programs may help address this problem by bundling together all types of projects to make them affordable as a packaged investment. In contrast, efficiency programs in Delaware have not had much success previously with the industrial sector, where there is the potential for dramatic efficiency savings with little direct program cost. In the industrial sector, information gaps and management resources are usually the limiting factors to investment activities instead of the upfront capital barrier often found in the residential sector.

[37] Kushler, et al. 2009 p.4.

[38] Note these are the costs for program spending on a per capita basis and not the impact cost to the ratepayer.

5.2 Estimates of the available funds to meet the EERS targets

There are several funding sources available for investing in energy efficiency in Delaware.

5.2.1 Regional Greenhouse Gas Initiative (RGGI)

Delaware is a participant in the Regional Greenhouse Gas Initiative (RGGI) and thus quarterly receives revenue from the carbon dioxide allowance auction. To date, Delaware has received $19 Million from the ten RGGI allowance auctions. By statute, the RGGI funds are distributed as follows: 65% to the Sustainable Energy Utility (SEU), 15% to the low-income consumers through the Weatherization Assistance Program and the Low Income Home Energy Assistance Program, 10% to DNREC, and 10% to Greenhouse Gas Reduction Projects.[39] Therefore, the total SEU allocation to date is about $12 Million. The auctions have raised $7-10 Million annually ($4.5-$6.5 Million annually to the SEU). There is concern that the auctions may continue to decrease in revenue in the future, but it is uncertain.

5.2.2 Federal Funding

Delaware received two large energy grants from the U.S. Department of Energy (USDOE) under the American Recovery and Reinvestment Act of 2009 (ARRA), which must be spent over the time period of 2009-2012. The ARRA State Energy Program grant is $24.2 Million, of which $19 Million is currently sub-granted to the SEU, and $2 Million is supplementing the State's Green Energy Program. The ARRA Energy Efficiency and Conservation Block Grant (EECBG) is about $9.6 Million, which is spent on a combination of over 40 small municipal government projects across the state, as well as on some state facilities. The ten largest local governments in Delaware received individual direct grants from USDOE that total $ 6.32 million. Neither is likely to be appropriated at such levels in the near future.

5.2.3 Energy Efficiency Charge

Section 1505 of the Energy Conservation and Efficiency Act of 2009, provides that the Secretary may impose an energy efficiency charge. The statute requires that the rate of this charge be the same for all rate classes. Further, the statute limits the monthly impact of these charges on residential customers. For electricity, the per kilowatt-hour charge may not exceed a level that would result in an average monthly charge in excess $0.58 per residential customer, and for natural gas a level that would result in an average monthly charge of more than $0.41 per residential customer. The charge would apply to all distribution customers of the affected energy suppliers; thus, it would apply to kWh supplied by third party suppliers and delivered by the affected utilities. As set forth in Table 10 below, these maximum rates would generate approximately $9 million or $45 Million over the 5 year compliance period, based on 2007 sales. Appendix B outlines the assumptions used in calculating the approximate revenue from the maximum efficiency charge. This estimate assumes a flat per kWh and per therm efficiency charge applied to all customer classes on a statewide basis uniformly across all energy providers. Workgroup members emphasize the need for ratepayer education if any efficiency charge is implemented.

[39] Delaware Code, Title 7, Chapter 60, Subchapter II-A, Section 6046

Table 10: Energy Efficiency Charge Estimate

	Rate	Total 2007 Sales	Approximate Revenue ($ millions)
Electric	$0.000605/kWh	11,900,000 kWh	$7.2
Natural gas	$0.006994/therm	260,000,000 therm	$1.8
Total			**$9.0**

In Workgroup discussions, none of the utilities identified any issues regarding the implementation of the energy efficiency charge that would affect the statute as currently written. The utility members of the Workgroup agreed that to the extent any issues arose during implementation of an energy efficiency charge they, either individually or collectively, would pursue any appropriate statute revisions, modifications, and/or other changes that might be necessary.

5.2.4 Financing Mechanisms

The SEU is developing innovative green financing programs that use a variety of financing vehicles to provide capital for both private and public sector efficiency projects. One of the largest funding streams anticipated to support the EERS savings targets is tax-exempt Green Energy Savings Bonds (GESBs) for the MUSH sector. These bonds are repaid through the energy savings achieved under guaranteed energy savings agreements. The SEU plans to issue its first bond this year for state facilities estimated at $35-50 million. Additional green financing vehicles that could be used to support EERS savings targets include Qualified Efficiency and Conservation Bonds (QECBs), tax exempt bonds from for Property Assessed Clean Energy (PACE) initiatives, and co-lending programs that utilize private and public capital for low-interest loans to residents and businesses to finance energy efficiency and renewable energy projects. Compared to traditional incentive based energy efficiency programs, these financing agreements help re-circulate program savings for continued green financing implementation that establishes a long-term self-financing mechanism for energy efficiency.[40]

The total amount of funding available from green financing programs is uncertain at this stage.

5.3 Estimates of the benefits of the EERS targets

5.3.1 Direct benefits to ratepayers from peak demand reduction investments

Reduction of peak electric demand will save money for all customers. Delaware utilities must purchase generating capacity to ensure that they can meet the highest levels of electric demand to provide full requirements supply service to their customers. Because Delaware is in an electrically constrained area, its capacity costs (predominantly from deregulated suppliers), which must be passed along to customers in their rates, are significantly higher than the overall PJM capacity cost. Delaware's reductions in peak electric use would result in lower capacity

[40]CEEP Report, 2010. P. 46

costs, generating savings for customers and further reducing demand pressure for building new generating facilities.

5.3.2 Direct benefits to ratepayers from efficiency investments

The reason one uses levelized cost of energy is to provide an "apples to apples" comparison of the full costs of different energy sources. Doing so ensures that the ratepayers receive the necessary energy services at the lowest cost. It is thus misleading to only look at the "total upfront cost" of efficiency, and important to compare the levelized cost of efficiency to the levelized costs of other energy sources (which are all much more expensive). A simple calculation can show the importance of levelized cost analysis. If the upfront cost of EERS is compared to the savings to the ratepayer from the lower levelized cost, then one sees the following benefit in electricity alone (see Table 11). Table 11 is a simple calculation that investigates the implications of 15% electric efficiency and 10% natural gas efficiency (these numbers represent a rough ballpark estimate). Table 11 subtracts the levelized cost of electric energy efficiency from an average wholesale cost of electricity of 7¢ per kWh to obtain the savings from efficiency (it can be repeated for any value of wholesale electricity). The savings from efficiency are estimated per year for the 15% EERS target value. The same analysis is repeated for 10% natural gas efficiency, using an average wholesale cost of $10 per Mcf.

Table 11: Ratepayer Cost Savings Estimates

Comparing levelized cost of electricity	**Low ACEEE Estimate**	**Average ACEEE Estimate**	**High ACEEE Estimate**
	1.6¢ per kWh	2.5¢ per kWh	3.3 ¢ per kWh
Savings in 1 year	$96 M	$80 M	$66 M
Savings over 5 years	$481 M	$401 M	$330 M
Savings over 10 years	$961 M	$801 M	$659 M
Savings over 20 years	$1.7 Billion	$1.2 Billion	$1.3 Billion
Total Upfront Efficiency Investment	$196 M	$374 M	$712 M
Comparing levelized cost of natural gas	**Low ACEEE Estimate**	**Average ACEEE Estimate**	**High ACEEE Estimate**
	$2.77 per Mcf	$3.80 per Mcf	5.65 per Mcf
Savings in 1 year	$18 M	$16 M	$11 M
Savings over 5 years	$92 M	$79 M	$55 M
Savings over 10 years	$183 M	$157 M	$110 M
Savings over 20 years	$367 M	$315 M	$221 M
Total Upfront Efficiency Investment	$88 M	$107 M	$137 M

What this table shows is that the electricity EERS target has a net benefit to ratepayers within 2-11 years and has a net savings over 20 years of $1.3-1.7 Billion. Similarly, the natural gas EERS target has a net benefit to ratepayers within 5-12 years and has a net savings over 20 years of $221-367 Million.

The Delaware electric rate structure must comply with State statutes. The State's "Electric Utility Retail Customer Supply Act of 2006 required Delmarva Power to conduct integrated resource planning every two years. In its IRP, DP&L was required to systematically evaluate all available supply options during a 10-year planning period in order to acquire sufficient, efficient and reliable resources over time to meet its customers' needs at a minimal cost. Section 1020 of the Act provided that the utility would first consider electricity demand response and demand-side management strategies for meeting base load and load growth needs and would preferentially obtain electricity demand response resources through utility operated programs or demand-side management resources from the SEU or Weatherization Assistance Program.

More recently the Delaware Energy Conservation & Efficiency Act of 2009 declared that energy efficiency is among the least expensive ways to meet the growing energy demands of the State; cost effective energy efficiency should be considered as an energy supply source before any increase or expansion of traditional energy supplies; and the benefits of cost effective energy efficiency include lowered consumer spending on energy, improved regional and local air quality, improved public health, increased electric supply diversity, increased protection against price volatility and supply disruption, improved transmission and distribution performance, and new economic development opportunities.[41] In looking at the cost of efficiency it is important to recognize that the cost for efficiency programs is far lower than the wholesale price of electricity. Once the benefits of efficiency savings are included in utility purchasing contracts, it would be a net savings to the consumer.

5.3.3 Economic development and job creation

The statute requirement for efficiency and peak demand savings will ultimately foster programs and services to help Delaware consumers achieve savings goals and these, in turn, will create new jobs, both direct and indirect. University of Delaware's Center for Energy and Environmental Policy reviewed the potential for job creation based on typical efficiency and peak demand programs and estimated the creation of 12.5 job-years per million dollars of investment.[42] Using the cost estimates of $284-849 Million to achieve the energy efficiency targets, the total jobs created are estimated at around 3,500-10,600 job-years. The White House Council for Economic Advisors released a memo on job creation that estimates $92,000 spent on energy efficiency equals one job-year. This translates to a slightly lower number of 10.86 job-years per $ million and a range of 3,000-9,200 job-years based on the $284-849 Million cost estimate range.

5.3.4 Societal benefits

Additional societal benefits are gained from the reductions in air pollution emissions caused by the EERS target. The average of published estimate of the social cost of carbon is around $50 per ton of carbon (/tC)[43]. However, the estimates in the literature have a large range

[41] Title 26, Chapter 15, Section1500(b)

[42] Delaware's Energy Efficiency Potential and Program Scenarios to Meet its Energy Efficiency Resource Standards, Dr. Lado Kurdgelashvili, January 12,2011, Slide 26. Sources: ASES 2007, ACEEE 2007, ACEEE 2008, ACEEE 2009, ACEEE 2010a.

[43] Klein, R.J.T. et al. (2007). "Inter-relationships between adaptation and mitigation. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the

with a standard deviation of $83 per ton of carbon. The Stern Review found a higher social cost of carbon of $300 per ton of carbon. Reaching the EERS 15% and 10% targets results in annual savings of 1.2 million tons of carbon dioxide, which results in societal benefits of $16 Million (assuming $50/tC) to $100 Million (assuming $300/tC).

A rough approximation of the savings resulting from emissions reductions from sulfur dioxide (SO2) and nitrous oxides (NOx) is one life saved per ton reduced or approximately $5.8 million dollars saved per ton.[44] Reaching the EERS 15% and 10% targets results in annual savings of 5,500 tons of SO2 and 1,600 tons of NOx, which results in societal benefits of $42 Billion (including 7,000 lives saved) per year.

