Virginia State Corporation Commission Energy Efficiency Working Group
Subgroup 1
Final Report

This report to the Virginia SCC staff is from Subgroup 1, charged with developing recommendations on issues concerning the statutory goal to achieve savings of 10% of Virginia's