5.4 Economic Impacts of EERS

The economic impacts of the EERS are complicated. There are several important direct positive impacts on the economy. Section 5.3.3 discussed the estimated job creation that would result from the investments in energy efficiency. Moreover, the industries, businesses, and residents that participate in the efficiency programs will significantly save on their energy bills and those savings will result in increased income and profit to be invested and to stimulate the Delaware economy.

However, the potential for increased energy costs from a new energy efficiency charge could have negative impacts on Delaware's economy, particularly given that the State of Delaware has some of the higher electricity rates in the nation.[45,46] These impacts could be felt in the residential sector and in the commercial and industrial sectors in the form of added energy charges that may affect consumer spending or incrementally increase the cost of some goods and services in some sectors. Participants in efficiency programs will benefit from reduced energy bills and all customers should benefit from either reduced or stable rates as utilities pass on the capacity savings to their customers.

The Workgroup did not analyze the impact of implementation and compliance specific to large users, such as major farm, commercial, and industrial customers. The impacts on these users will likely depend on the participation rates in the various efficiency programs, as well as the implementation of combined heat and power and fuel switching. Large users also are often prime candidates for efficiency savings, and could be a primary target for future incentive and financing programs.

Intergovernmental Panel on Climate Change [M.L. Parry et al. Eds."]. Cambridge University Press, Cambridge, U.K., and New York, N.Y., U.S.A.. pp. 745–777.

[44] EPA Report to Congress: The Benefits and Costs of the Clean Air Act 1990 to 2010, http://www.epa.gov/air/sect812/1990-2010/fullrept.pdf; http://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf

[45] http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html

[46] For the year 2010, Delaware had the 14th highest average retail price of electricity for residential and commercial end use sectors. Delaware has the 8th highest average retail price of electricity for industrial end use customers.

6.0 EERS Statute Issues

The EERS statute appears to have several conflicting issues that make it difficult to effectively address many of the key issues requested of the Workgroup. The statute effectively sets savings targets, available funding levels and achievement timeframes with limited consideration for program abilities or levels of achievable participation. The statute further identifies certain managing and reporting responsibilities that are inconsistent with Delaware's current utility structure.

6.1 EERS Feasibility

The statute sets mandatory savings targets, time limits, and efficiency charge limits for the accomplishment of the statute directive. The Workgroup finds that Delaware is unlikely to achieve the legislated efficiency targets given the current and prospective funding levels. Some modification is required in some or all of the following: 1) funding for efficiency investments; 2) efficiency targets; and/or 3) the timeframe to accomplish the targets. See Section 5.0 for more details on the interrelationship of funding, targets, and timelines.

The Workgroup discussed the types of programs and initiatives that would need to be considered to achieve the legislated targets (see Section 7.2). The potential policy changes included broadening program offerings and delivery mechanisms, increasing the energy savings that could count toward energy efficiency, creating new stricter regulations and new pricing structures designed to incentivize energy efficiency, and establishing higher levels of funding to supplement existing programs.

The affected energy providers anticipate that they will be able to achieve the electricity peak reduction targets. As described in Section 5.3.1, reducing peak electric load creates cost savings for all electric customers. [47] In addition and still to be identified are the utility costs to achieve the 15% peak demand reduction. While much of the reduction can be achieved just by implementing energy efficiency programs and taking advantage of a spillover effect[48], there will most likely be a need for specific demand reduction programs to achieve the full target savings. The cost of these programs will depend heavily on the level of technology needed to implement the programs. It can range from low cost load control device programs to more sophisticated pricing and metering arrangements. Since each type of load control program carries differing implementation requirements and each utility elects different programs, generic program costs have not been established. Costs for these programs are typically looked at in a cost/benefit ratio test and it is difficult to estimate an overall cost without knowing the peak demand program content and approach. The total costs associated with reducing the peak to meet state targets have not been fully quantified. However, to provide an example of anticipated costs, Delmarva's 2010 Integrated Resource Plan describes residential and non-residential direct load control programs achieving savings of 47MW and 26.8 MW by 2015, respectively. The report cites program costs estimates of $10.8 million for residential and $2.6 million for non-residential

[47] All demand reduction programs need to be approved by the by the relevant regulatory bodies. Potential delays of programs due to administration, technology, or regulations could impact the achievement of these targets.
[48] Spillover refers to the peak demand reductions that can result from energy efficiency programs, Section 3.6 of this report.

direct load control programs. Both programs have excellent benefit/cost ratios exceeding six to one. [49]

6.2 Accountability Conflict

The Workgroup has identified that the EERS statute, as currently written, has several conflicting directives. The Workgroup recommends that the Legislature make the necessary changes to the legislation to clarify the accountability structure.

6.2.1 Utility versus SEU Responsibility

Titles 26 and Titles 29 of the Delaware Code provide for conflicting responsibility for implementing EERS requirements. Title 26, Chapter 15 requires each affected energy provider to achieve the savings specified in the statute.[50] For the cooperative and municipal utilities, Section 1505(b) states that each individual affected energy provider may determine how best to fund activities necessary to achieve the energy savings goals within its service territory and implement programs as it sees fit.

However, Delaware Title 29, Chapter 80, Subchapter II, Section 8059(b) and (c) creates the Sustainable Energy Utility (SEU) and charges the SEU with designing and implementing energy efficiency programs in the state.

> "(c)(1) This section creates the "Sustainable Energy Utility" ("SEU"). The SEU program through the contractor administrator shall design and deliver comprehensive end-user energy efficiency and customer-sited renewable energy services to Delaware's households and businesses. The SEU shall be unaffiliated with any of the State's electric or gas utilities, public or private, and it will operate through the contract administrators under contract to the Delaware Energy Office ("Energy Office" or "DEO") under the direction of the State Energy Coordinator. The SEU shall be known by a trade name to be determined by the Delaware Energy Office."

The statue directs funding to the SEU to accomplish the energy savings goals under Section 1505(f) and (j). Title 26, Chapter 15, Section 1505(g) goes a step further and prohibits the PSC from approving any regulated utility cost recovery for programs designed to achieve energy efficiency savings.

The conflicting directives in the statute make it unclear who would be accountable for EERS performance results and how the State could develop enforcement mechanisms. Holding regulated affected energy providers responsible for outcomes without any ability to design and administer efficiency programs may create unintended issues.

6.2.2 Energy Efficiency Implementation and Funding

Section 1502 of Title 26 assigns responsibility for achieving the savings targets to Delaware's electric and gas utilities. The utilities must submit a report to the State Energy Coordinator demonstrating that the savings achieved by the affected utility, the SEU and

[49] Delmarva IRP, 2010. http://depsc.delaware.gov/documents/Public%20IRP%20Filing.pdf
[50] Title 26, Chapter 15, Section 1502 (a)

Delaware's Weatherization Assistance Program have met the established targets.[51] However, the electric and gas utilities have no access for funding to support efficiency programs. The possible energy efficiency charges discussed above could generate funds from ratepayers of up to approximately $9 million. Per the legislation, these funds would be remitted to the SEU to support its programs, including the promotion of energy conservation, energy efficiency, energy financing and renewable energy (75%), to the Weatherization Assistance Program (20%) and 5% to the Secretary and DEO to cover the costs of implementing the EERS. The statute provides that "Costs associated with achieving the energy savings goals are not recoverable through Public Service Commission proceedings." [52] In other words, the regulated utilities may not seek recovery of costs from ratepayers through the Public Service Commission.

These overlapping responsibilities and authorities lead to some confusion. If responsibility and funding for energy efficiency programs remains with the SEU, then statewide energy targets should be established to correspond with the statewide focus of the SEU. This would allow the SEU the flexibility to implement the most cost-effective programs to achieve statewide goals. As discussed in Section 7.2.1, if affected energy providers are also permitted to engage in additional or complementary energy efficiency measures, then such programs must be cost-effective for the ratepayers of the utility and additional to the SEU programs. Such programs will also need to have safeguards to ensure that customers are receiving benefits that are proportional to the increased efficiency funding and not paying for the same service twice.

6.2.3 Measuring and Monitoring

By virtue of the Delaware organizational structure, electric utilities would be responsible for measuring and reporting peak demand savings while the SEU would be responsible for reporting energy efficiency consumption savings. Since the SEU programs are statewide, it would be difficult to track and report which utility should get credit for SEU energy savings. In addition, placing the measurement and reporting responsibility on each affected energy provider, as currently mandated, creates a duplicative, potential conflicting, and ineffective approach to ensure compliance. To avoid duplicative monitoring and reporting roles, the Workgroup recommended monitoring and measuring at the state level as opposed to individual utilities. Under this approach the consumption savings would come from the SEU and peak demand savings from the utilities-- if the SEU remains the sole provider of energy efficiency programs.

6.3 Equivalency

Title 26, Chapter 15, Section 1502(c)(2)(k) asks the Workgroup to address the "appropriate level of equivalency for electricity demand response and energy efficiency measures in achieving compliance with the energy savings goals of this section;" In subsection (m) it further asks "Whether the Secretary, by regulation, should permit trading of EERUs, among affected energy providers;" which presumes some equivalency of measure. The statute requires affected energy providers to achieve set percentages of energy savings related to consumption and peak demand without defining measurable units. However, Section 1502 (c)(3)

[51] Delaware Code Title 26, Section 1502(b)

[52] Delaware Code Title 26, Section 1505(g)

asks the Workgroup to "create quantitative annual reduction targets in EERUs, which are consistent with the State's energy savings objectives."

Within the statute definition for EERU there is no equivalency between the measures. The conflict comes when Section 1501 (13) defines the EERU as "1 kilowatt-hour of electricity demand reduction relating to demand side management programs, 1 kilowatt of electric demand response, or 1 decatherm of reduced natural gas consumption, or an equivalent energy efficiency measure." The electric kilowatt-hour, as a measure of consumption, can be related to the natural gas decatherm by virtue of the British Thermal Unit (BTU) heat content measure. One kilowatt-hour ("kWh") of electricity or 1 EERU is the equivalent of 3,412 British Thermal Units ("BTUs") of energy. One decatherm of gas is also 1 EERU, but equivalent to 1,000,000 BTUs of energy.[53] There is no clear correlation between the two measures as the gas measure is over 293.1 times larger than the electric measure on a BTU basis. Therefore, the Workgroup recommends that efficiency units (be they EERUs or Energy Efficiency Credits—EECs) be redefined to a common BTU scale to enable meaningful cost comparisons and possible trading of electric and gas efficiency.

In contrast, 1 kilowatt of electric demand response is a single average measure of demand over a one-hour period and has no heat-energy value relationship with efficiency savings. There is no practical way to establish a joint equivalency among all three measures. However, there is the potential for measure overlap where electric energy efficiency programs provide peak reductions and where peak demand reduction programs sometimes contribute toward energy efficiency. The Workgroup recommends that demand reduction credits are not traded or viewed as equivalent to any metric of efficiency credits. However, when both demand reduction and base energy efficiency savings can be achieved from the same measure or program, then the Workgroup recommends that the program be awarded credits for both the demand reduction and efficiency savings.

[53]To further complicate the issue, many natural gas utilities measure and bill on a cubic foot volumetric basis as opposed to a decatherm heat content basis. In particular, Delaware's affected energy providers bill typical customers on a Ccf or 100 cubic foot basis. Setting natural gas savings targets in decatherms requires an estimate of nominal heat content by volume which can change depending on the source of the gas.

7.0 EERS Goal Achievement

As part of its efforts, the Workgroup was charged with supporting and confirming the energy savings percentages identified for 2011 and 2015 or recommending alternative energy savings percentages if warranted. The affected energy providers agreed that the 15% demand reduction was the utilities' responsibility and they would bear the costs. However, for energy efficiency, there appears to be a resource gap to meet the necessary investments outlined in Chapter 5. Additional policy changes that Delaware may want to consider in order to achieve the 15%/10% targets by 2015 are summarized in Section 7.2.

7.1 EERS Goals and the Achievement Challenge

7.1.1 Energy Efficiency Goals

The Workgroup finds that Delaware is unlikely to achieve the legislated efficiency targets given the current and prospective funding levels and the high participation rates that would be necessary to meet such a short timeline. Modifications are required in some or all of the following: 1) funding for efficiency investments; 2) efficiency targets; and/or 3) the timeframe to accomplish the targets. See Section 5.0 for more details on the interrelationship of funding, targets, and timelines.

7.1.2 Demand Response Reductions

The affected energy providers agreed that the 15% demand reduction was the utilities' responsibility and they would bear the costs.[54] As noted in Section 3.6, demand reductions from efficiency programs may help meet a significant portion of the demand reduction target. With smart meters, smart grid and dynamic energy pricing structures, consumers can be effectively encouraged to shift energy usage to off peak periods of time. Peak demand reductions do not necessarily require reduced consumption, but instead a shift of the time periods during which consumers use energy. Delaware utilities have historically offered demand response programs to help reduce costs during peak loads and while those programs have not been actively promoted until recently, proposed dynamic pricing structures have the potential to make both energy efficiency and peak demand reduction programs more cost/benefit neutral from the utility viewpoint.

Utilities have had significant success in reducing peak demands and getting consumers to shift load to off peak periods. The Delaware Electric Cooperative has achieved impressive results with its voluntary Beat the Peak and Switch and Save programs. As smart meters are teamed up with proposed dynamic pricing structures, it's anticipated that the targeted demand reduction savings for electric may be met, assuming timely approval and implementation of new programs, effective roll-out of equipment and consumer tools and improved consumer education efforts to ensure a better understanding of the process.

[54] All demand reduction programs need to be approved by the by the relevant regulatory bodies. Potential delays of programs due to administration, technology, or regulations could impact the achievement of these targets.

With respect to demand reduction savings targets, the utilities have continued to move forward with various programs all designed to lower peak demand use. Delmarva, the Delaware Electric Cooperative, and the municipal utilities have all been particularly attentive to their peak demand and the ability of lower peak demands to significantly reduce energy costs. Given the programs that are currently in play and the potential for the utilities to extend participation rates with new programs, the Workgroup supports and confirms the statute's peak demand energy savings percentages.

It is also important to note that much of the peak reduction can be achieved just by implementing energy efficiency programs and taking advantage of a spillover effect of many efficiency reductions also causing peak reductions.[55]

7.2 Opportunities to Meet the Efficiency Challenge

The Workgroup identified several opportunities that could be used to move toward the statute's 15% electric consumption and demand goal and the 10% gas consumption goal. Energy efficiency and reduced consumption are the most difficult goals to achieve given the legislated timeframe, as they require certain levels of investment and high voluntary participation levels. While some peak demand reduction programs need little customer involvement, reducing energy consumption requires a consumer commitment to financially invest in energy efficiency and to change their behavior and attitudes toward the consumption of energy. To move toward the statute savings targets, Delaware may want to consider some of the following options.

Please note: These are options that the Workgroup identified, but does not necessarily endorse. The Workgroup offers these options for consideration by the policymakers in the State. All of these programs would require extensive analysis, evaluation, education, and stakeholder outreach.

7.2.1 Increase Funding to Energy Efficiency

1. **Seek additional revenue and leveraging sources for improved and sustainable EE programs**

Chapters 5 and 6 outline the significant resource gap of insufficient funding available to meet the legislated EERS targets. Three opportunities for funding from energy surcharges to be considered are: 1) implement the maximum Energy Efficiency Charge permitted in the EERS statute; 2) increase the Energy Efficiency Charge to a level that adequately supports annual program funding needs; and 3) increase the number of energy efficiency investments under the Green Energy Fund.

The Energy Efficiency charge could be implemented at the maximum allowed funding levels. Some utilities are contributing to energy efficiency and demand side management efforts by virtue of tariff riders or other mechanisms. The Workgroup could examine these numbers and determine if an increase in the energy efficiency charge should be implemented for future programs. Increasing this surcharge beyond the statute's limits or identifying additional and supplemental funding sources will likely be necessary to move towards the statute's 10%/15%

[55] Spillover refers to the peak demand reductions that can be generated by energy efficiency programs, Section 3.6 of this report.

goals. Delaware's Green Energy Fund is currently used to incentivize renewable energy, but could be used to fund energy efficiency and demand side management investments. Currently Delmarva Power and City of Newark electric customers pay Green Energy Fund charges of $0.000356/kWh, while the remaining municipal utilities and the Delaware Electric Cooperative customers are paying $0.000178/kWh).

Funds raised through these mechanisms do not necessarily have to be spent on direct rebates to participants. Consideration also should be given to leveraging some of these funds to support higher investment levels. Leveraging could include using some of the available funds to support bond issuance for other types of financing programs.

2. Review PACE financing program options and consider implementation

Property-Assessed Clean Energy (PACE) financing allows property owners to borrow money to pay for energy improvements. The amount borrowed is typically repaid via a special assessment on the property over a period of years. PACE is a mechanism to provide low-cost, upfront capital for clean energy. Implementation of PACE Programs is often through municipal bond financing. Delaware would need to pass legislation to establish a loan program to provide financing for clean energy improvements to property owners via local ordinance or use existing bonding ability to offer the program. However, PACE has recently faced challenges by mortgage lenders. In order to implement a PACE financing program at this time, the lender would have to take a second or third position on affected properties.

Examples: A half-dozen California cities including Berkeley, San Francisco and San Diego are already committed to developing similar solar financing programs. A handful of states, including Arizona, Texas, New Mexico, Virginia, and Maine have legislation to allow municipal financing.

3. Consider EE programs that permit on-bill financing

On-bill financing provides capital for investments in energy efficiency projects which are repaid through the participant's energy bill. On-bill financing requires, at a minimum, (1) identifying sources of capital for funding projects, and (2) integration with a utility's billing system. Utilities offer on-bill payment in two different ways: through loans or tariffs. Loan repayment stays with the person and tariff repayment stays with the home/meter. When properly designed, the energy savings should more than offset the periodic repayment. Fuel switching programs that permit on-bill financing or other creative rate mechanisms should be considered in this context as well. Implementation of on-bill financing is complex and potentially expensive, and would require close collaboration with any participating energy provider.

Examples: Connecticut and California have the largest on-bill programs. Most are geared toward small businesses and governments. New Hampshire, Hawaii and Kansas have tariff based programs underway. Massachusetts, Connecticut and Rhode Island have used the on-bill financing approach for almost two decades. New York is developing statewide on-bill financing pilot programs to help implement its Energy Efficiency Portfolio Standard.

4. Increase customer education of energy charges on customer bills

Education of customers about both the direct and indirect benefits of energy efficiency is essential to garnering customer support for energy savings initiatives. Energy customers can benefit from increased education on how to read and understand their energy bills, including having a better understanding of what they are charged for. For example, additional charges added to customer bills to fund energy efficiency efforts should be displayed on the customer's bill with an explanatory footnote, rather than rolled into the overall rate or added without explanation. Additionally, separate bill inserts could be required on not less than an annual basis providing customers with information describing the energy efficiency options implemented and their benefits and costs. A collaborative process between the utilities (including the SEU), the Public Advocate, the Public Service Commission, and other appropriate parties to develop such customer education programs should be considered. Customer education programs should provide customers with information on the energy efficiency options available to them, how to apply for such energy efficiency options, and any other pertinent information.

5. Make all EE programs customer inclusive unless opted out

One of the key challenges to achieving the EERS targets is sufficient participation rates in the efficiency programs. Switching voluntary programs to opt-out instead of opt-in increases participation. Another way to increase program participation is to cross-market those programs with other programs that customers are eager to adopt. As Delaware utilities begin to offer such dynamic pricing and programs, it may be appropriate to include efficiency program participation with customer opt-out provisions at the same time as those other changes. All of those programs will require extensive consumer education and outreach. Utilities and the SEU could work together to help secure additional program participants, more energy efficiency and environmental savings.

Examples of mandatory energy efficiency and renewable energy programs: Marin County, CA's Community Choice Aggregation under AB 117, and Duke Energy's Energy Efficiency Program Opt In/Opt Out Provision[56].

6. Consider utility provided EE programs with cost recovery and rate-of-return performance-based incentives

Chapters 5 and 6 outline the significant resource gap of insufficient funding available to meet the legislated EERS targets. Even with the addition of the energy efficiency charge and revolving funds from green financing programs, the state likely will not be able to reach the target goals in the given timeframe. As Delaware strives to be both a leader and innovator in efficiency policy, it must maximize available funding and resources to do so. One possible option to increase available funding for efficiency investments is for Delaware energy utilities to partner with the SEU in funding and providing energy efficiency programs that are complementary to SEU programs or in addition to SEU programs. To acquire sources of capital

[56] Under Duke Energy's Energy Efficiency Plan, industrial customers may elect to opt out of and be exempt from the costs associated with the "conservation" and/or "demand-side management" components of the energy efficiency rider. However, in doing so, the customer will forego the opportunity to take advantage of energy efficiency incentives. For more information visit: http://www.duke-energy.com/north-carolina-large-business/energy-efficiency/nclb-ee-opt-out-provision.asp

sufficient to implement these programs, regulated utilities will need the ability to recover the costs for energy efficiency programs. Delaware could modify legislation to permit rate-base cost recovery, shared savings models, and rate-of-return performance-based incentives for regulated utilities choosing to offer such programs that would be cost-effective for the ratepayers of the utility to benefit from efficiency programs. Oversight will be necessary to ensure the programs are cost-effective for the ratepayers of the utility and additional to the SEU programs. Such programs also will need to have safeguards to ensure that customers are receiving benefits that are proportional to the increased efficiency funding and not paying for the same service twice. Consumer education will also be necessary to provide transparency of the funding sources and explain the various funding sources provided for the different types of energy efficiency programs.

7. Consider a possible linkage between RPS and EE to help meet both goals

The current Renewable Portfolio Standard (RPS) also has aggressive targets of 25% of electricity consumption from renewable energy by 2025 (3.5% of which from solar energy). Delaware is currently challenged to meet the non-solar targets through in-state resources. Until off-shore wind reaches sufficient scale, Delaware is limited in renewable energy opportunities. In contrast, the opportunities for in-state investment in energy efficiency are arguably unbounded, and have the added benefits of in-state economic development, in-state jobs, and in-state benefits to the customers of direct energy savings. Moreover, the average cost of energy efficiency is below the average cost of either fossil fuel or renewable energy. Enabling energy efficiency to be an eligible resource in the RPS will accomplish two goals: 1) low-cost solution to meeting the RPS that also benefits Delawareans directly while also achieving important environmental and energy resource goals; and 2) provide additional funding resources to pay for energy efficiency investments through the provision of Renewable Energy Credits (RECs). Important to this market linkage will be deciding the following issues: 1) sufficient evaluation, measurement, and verification procedures to ensure the quality of efficiency-based RECs in the market; 2) establishment of new overall targets for a combination of efficiency and renewable energy together to avoid double counting; 3) trading equivalency between efficiency and renewable energy; and 4) the administration and oversight of such a new trading program.

7.2.2 Adopt Pricing Structures to Incent Peak Demand Reductions

1. Create and implement new pricing structures that increase incentives for efficiency and demand reduction

Encourage Delaware utilities to offer a dynamic pricing tariff that provides consumers with an effective incentive to reduce peak demand and total energy use. Tariff options should consider hourly dynamic retail pricing, critical peak pricing, and conservation pricing.

2. Increase participation rates in existing program via new/revised pricing structures

Provide incentives or other mechanisms that encourage customers to try new time of use pricing structures as offered by utilities. This could range from various reduced price contracts to incentives tied to trial programs or actual savings achieved.

7.2.3 Broaden the Scope of Energy Efficiency

1. **Include efficiency credit for efficiency gains from CHP, transmission & distribution and other atypical sources.**

Expand suite of programs to include more energy savings opportunities, such as Combined Heat and Power (CHP), transmission and distribution upgrades, higher efficiency generation technologies, building standards, etc. Develop programs to target specific customers or audiences that do not normally participate in programs, such as rental properties and state hospitals that have split incentives.

2. **Provide and include EE credits for oil and propane fuel use reductions**

Many larger customers are switching their fuels on process heat boilers from propane or oil to natural gas where available. This can result in both cost and environmental savings. A program to credit customers for conversions to cleaner fuels can help achieve State goals. Under a broad interpretation, a program designed to get consumers to drive more fuel efficient vehicles could also be considered.

3. **Establish a fuel switching program and promote gas distribution expansion with incentives or shared savings**

Gas used as a direct fuel in many appliances is a more efficient use of energy resources than using it to create electrical energy in the generation process, transmitting it over wires and transforming it for household use. The efficiency improvement is almost 3 fold for direct use. Promoting programs which help expand gas distribution systems for more direct fuel use creates energy efficiency by eliminating the equivalent electrical losses. Utility tariffs that provide for a shared savings could help pay for expansions and help meet State energy and environmental goals.

4. **Establish incentives or promotional efforts to encourage CHP installations**

Combined Heat and Power (CHP) systems are systems that generate useful thermal energy and electricity or mechanical power in a single, integrated system. CHP systems are much more efficient than separate generation of thermal energy and electricity because heat that is normally wasted in conventional power generation is recovered to meet existing thermal demands.

State program examples: Loan programs are run in New Jersey, Connecticut, and the Green Bank of Kentucky. Grants programs are offered in Massachusetts and Ohio. Tax credits and exemptions are available in Arizona and Oregon. Rebates are available in New York and a bond program is offered in New Mexico.[57]

5. **Include renewable generation and clean distributed generation (displacing electric energy use) as potential peak demand reductions**

[57] http://www.aceee.org/sector/state-policy/toolkit/chp/financial-incentives

New renewable generation and other clean distributed generation, while not as cost effective as energy efficiency, provide the same outcome of reduced customer energy usage from the grid and carry with them the associated environmental benefit. Customers who elect to install these facilities are actually providing moderate peak demand reduction that helps hold down costs for all energy consumers. Theoretically, an aggregation of renewable resource installations could be bid into the PJM capacity market to help hold down energy costs. Permitting renewable generation to function as a capacity resource as well as a renewable energy credit would enable additional funding provisions for both renewable energy and demand reduction. However, the magnitude of the beneficial effects of renewable energy and distributed generation on peak shaving is unclear without further analysis.

7.2.4 Establish New Regulations

1. Establish stricter building codes and improve enforcement

Delaware could enact legislation to exceed national building code standards and improve enforcement practices to measure energy savings. The State could expand incentive programs to encourage certifications Leadership in Energy and Environmental Design (LEED) and the National Home Builders Association Green Standard.

Examples: California Green Building Standards Code and Massachusetts Stretch Building Codes both go beyond the 2009 IECC.

2. Mandate energy efficiency investments at point of sale of buildings

A program to mandate energy efficiency improvements prior to building sales or at a minimum to require buyer notification of energy consumption and costs would over time help increase building energy efficiency. Realtors have generally opposed these types of programs as a barrier to property transfers, but they offer opportunity to upgrade building infrastructure.

3. Programs to reduce incandescent lighting and promote alternative lighting products, as well as other potential appliance standards

This measure would require legislation to limit and prohibit the sale of incandescent lighting. In December of 2007, the Energy Independence and Security Act of 2007 requires all general purpose light bulbs that produce 310-2,600 lumens of light be 30% more energy efficiency than current incandescent bulbs by 2012 to 2014.

In addition there are other actions that could be taken to help achieve the target savings. These include adopting stricter appliance standards such as the California TV standard (which will require new TVs to be 49% more efficient by 2013), encouraging video and cable services to supply more efficient Digital Video Recorders and conducting a general behavioral awareness campaign enlisting consumer help to achieve goals.

4. Increase the availability of energy generated from net metering capacity to displace electric energy use and achieve peak demand reductions

As stated in Section 7.2.3 #5, added distributed renewable generation can result in reduced peak demand which could lower capacity requirements and, ultimately, capacity costs for all customers. In recognition of the peak demand reduction benefits of renewable energy and distributed generation, Delaware could increase the availability of net metering options to

customers for renewable and clean distributed generation systems. The sources of fuel that qualify for net metering are consistent with renewable generation and clean distributed generation resources and include: solar, wind, hydro, a fuel cell, or gas from the anaerobic digestion of organic material. There are measures that could be included in legislation that would result in increased options for the development of energy generated from net metering. The two legislative initiatives that could increase the renewable generation and clean distributed generation resources from net metering are as follows: 1) allow all customers of utilities regulated by the PSC to pursue from the Delaware Energy Office or their own regulatory authority a case-by-case exception from the net metering capacity limits as currently allowed for farm customers pursuant to Title 26, section 1014(d)(1)b; and 2) allow new (or incremental) natural-gas-fired CHP capacity to be eligible for net metering for utilities regulated by the PSC. It also should be noted that to the extent a utility regulated by the PSC had distribution delivery service rates that were decoupled from energy consumption charges, there would be no impact on profitability as the same level of revenues from distribution delivery service charges would be achieved regardless of increases in net metering.

8.0 Additional EERS Findings

8.1 Air Pollution and Greenhouse Gas Emission Impacts

The environmental emissions impact of the energy reductions is dependent on the level of energy efficiency and peak demand savings achieved. The estimated PJM mix of electric generation for Delaware indicates a NOx (nitrogen oxides) savings of 1.8 lbs. per MWh, an SO_2 (sulfur dioxide) savings of 6.2 lbs. per MWh, and CO_2 (carbon dioxide) savings of 1,179 lbs. per MWh. Based on the achievement of the 15% electric consumption savings target, Delaware would save 4,485 tons of NOx, 15,447 tons of SO_2 and 2.9 million tons of CO_2 over the five year period.

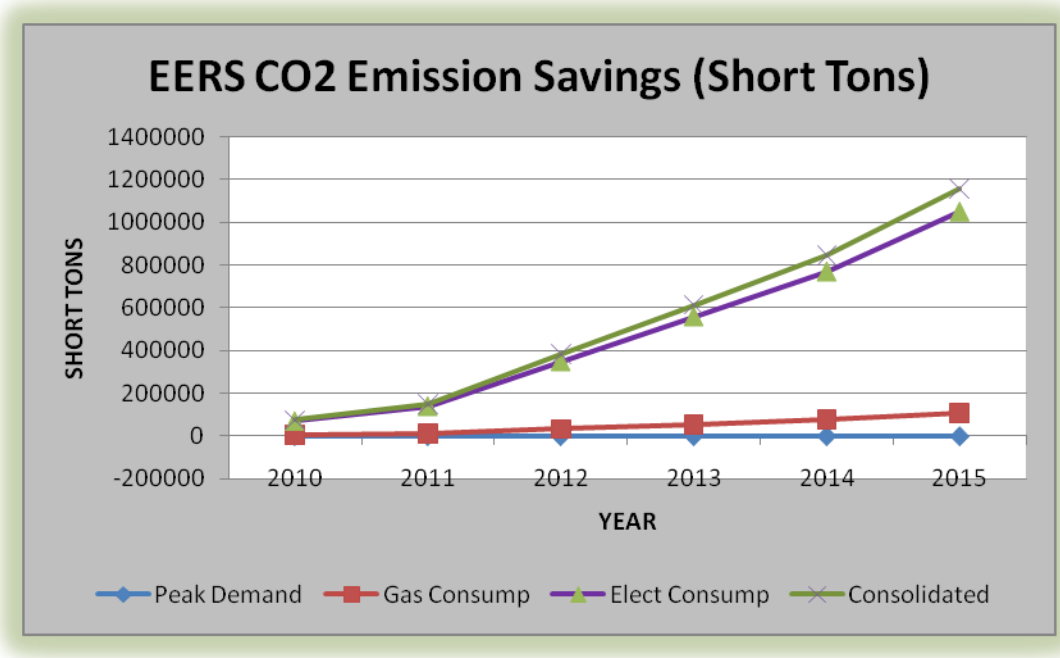
Natural gas consumption offers similar direct savings to electric, but at a much lower level. Achievement of 2015 10% savings targets results in limited to no SO_2 savings, 23 tons of NOx savings and 29,495 tons of CO_2 savings.

Reduction in peak demand can have a different effect. While reducing generation during peak periods reduces emissions, much of that conservation is displaced to other periods of time. Essentially, in PJM one is displacing peak gas fired generation with a normal mix of coal, gas, oil and nuclear. Peak demand reductions can actually increase emissions by a small amount. Assuming achievement of 2015 targets, impacts could result in 4 additional tons of NOx, 17 additional tons of SO_2 and 1,854 additional tons of CO_2. However, it should also be noted that ongoing peak reduction programs help limit the need for additional peaking capacity and new power plant investments, avoiding potential future emission increases.

Looking at the consolidated picture shows that the preponderance of emission savings is derived from the electric consumption reductions. But to also put that savings into perspective, one should compare total estimated emissions to the anticipated savings. Based on the PJM mix of generation and current retail electric and natural gas use, Delaware's business as usual electric generation and gas CO_2 emission for the 2010-2015 time frame are estimated at approximately 45 million tons. With approximately 3 million in savings over that same timeframe, Delaware would be reducing its CO_2 emissions by around 6.5% in achieving EERS savings goals. A concentration of programs on electric energy efficiency and conservation achieves the majority of emission reductions savings. Expansion of natural gas use to displace electric, while perhaps not considered energy efficiency at the point of use, certainly helps to reduce emissions and consumers' energy costs. It should be noted that where a utility regulated by the PSC has received approval for the implementation of decoupling, there is no harmful impact from efficiency programs that encourage expansion of natural gas to displace electricity consumption on revenues and recovery of approved costs. Targeted savings goals less than the statute requirements will result in less emission reductions.

The achievement of efficiency savings targets results in a direct savings in emissions. In terms of total NOx, SO_2 and CO_2 emissions, targeted 15% electric consumption reductions are expected to yield almost 3 million short tons of savings, mostly CO_2 and SO_2. Gas consumption reductions are anticipated to yield approximately 30 thousand tons while peak demand reductions could yield an increase of almost 2 thousand tons.

Figure 4: EERS Carbon Dioxide Emissions Savings



In summary, achievement of the 15% electric consumption savings target would save Delaware 4,480 tons of NOx, 15,427 tons of SO2 and 2.9 million tons of CO_2 over the five (5) year period. Achievement of 2015 10% natural gas savings targets results in 3 tons of SO2 savings, 318 tons of NOx savings and 404 thousand tons of CO_2 savings.

8.2 Electric and Gas Full Cycle Efficiency

The legislation directed the Workgroup to consider the efficiency of the natural gas system relative to other energy alternatives on a full-fuel-cycle measurement basis (from source to point-of-use). Significant amounts of energy can be used or lost along the complete energy delivery path, that is, in the extraction, processing, transportation, conversion, and distribution of energy. The more efficient the complete energy delivery path becomes, the less overall energy production that is required. In addition, the efficiency of end-use equipment affects the total energy requirement. In order to obtain a comprehensive assessment of the total impact of end-use energy applications on energy resources, the full-fuel-cycle, that is the efficiency of the energy path in conjunction with that of the end-use devices, must be examined.

As can be seen in Table 12, below, the natural gas delivery system is the most efficient energy system for delivering raw energy to the home compared to fuel oil, propane, and electric delivery systems.

Table 12: Efficiency of Energy Delivered to the Home[58]

ENERGY TRAJECTORY EFFICIENCY OF ENERGY DELIVERED TO THE HOME[1]

	Extraction	Processing	Transportation[2]	Conversion	Distribution	Cumulative Efficiency
Natural Gas	97.0%	96.9%	99.0%	--	98.8%	91.9%
Oil	96.3%	93.8%	98.8%	--	99.3%	88.6%
Propane	95.9%	95.3%	98.6%	--	99.2%	89.3%
Electricity:						
Coal-Based	98.0%	98.6%	99.0%	32.7%	93.8%	29.3%
Oil-Based	96.3%	93.8%	98.8%	31.7%	93.8%	26.5%
Natural Gas-Based	97.0%	96.9%	99.0%	42.1%	93.8%	36.7%
Nuclear-Based	99.0%	96.2%	99.9%	32.7%	93.8%	29.2%
Other[3]-Based	--	--	--	56.0%	93.8%	49.7%
Electricity Weighted Average[4]	--	--	--	35.8%	--	31.9%

Source: *Source Energy and Emission Factors for Building Energy Consumption*, Prepared by the Gas Technology Institute for the Codes & Standards Research Consortium, August 2009.

"--" indicates not applicable or no efficiency loss.
[1]Efficiency of energy delivered to the home refers to the energy used or lost, from the point of extraction to the residence, not including the end-use device.
[2]Transportation of natural gas from processing plant to local distribution system; transportation of fossil fuel to electricity generating plants.
[3]Includes renewable energy
[4]Current national weighted average mix of all power generation sources.

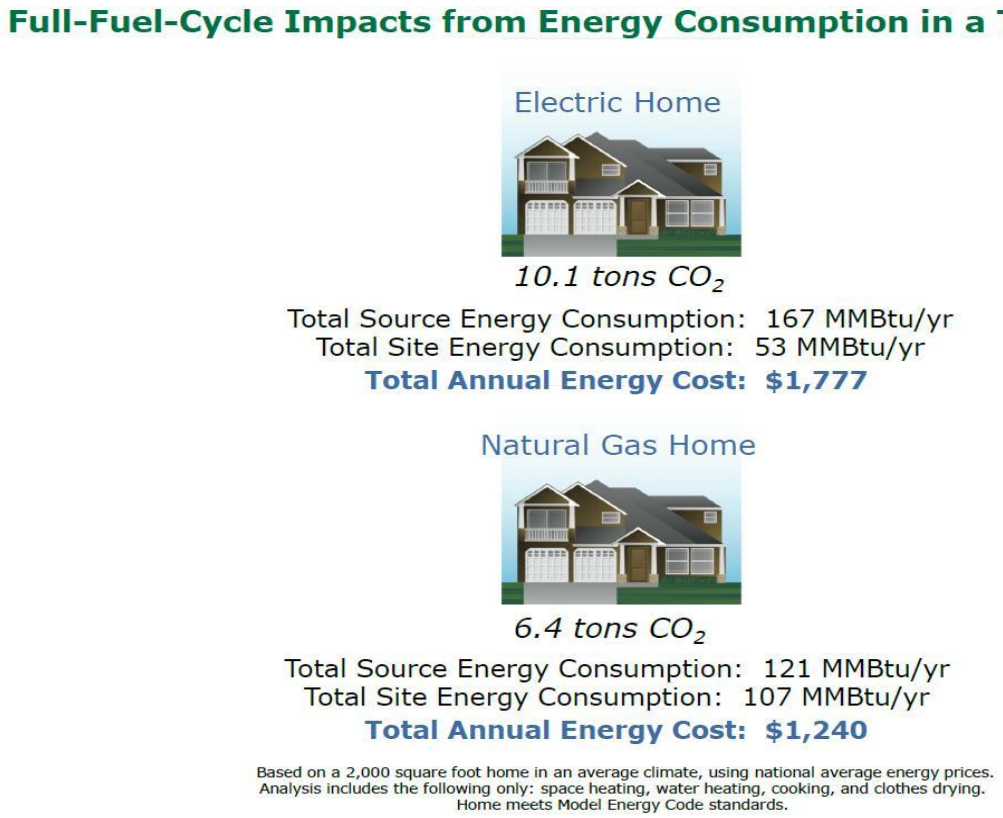
On a full-fuel-cycle energy basis taking into consideration the site use efficiencies, the direct use of natural gas in primary residential appliance applications is the most efficient energy source compared to electricity, propane, and fuel oil on an MMBtu basis. The full-fuel-cycle energy requirement for an average home using natural gas is approximately twenty-seven percent less than for a similar home using electricity, eleven percent less than the similar fuel oil home, and three percent less than the similar propane home. The full-fuel-cycle energy analysis indicates that natural gas is the most efficient energy source taking into consideration the idea that electricity is the most efficient when only considering the end-use energy requirements on site at the home.

Pursuant to the Notice of Proposed Policy ("Notice") issued August 20, 2010, the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy ("DOE") proposed to incorporate full-fuel cycle analyses into the methods it uses to estimate the likely impacts of energy conservation standards on energy use and greenhouse gas emissions as part of its Energy Conservation Standards program.

[58] American Gas Association's Energy Analysis, "A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances" (EA 2009-3, Dated October 20, 2009)

The legislation also directed the Workgroup to address the impact of energy use reductions on carbon dioxide and other greenhouse gas emissions. On a full-fuel-cycle analysis, the direct use of natural gas in new homes improves the environmental footprint of the home compared to the use of electricity, fuel oil, and propane as noted in Table 12 and in Figure 5 below. Natural gas offers a 37% reduction in carbon emissions over electricity and a 16% reduction over fuel oil use.

Figure 5: Full-Fuel-Cycle Impacts from Energy Consumption in a Typical Home[59]



The following table (Table 13) shows by fuel type the carbon dioxide emissions per MMBtu equivalent. As shown, natural gas emits approximately 16% less carbon than propane and approximately 27% less carbon than fuel oil. Carbon emissions for electricity are generally a function of the fuel mix of the generating plants (i.e. coal, natural gas, oil, nuclear, hydro, renewable). More than half of the power generated in the PJM comes from coal-fired generating plants.

[59] American Gas Association's Energy Analysis, "A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances" (EA 2009-3, Dated October 20, 2009)

Table 13: Carbon Dioxide Emissions by Fuel Type

Fuel	Lbs CO_2 per MMBtu
Natural Gas	117
Propane	139
Fuel Oil	161
Residual Oil (No. 6)	174
Coal (Bituminous)	205
Wood	195

In Summary, given the benefits of natural gas and the potential energy savings on a full-fuel-cycle basis, the Workgroup supports the expansion of gas service in all areas of the state and recommends inclusion of fuel switching and gas fired CHP toward energy efficiency savings.

8.3 Trading Energy Efficiency Resource Units

Trading between affected energy providers can offer benefit to individual utilities if compliance is monitored at the affected energy provider level and if early adopters had excess energy savings credits or EERUs for trading. While the legislation defines the measurement of an EERU there is no equivalency established that would provide for uniform trading between a natural gas EERU and an electric EERU. If trading were to be permitted between natural gas and electric providers then an equivalency between the two EERUs must be determined by the Workgroup (Section 6.3).

Another issue to be considered is the need for a trading platform or bulletin board that can facilitate a financial interchange and a funding mechanism to cover the administrative costs for a trading program. This would also require the Workgroup to consider establishing a responsible party to monitor and implement a trading platform.

The Workgroup sees little value at the present time in the trading of EERUs due to the current responsibility of the SEU, but also sees no reason to deny the potential opportunity. The Workgroup recommends the Secretary permit trading in any standard measurable units with value determined between the buyer and the seller.

8.4 Evaluation, Measurement, and Verification

While not a direct requirement for Workgroup review, Section 1504(a)(1) of the statute requires regulations to address measurement and verification procedures and standards. Measuring and validating EERS performance is a key issue for DNREC. Preliminary discussions with the SEU, the utilities and other parties seems to favor a comprehensive Evaluation, Measurement and Verification (EM&V) effort for all energy efficiency and demand

response programs. Delaware is currently participating with the Northeast Energy Efficiency Partnership to develop protocols for measuring and confirming efficiency savings. DNREC anticipates using those protocols to initiate an EM&V process for oversight of SEU and utility efficiency programs.

Since compliance with the EERS statute falls principally on the SEU and the affected energy providers for efficiency programs, it's anticipated that each party will conduct their own EM&V process to confirm their efficiency savings. As part of the regulations, the Secretary may want to require each affected energy provider to submit an annual independent EM&V validation report, confirming the process and result for the reporting year. As an alternative or in addition, the Secretary may want to provide a statewide EM&V oversight which evaluates all parties' programs, identifies appropriate protocols or any deficiencies and confirms measured and reported energy efficiency savings by affected energy provider.

8.5 Step Load Increases or Decreases

The legislation directs the Workgroup to examine the impact on the achievability of the targets in relation to the step load increases or decreases caused by the connection of large, new energy consumers, such as data centers.

The Workgroup agreed that annual reporting would continue to reflect major uncontrollable changes such as weather and population to ensure accurate comparisons to targets. Step load increases or decreases are merely an extension of that concept and could be accounted for in the reporting process.

8.6 Enforcement Mechanisms

While the legislation directs the Workgroup to provide recommendations to the Secretary as to whether or not enforcement mechanisms should be adopted to ensure compliance with the EERS, the Workgroup believes at this early stage in the process it is premature to discuss enforcement mechanisms and suggests revisiting the subject as need arises.

Where there have been regulation compliance mechanisms, they have most often addressed performance issues with some type of compliance penalty (typically referred to as the "stick"). Penalties or "sticks" that are already available for failure to perform include negative press announcements and further regulatory or potential legislative actions. All too often, the beneficial nature of the requirement and the need to achieve the targets loses the "carrot" portion related to superior performance. While the Workgroup recommends deferring the consideration of a compliance mechanism, it would be helpful to make sure that any compliance mechanism recognize the positive value of performance in the regulations and provide an approach that can also reward those affected energy providers that exceed targeted savings. Effective regulation should consider both upside and downside performance risk when attempting to impose compliance behaviors.

8.7 General Unintended Consequences

There could be consequences for the rate of implementation of renewable energy, for fuel switching, and on the most cost effective way to achieve energy efficiency. Assuming an equitable application of any energy efficiency charges, the Workgroup did not see an impact on other suppliers (that is, other than Delaware electric utilities) of electricity. There may also be

consequences around the Delaware energy efficiency organizational structure with conflicting responsibility and how the savings targets are measured/ monitored. These aspects are discussed below.

Energy savings are defined in the legislation as a:

- Reduction in electricity consumption;
- Reduction in natural gas consumption;
- Electricity coincident peak demand response capability; or
- "Equivalent energy efficiency measures" in Delaware from a base year of 2007, calculated on a calendar year basis.

"Equivalent energy efficiency measures" are defined in the legislation as those reductions in the use of fossil fuel other than natural gas or use of other sources of energy not derived from fossil fuel equivalent to a reduction in natural gas consumption or electricity consumption, as defined by the Secretary by regulations pursuant to & 1504 of this title.

Equity: It will be important to ensure that the benefits of energy efficiency, and customers' ability to participate in efficiency programs, are equitably allocated. Generally, wealthier customers can more easily afford the investment participants must make to obtain energy efficiency. Without ensuring an equitable distribution of incentives, wealthy customers would tend to benefit at the expense of lower income customers who are supporting the efficiency programs through their rates but who are not able to participate in the programs. The Weatherization Assistance Program addresses, at least in part, this issue.

Third party suppliers: In order to avoid an unintended consequence, the Workgroup recommends that if an energy efficiency charge is implemented, it apply to all sales of electricity and gas in Delaware, including sales from third party suppliers. It appears that the legislation intends this result. The Workgroup recommends that such a charge be in the form of a non-bypassable surcharge that would apply to sales of electricity and gas from third party suppliers as well as electricity and gas provided by affected electric energy providers; all of the affected electric and gas energy providers' customers would pay the charge, regardless of their source of supply.

Cost effectiveness of energy efficiency in electricity or natural gas: The statute mandates specific energy reduction targets for electricity and natural gas. It could be the case that reductions in one or the other would be more cost effective. The group did not do a detailed evaluation of the relative effectiveness of dollars spent reducing electricity versus gas consumption. One way to avoid putting more effort toward the more difficult-to-achieve energy reduction would be to use BTUs as a universal measurement. Electricity consumption goals could be converted to BTUs[60] and reduction targets could be a percent reduction in total BTUs.

Fuel switching: As noted in Sections 7.2.3 and 8.2, an active fuel-switching program can achieve significant energy savings for Delaware. However, it would be necessary to ensure that such savings were accurately measured and counted as part of the savings targets. Actively promoting fuel-switching programs could have major impacts on other Delaware energy

[60] One kWh equals 3,412 BTU.

providers such as electric utilities, fuel oil and propane companies, but provide significant benefits to the State of Delaware and consumers.

In Summary, there may be some general unintended consequences with implementing the EERS statute and any regulations that may be promulgated should ensure fairness and equity among all parties, while not losing focus on other complementary clean energy programs.

8.8 Natural Gas Unintended Consequences

Over the past two to three years, Chesapeake Utilities Corporation has converted several medium to large sized commercial and industrial customers in Sussex County, Delaware to natural gas that has lowered energy costs for these customers as well as their carbon footprint. These conversions to natural gas have displaced several million gallons of propane and fuel oil in the State; thus enabling customers and the State of Delaware to improve their environmental footprint, save millions of dollars in energy costs and create jobs.

The following Table 14 demonstrates the annual gallons of propane and fuel oil that have been displaced in Sussex County, Delaware as a result of conversions to natural gas. The table also shows the natural gas equivalents resulting from these conversions.

Table 14: Delaware Natural Gas Conversion Displacements of Propane and Fuel Oil

Fuel Source	Annual Gallons Displaced	Annual Energy Savings	Annual Avoided Tons CO_2	Natural Gas Equivalent (MMBtu)
No. 2 Fuel Oil	1,202,481	$967,989	2,907	161,493
No. 4 Fuel Oil	622,225	$444,557	1,707	85,369
No. 6 Fuel Oil	3,586,733	$1,726,489	11,434	519,718
Propane	2,824,783	$2,113,525	2,846	258,750
Total	8,236,222	$5,252,560	*18,894	1,025,330

* Equivalent to approximately 3,246 cars being taken off the road

The establishment of defined energy savings targets for the affected energy providers under this legislation has the potential of leading to unintended consequences for energy consumers and the State of Delaware in terms of the real potential for increased energy costs, increased environmental emissions in terms of carbon dioxide, and overall increased energy usage.

With respect to the final establishment of natural gas energy savings targets and the ultimate defined credit for "equivalent energy efficiency measures" in this regard, certain unintended consequences associated with this legislation may occur such as:

- Beneficial fuel switching to natural gas will be slowed and may not even occur.
- Compliance with the established energy savings target levels under this legislation will negatively impact the ability of regulated natural gas utilities to compete with higher carbon fuel alternatives that are not regulated and not subject to this legislation.
- The potential for increased energy costs to consumers in that the costs of the ultimately defined energy efficiency programs may exceed defined program savings.
- The potential for an increase in overall energy consumption in the State of Delaware if consumers are incentivized to use less efficient energy alternatives when the full-fuel-cycle is considered.
- The potential loss of existing natural gas customers to other energy alternatives with higher carbon footprints.

Energy consumers in Delaware where natural gas infrastructure is available significantly benefit from having natural gas as an alternative. Any steps that discourage rather than encourage natural gas availability must be seriously considered before being enacted.

Because of the inherent benefits that natural gas service provides to consumers and the State of Delaware as a whole, when defining the term "equivalent energy efficiency measures", the regulated natural gas utilities should receive energy savings credit towards any defined natural gas energy savings targets on a MMBtu equivalent basis taking into consideration the full-fuel-cycle analysis discussed in Section 6.5 of this report.

In Summary, the imposition of an energy efficiency charge for natural gas customers or other barriers that are not equally applied to other unregulated carbon based fuel alternatives may negatively impact regulated natural gas utilities driving up consumer costs and limiting environmental benefit. Regulation should work to minimize such impacts to the extent possible, and work to redress policies that impair cost-effective infrastructure expansion.

9.0 Conclusions and Findings

Delaware's directive to reach15%/10% energy savings in five years is an aggressive state target that requires significant programs and funding sources to achieve. Given the current and prospective funding levels, the Workgroup finds that Delaware is unlikely to achieve the legislated efficiency targets without some modification to the funding for efficiency investments, size of the efficiency targets, and/or the timeframe to accomplish the targets.

Equally important, the Workgroup has identified that the EERS statute, as currently written, has several conflicting directives including, most notably, in implementation and accountability. The Workgroup recommends that the Legislature make the necessary changes to the legislation to clarify the structure.

The Workgroup discussed the types of programs and initiatives that would need to be considered to achieve the existing legislated targets. The Workgroup identified potential policy changes, including:

- Establishing alternative and/or higher levels of funding to supplement existing programs;
- Creating new stricter regulations and new pricing structures designed to incentivize energy efficiency;
- Broadening program offerings and delivery mechanisms; and
- Increasing the energy savings that could count toward energy efficiency

The Workgroup would like to express its appreciation to the Secretary for the opportunity to work on the implementation of this very important statute and offers its assistance in the drafting of any regulations the Secretary feels would be appropriate.

9.1 Summary of Findings

1. Targets

The Workgroup agreed to the following interpretation of the statute's targets: "Targeted electricity consumption and peak demand savings would be 15% of the 2007 actual consumption and peak demand (10% for natural gas consumption)."

2. EERS Feasibility

The Workgroup finds that Delaware is unlikely to achieve the legislated efficiency targets given the current and prospective funding levels and the high participation rates that would be necessary to meet such a short timeline. Modifications are required in some or all of the following: 1) funding for efficiency investments; 2) efficiency targets; and/or 3) the timeframe to accomplish the targets.

If fully implemented, the efficiency charge is estimated to produce approximately $9 million dollars annually or approximately $45 million over the next five years. Conversely the estimated cost to meet the legislative objectives is $284-849 million (with an average estimate of $481 million) over the next five years.

The Workgroup identified programs and initiatives that could be considered to work toward the legislated targets.

3. Accountability Conflict

The Workgroup has identified that the EERS statute, as currently written, has several conflicting directives. The conflicting directives in the statute make it unclear who would be accountable for EERS performance results and how the State could develop enforcement mechanisms. Holding regulated affected energy providers responsible for outcomes without any ability to design and administer efficiency programs may create unintended issues. The Workgroup recommends that the Legislature make the necessary changes to the legislation to clarify the accountability structure.

4. Equivalency and Trading of Energy Efficiency Resource Units

The Workgroup finds that the efficiency units and credits need to be redefined to a common BTU scale to enable meaningful cost comparisons and possible trading of electric and gas efficiency credits. The Workgroup recommends that demand reduction credits are not traded or viewed as equivalent to any metric of efficiency credits. When both demand reduction and base energy efficiency savings can be achieved from the same measure or program, then the Workgroup recommends that the program be awarded credits for both the demand reduction and efficiency savings.

5. Economic Impacts

Implementation of the EERS targets and associated costs should be made with consideration of the impact on the Delaware economy and its citizens. Electric efficiency and demand reduction programs deliver a net savings to electric customers as their reduced energy use and utility savings from wholesale capacity bids help lower energy bills. Conversely, only participants of the natural gas programs will experience the direct benefits of reduced energy bills.

The job potential based on typical efficiency and peak demand programs is estimated to be from 10.8 to 12.5 jobs-years per million dollars of investment. Therefore, using the cost estimate range of $284-849 Million to achieve the energy efficiency targets, the estimated total jobs created ranges from 3,000-10,600 job-years.

6. Air Pollution &Greenhouse Gas Impacts

The environmental impact of the energy reductions is dependent on the achieved level of energy efficiency and peak demand savings. The achievement of efficiency savings targets will result in a direct savings in emissions. Based on the achievement of the 15% electric consumption savings target, Delaware would save 4,485 tons of NOx, 15,447 tons of SO_2 and 2.9 million tons of CO_2 over the five year period. Natural gas consumption offers similar direct savings to electric, but at a lower level. Achievement of 2015 10% savings targets results in limited to no SO_2 savings, 23 tons of NOx savings and 29,495 tons of CO_2 savings.

7. Electric and Gas Full Cycle Efficiency

Given the benefits of natural gas and the potential energy savings on a full-fuel-cycle basis, the Workgroup supports the expansion of gas service in all areas of the state and recommends inclusion of fuel switching and gas fired CHP toward energy efficiency savings.

8. Eligible Programs

The Workgroup recommends a broad use of that discretion to include fuel switching, peak-shaving renewable energy systems, combined heat and power systems (CHP), transmission and distribution system upgrades, higher efficiency generation technologies, and building energy standards.

9. Evaluation, Measurement and Verification (EM&V)

Since compliance with the EERS statute falls principally on the SEU and the affected energy providers for efficiency programs, it's anticipated that each party will conduct their own EM&V process to confirm their efficiency savings. As part of the regulations, the Secretary may want to require each affected energy provider to submit an annual independent EM&V validation report, confirming the process and result for the reporting year. As an alternative or in addition, the Secretary may want to provide a Statewide EM&V oversight which evaluates all parties' programs, identifies appropriate protocols or any deficiencies and confirms measured and reported energy efficiency savings by affected energy provider. The EM&V reporting responsibilities will be developed in conjunction with any legislative changes.

10. Step load Increases or Decreases

Annual reporting by affected energy providers should be adjusted to reflect weather, population, significant customer load increases or decreases and other uncontrollable impacts.

11. Enforcement Mechanisms

The Workgroup believes at this early stage in the process it is premature to discuss enforcement mechanisms and suggests revisiting the subject as need arises.

12. General Unintended Consequences

There may be some general unintended consequences with implementing the EERS statute and any regulations that may be promulgated should ensure fairness and equity among all parties, while not losing focus on other complementary clean energy programs.

13. Natural Gas Unintended Consequences

The imposition of an energy efficiency charge for natural gas customers or other barriers that are not equally applied to other unregulated carbon based fuel alternatives may negatively impact regulated natural gas utilities driving up consumer costs and limiting environmental benefit. Regulation should work to minimize such impacts, as well as other policies that impair cost-effective infrastructure expansion to the extent possible.

Appendix A. Delaware Code, Title 26, Chapter 15

TITLE 26. Public Utilities
CHAPTER 15. ENERGY EFFICIENCY RESOURCE STANDARDS

§ 1500. Short title; declaration of policy.
(a) This chapter shall be known and may be cited as the "Energy Efficiency Resource Standards Act of 2009."
(b) The General Assembly finds and declares that:

(1) Cost effective energy efficiency shall be considered as an energy supply source before any increase or expansion of traditional energy supplies; and
(2) Energy efficiency is among the least expensive ways to meet the growing energy demands of the State; and
(3) Providing affordable, reliable, and clean energy for all consumers in Delaware is in the public interest and will yield social, economic, and welfare benefits for generations to come; and
(4) The benefits of a strong focus on cost effective energy efficiency accrue to the public at large, and all electric and natural gas suppliers and consumers in Delaware share an obligation to develop a minimum level of these resources in the energy supply portfolio of the State.
(5) The benefits of cost effective energy efficiency include lowered consumer spending on energy, improved regional and local air quality, improved public health, increased electric supply diversity, increased protection against price volatility and supply disruption, improved transmission and distribution performance, and new economic development opportunities; and
(6) The Delaware Sustainable Energy Utility (SEU) combines public funding sources and consumer savings with private sector funds and management skills to provide all Delaware energy users with assistance for all their energy efficiency and renewable energy needs; and
(7) The SEU is a critical mechanism for achieving energy conservation and energy efficiency in the State.
(8) Delivery rate structures for regulated natural gas and electric utilities shall be designed to avoid unnecessary impediments to the Energy Efficiency Resource Standards under this chapter.

§ 1501. Definitions.
For purposes of this chapter:

(1) "Affected electric energy provider" means an electric distribution company, rural electric cooperative, or municipal electric company serving energy customers in Delaware.
(2) "Affected energy provider" means an affected electric energy provider or affected natural gas distribution company.
(3) "Affected natural gas distribution company" means a natural gas distribution company serving energy customers in Delaware.
(4) "Coincident peak demand" means for each affected electric energy provider the highest level of electricity demand for such affected electric energy provider.

(5) "Combined heat and power" means a system that uses the same energy source both for the generation of electrical or mechanical power and the production of steam or another form of useful thermal energy.
(6) "Combined heat and power system savings" means the electric output, and the electricity saved due to the mechanical output, of a combined heat and power system, adjusted to reflect any increase in fuel consumption by that system as compared to the fuel that would have been required to produce an equivalent useful thermal energy output in a separate thermal-only system, as determined in accordance with regulations promulgated by the Secretary.
(7) "DEC" has the same definition set forth in § 1001 of this title.
(8) "Demand-side management" has the same definition set forth in § 1001 of this title.
(9) "DEO" means the State Energy Office established in § 8053 of Title 29.
(10) "DNREC" has the same definition set forth in § 352 of this title.
(11) "DP&L" has the same definition set forth in § 1001 of this title.
(12) "EERS" means Energy Efficiency Resource Standards.
(13) "EERU" or "Energy Efficiency Resource Unit" means 1 kilowatt-hour of electricity demand reduction relating to demand side management programs, 1 kilowatt of electricity demand response, or 1 decatherm of reduced natural gas consumption, or an equivalent energy efficiency measure.
(14) "Electric distribution company" has the same definition set forth in § 1001 of this title.
(15) "Electricity consumption" and "electricity consumed" means, for any affected electric energy provider, the sum of retail electricity deliveries to all energy customers within the electric distribution system.
(16) "Electricity demand response" means a reduction in the use of electricity by electricity energy customers in response to power grid needs, economic signals from a competitive wholesale market or special retail rates.
(17) "Energy customer" means a natural person or public or private entity that receives electric distribution service from an affected energy provider.
(18) "Energy efficiency" means either a decrease in consumption of electric energy or natural gas or a decrease in consumption of electric energy or natural gas on a per unit of production basis or equivalent energy efficiency measures that do not cause a reduction in the quality or level of service provided to the energy customer achieved through measures or programs that target consumer behavior, or replace or improve the performance of equipment, processes, or devices. Energy efficiency can also mean the reduction in transmission and distribution losses associated with the design and operation of the electrical system.
(19) "Energy efficiency charge" has the meaning given in § 1505 of this title.
(20) "Energy savings" means:
    a. Reduction in electricity consumption;
    b. Reduction in natural gas consumption;
    c. Electricity coincident peak demand response capability; or
    d. Equivalent energy efficiency measures, in Delaware from a base year of 2007, calculated on a calendar year basis.
(21) "Equivalent energy efficiency measure" means reductions in the use of fossil fuel other than natural gas or use of other sources of energy not derived from fossil fuel

equivalent to a reduction in natural gas consumption or electricity consumption, as defined by the Secretary by regulations pursuant to § 1504 of this title.
(22) "Municipal electric company" has the same definition set forth in § 352 of this title.
(23) "Natural gas consumption" and "natural gas consumed" means, for any affected natural gas provider, the sum of retail natural gas deliveries in Delaware.
(24) "Natural gas distribution company" means a public utility owning and/or operating natural gas distribution facilities in the State.
(25) "Recycled energy savings" means a reduction in electricity or natural gas consumption that results from a modification of an industrial or commercial system that commenced operation before July 29, 2009, in order to make productive use of electrical, mechanical, or thermal energy that would otherwise be wasted, as determined in accordance with regulations promulgated by the Secretary.
(26) "Rural electric cooperative" has the same definition set forth in § 352 of this title.
(27) "Secretary" means the Secretary of DNREC.
(28) "State Energy Coordinator" is the administrator and head of the State Energy Office as established in § 8053 of Title 29.
(29) "Sustainable Energy Utility" or "SEU" have the same meaning as set forth in § 8059 of Title 29.

§ 1502. Energy Efficiency Resource Standards.
(a) It is the goal of this chapter that each affected energy provider shall achieve a minimum percentage of energy savings as follows:
(1) For each affected electric energy provider, energy savings that is equivalent to 2% of the provider's 2007 electricity consumption, and coincident peak demand reduction that is equivalent to 2% of the provider's 2007 peak demand by 2011, with both of the foregoing increasing from 2% to 15% by 2015;
(2) For each affected natural gas distribution company, energy savings that is equivalent to 1% of the company's 2007 natural gas consumption by 2011, increasing to 10% by 2015.
(b) Not later than April 1 of the calendar year immediately following each reporting period:
(1) Each affected electric energy provider shall submit to the State Energy Coordinator a report, in accordance with regulations promulgated by the Secretary, demonstrating that the affected electric energy provider, in cooperation with the Sustainable Energy Utility and the Weatherization Assistance Program, has achieved cumulative energy savings (adjusted to account for any attrition of energy savings measures implemented in prior years) in the previous calendar year that are at least equal to the energy savings required by regulations adopted by the Secretary pursuant to § 1504(a) of this title.
(2) Each affected natural gas provider shall submit to the State Energy Coordinator a report, in accordance with regulations promulgated by the Secretary, demonstrating that the affected natural gas provider, in cooperation with the Sustainable Energy Utility and the Weatherization Assistance Program, has achieved cumulative energy savings (adjusted to account for any attrition of energy savings measures implemented in prior years) in the previous calendar year that are at least equal to the energy savings contained in regulations adopted by the Secretary pursuant to § 1504(a) of this title.
(c) A Workgroup shall be established to complete a study and provide recommendations during the planning and implementation of this policy.

(1) The Workgroup shall be composed of 11 members. It shall be chaired by the State Energy Coordinator and include 1 representative of each of DP&L, DEC, and Chesapeake Utilities, 1 representative appointed by the municipal electric companies, 1 representative of each of the Public Service Commission, the Public Advocate, and the SEU, and shall also include the Weatherization Assistance Program Manager and 2 members of the public with experience representing, respectively, low- and moderate-income families and environmental concerns.

(2) The Workgroup shall complete a study and submit its findings to the Secretary no later than December 31, 2010, to determine the feasibility and impact of pursuing EERS goals for the affected energy providers in Delaware. Such a study at minimum must address:

a. Supporting and confirming the energy savings percentages identified for 2011 and 2015 or recommending alternative energy savings percentages if warranted.

b. The impact of implementation and compliance on carbon dioxide and other greenhouse gas emissions;

c. The issue of "unintended consequences" of establishing goals for the affected energy providers, especially, for instance, where beneficial fuel switching might otherwise be penalized or compliance with the goal negatively impacts the ability of gas utilities to compete with higher carbon fuel alternatives;

d. Consideration of any EERS type goals and programs established for natural gas distribution utilities in nearby states and the measurable results of any ongoing programs in those states;

e. The evaluation of the results of any ongoing natural gas energy efficiency and conservation programs implemented and administered through the SEU or any individual natural gas distribution utility;

f. The impact of implementation and compliance on customer rates for affected energy providers;

g. The efficiency of the natural gas system relative to other energy alternatives on full-fuel-cycle measurement basis (from source to point-of-use);

h. The level of an energy efficiency charge, if any, needed to fund energy efficiency measures to meet compliance of the EERS pursuant to § 1505 of this title;

i. The step load increases or decreases caused by the connection of large, new energy consumers, such as data centers;

j. The impact of implementation and compliance on major farm, commercial, and industrial customers;

k. The appropriate level of equivalency for electricity demand response and energy efficiency measures in achieving compliance with the energy savings goals of this section;

l. The appropriate scope of equivalent energy efficiency measures; and

m. Whether the Secretary, by regulation, should permit trading of EERUs among affected energy providers;

n. Enforcement mechanism or mechanisms to be adopted by the Secretary which will ensure compliance with the EERS.

(3) The Workgroup shall create quantitative annual reduction targets in EERUs, which are consistent with the State's energy savings objectives.

(4) The Workgroup will meet at least once each year to review progress in meeting the goals and to recommend changes to the plan for meeting the quantitative reduction targets.
(5) The Secretary will reconvene the Workgroup in February 2013 to evaluate progress toward the EERS goals.

§ 1503. Energy use reporting.
(a) The DEO shall annually publish a report on statewide electricity and natural gas consumption and electricity peak energy demand, submit this report to the Secretary, and make the report available to the general public by December 31 of each calendar year commencing in 2011.
(b) All affected energy providers shall provide electric and natural gas consumption and peak usage data to the State Energy Coordinator annually by April 1 as required in § 1502(b) of this title.

§ 1504. Regulations; jurisdiction; administration.
(a) Not later than July 29, 2010, the Secretary, with the cooperation of affected energy providers, shall, by regulation, establish the requirements of this subsection, including, but not limited to:
(1) Measurement and verification procedures and standards;
(2) Requirements under which affected energy providers shall demonstrate, document, and report compliance with the energy savings goals established under § 1502(a) of this title:
(3) Procedures and standards for defining and measuring electricity savings and natural gas savings that can be counted towards the energy savings targets established under § 1502(a) of this title, which shall, at a minimum:
a. Specify the types of energy efficiency and energy conservation measures that can be counted;
b. Enable that energy consumption and peak estimates in the applicable base and current years be adjusted, as appropriate, to account for changes in weather, population previously enacted and deployed demand side management and energy efficient programs by an affected energy provider since the 2007 base year, or other variables;
c. Account for the useful life of measures;
d. Include deemed savings values for specific, commonly used measures;
e. Allow for savings from a program to be estimated based on extrapolation from a representative sample of participating customers;
f. Include procedures for counting combined heat and power savings and recycled energy savings;
g. Establish methods for calculating codes and standards savings, including the use of verified compliance rates;
h. Provide for standardized determination of baselines for energy efficiency projects; and
i. Procedures and standards for third-party verification of reported electricity savings or natural gas savings.
(b) Regulations promulgated pursuant to this chapter and case decisions issued under the auspices of this chapter by the Secretary or DNREC shall be subject to direct appeal to the

Superior Court pursuant to the provisions of the Administrative Procedures Act, Chapter 101 of Title 29. The Environmental Appeals Board shall not have jurisdiction over any such appeal.
(c) Regulations promulgated by the Secretary shall not differ significantly among affected natural gas distribution companies or among affected electric energy providers.
(d) All regulations promulgated under this chapter shall be adopted under the Administrative Procedures Act [Chapter 101 of Title 29].
(e) Any costs incurred by the Secretary and DEO in developing and implementing the programs under this chapter shall be funded through a charge placed by the Public Service Commission on entities under its jurisdiction that have an obligation to comply with the provisions of this chapter and through compliance payments submitted by entities not regulated by the Public Service Commission. Any remaining funds shall be distributed as authorized in § 1505 of this title.
(f) If an energy efficiency charge greater than zero is established pursuant to § 1505 of this title, then subsection (e) of this section will no longer apply.

§ 1505. Energy efficiency charge.
(a) There is hereby established the Sustainable Energy Trust Fund.
(b) Each individual affected energy provider may determine how best to fund activities necessary to achieve the energy savings goals within its service territory and implement programs as it sees fit. Should an affected energy provider determine that a charge is unnecessary, a plan shall be submitted that demonstrates how the goals will be achieved. Should an affected energy provider determine that an energy efficiency charge is necessary to achieve the goals, it may make such a recommendation in the Workgroup study that is consistent with this section.
(c) Based upon the recommendation or recommendations of the Workgroup, the Secretary may implement a charge to be collected from each energy customer by its affected energy provider ("energy efficiency charge"), which may not vary by customer class and is consistent with this section.
(d) Any energy efficiency charge for energy customers of affected electric energy providers shall be imposed on a per kilowatt-hour basis and may not exceed a level that would result in an average charge in excess of $0.58 per month per residential electric customer.
(e) Any energy efficiency charge for energy customers of affected natural gas energy providers shall be imposed on a therm basis and may not exceed a level that would result in an average charge in excess of $0.41 per month per residential natural gas customer.
(f) Each affected energy provider shall remit any energy efficiency charges collected pursuant to this chapter to the DEO to be deposited in the Sustainable Energy Trust Fund on a monthly basis. Funds shall be deposited in the Sustainable Energy Trust Fund by the DEO in separate accounts for each affected energy provider and shall, to the extent feasible, and except as otherwise provided in paragraph (j)(3) of this section below, be earmarked for use on behalf of energy customers of the affected energy provider from which they are collected in collaboration with the affected energy providers. Funds deposited in the Sustainable Energy Trust Fund shall not be funds of the State, shall not be available to meet the general obligations of the government, and shall not be included in the financial reports of the State. The DEO shall submit to the General Assembly and the Governor by May 30 of each year a written accounting of monies received from the fund during the previous year and how those moneys were used or disbursed during that year.
(g) Costs associated with achieving the energy savings goals are not recoverable through Public Service Commission proceedings.

(h) All revenue credited to the Sustainable Energy Trust Fund shall be used solely to fund the programs mandated by this chapter.
(i) All interest earned on moneys deposited in the Sustainable Energy Trust Fund shall be credited to the Sustainable Energy Trust Fund and shall be used solely for the purposes designated in this chapter.
(j) All moneys deposited into the Sustainable Energy Trust Fund shall be transferred in their entirety on July 1 of each year to the DEO to fund the programs mandated by this chapter. The DEO shall distribute the funds in each separate account established pursuant to subsection (f) of this section to the following uses:

(1) Seventy-five percent of the assessment is provided to the SEU and shall be used to further the goals and activities of the SEU including, but not limited to, the promotion of energy conservation, energy efficiency, renewable energy, and energy financing pursuant to § 8059(j)(3) of Title 29.
(2) Twenty percent of the assessment is provided to the Weatherization Assistance Program.
(3) Five percent of the assessment is provided to the Secretary and DEO to cover costs incurred in developing and implementing the EERS.

§ 1506. Verified savings.
(a) Subject to the other provisions of this subsection, affected energy providers will use EERUs obtained from the Sustainable Energy Utility or the Weatherization Assistance Program and approved by the State Energy Coordinator or created by an affected energy provider under a demand response program to meet the applicable energy savings requirements defined pursuant to § 1502(a) of this title.
(b) Energy savings achieved and used for compliance pursuant to this subsection shall be:

(1) Measured and verified in accordance with the procedures specified by regulations developed under § 1504(c) of this title;
(2) Reported in accordance with § 1502(b) of this title; and
(3) Located in the State.

§ 1507. Review and enforcement.
(a) The Secretary shall review each report submitted by all affected energy providers under § 1502(b) of this title to verify that the applicable performance standards under that subsection have been met.
(b) In determining compliance with the applicable energy savings requirements, the Secretary shall exclude reported electricity savings or natural gas savings that are not adequately demonstrated and documented, in accordance with the regulations promulgated under § 1504 of this title.

Appendix B. Energy Efficiency Charge Estimation

Funding that Would be Generated by EERS Limits

Electricity

Limit per residential customer per month = $0.58

	2007 MWH Sales Residential	Total	Source
Delmarva	2,969,021	8,855,916	Bob Howatt
DEC	930,154	1,162,642	Bob Howatt
DEMEC	618,823	1,845,809	Total residential from EIA Database
Total	4,517,998	11,864,367	Total for DE from Bob Howatt. Residential included DEMEC proration

Avg DE residential kWh consumption

Annual	11,500	Lado 6/10/10 presentation
Monthly	958	By calculation

Calculation of maximum rate

958 kWh x Rate = $0.58 per average residential customer per month

Rate = $0.58/958 kWh = $0.000605

Note: current Green Energy Fund rate for Delmarva customers is $0.000356/kWh

Revenue generated by $0.000605/kWh

Total sales, kWh	11,864,367,000
Rate/kWh	$0.000605
Revenue	**$7,180,521**

Natural Gas

Limit per residential customer per month per therm: $0.41

	2007 MCF Sales Residential	Total		Source
Delmarva	7,909,416	20,713,658		By difference and prorated
Chesapeake	2,090,460	4,652,207		Bob Howatt
Total	9,999,876	25,365,865		Bob Howatt and prorated
Convert to therms: 1 mcf =		10.27	therms	
Total therms	102,698,727	260,507,434		

Avg DE residential MCF consumption

Annual	68.5	Lado 6/10/10 presentation, slide 26
Monthly	5.7	By calculation

Avg DE residential thermscomsumption

Annual	703.5
Monthly	58.6

Calculation of maximum rate using therms

58.6 therms x Rate = $0.41/therm/month

Rate = $0.41/58.6 therms = $0.006994

Calculation of maximum rate using MCF

5.7 MCF x Rate = $0.41 per average residential customer per month

Rate = $0.41/5.7 MCF = $0.071825

Revenue generated by $0.071825/MCF

Total sales, MCF	25,365,865
Rate/MCF	$0.071825
Revenue	**$1,821,899**

Appendix C. Energy Efficiency and Peak Demand Emission Savings

EMISSIONS IMPACT CALCULATIONS

Electric Consumption (Megawatt-Hours)

YEAR	2007	2015	Totals thru 2015
BAU Consumption	11,868,810	12,852,220	75,229,589
15% of 2007	11,868,810	11,071,899	70,244,689
Annual Percent Targets		0.15	
Electric Consumption Savings	0	1,780,322	4,984,900

Delmarva Power 2009 Baseline

6.2 lbs per Megawatt-Hour	SO2	5,519	15,453
1.8 lbs per Megawatt-Hour	NOx	1,602	4,486
1,179 lbs per Megawatt-Hour	CO2	1,049,500	2,938,599

Natural Gas Consumption (Mcf)

YEAR	2007	2015	Totals thru 2015
BAU Consumption	25,365,865	27,467,597	160,779,690
15% of 2007	25,365,865	24,931,011	154,057,736
Annual Percent Targets		0.100	
Gas Consumption Savings	0	2,536,587	6,721,954

Natural Gas http://www.naturalgas.org/environment/naturalgas.asp

1 Mcf<= 1,027,000 BTUs			
1 lbs per Billion BTU	SO2	1.3025	3
92 lbs per Billion BTU	Nox	119.8334	318
117,000 lbs per Billion BTU	CO2	152397	403852

Electric Peak Demand (MWs)			
YEAR	2007	2015	12,075
BAU Peak Demand	4,178	4,524	26,482
15% of 2007	4,178	3,897	24,727
Annual Percent Targets		0.15	
Electric Demand Savings	0	627	1,755
Marginal Unit Savings (Gas)			
1 Day for 6 hours (6 Hours)			
1 MW = 3,413,000 BTU per Hr	SO2	0.006416781	
	NOx	0.59034388	2
	CO2	750.7634121	2,102
80% redistributed to off peak			
Emissions Profile	SO2	9.325296	26
	NOx	2.707344	8
	CO2	1759.7736	4,927
Net Emissions Savings/Costs	SO2	-9.318879219	-26
	NOx	-2.11700012	-6
	CO2	-1009	-2,825
Consolidated Emission Savings	**SO2**	**5,510.9803**	**15,431**
	NOx	**1,720.0058**	**4,798**
	CO2	**1,200,887.3627**	**3,339,625**

Appendix D. EERS Target Equivalency Based on Market Value

Assuming a desire to create equivalency among all three (3) commodities (electric consumption reductions, electric demand reductions and gas consumption reductions), there are methods that could be used. One method might be to look at the market value of the resource on an average basis. As an example, based on PJM's 2010/2011 Base Residual Auction, 1 kilowatt of instantaneous peak demand reduction could have theoretically reduced the auction clearing price by $0.833 per MW-Day and save Delaware consumers approximately $794,470 per year. Based on 2010 costs, the consumption reduction of 1 kilowatt-hour of energy is worth approximately $0.10. The consumption reduction of 1 decatherm, or 9.747Ccf would be valued at approximately $9.75[61]. Assuming a 1 MWh = 1 Tradable Option = $100 equivalency creates the following value table.

EE Options Table	Electric Consumption	Electric Demand	Nat. Gas Consumption
2011 Target	237,376 MWh	52 MWs	253,659 Mcf
$ Target Value	$23,737,600	$41,312,418	$2,537,371
2011 Options	237,376	413,124	25,374
Option per Savings	1 MWh =1 Option	1 MW = 7,945 Options	1 Mcf = 0.1 Options
2015 Target	1,780,322 MWh	392 MW	2,536,587 Mcf
$ Target Value	$178,032,200	$311,432,077	25,373,677
2015 Options	1,780,322	3,114,321	253,737

The deficiency in this approach is the reliance on nominal or average values which actually change annually or more frequently. The analysis could be enhanced to reflect 10 year average values or individual utility values, particularly if the Workgroup contemplated any recommendation for trading of EERUs.

Since the actual value/cost of energy efficiency or peak demand savings is only known by the utility owner, trading could still occur and be facilitated by an organized market, but trade values would likely vary by utility, commodity and timeframe.

[61] One decatherm value is based on a retail market rate of $1.00 per Ccf @9.747 Ccf per decatherm or $9.75 per decatherm.

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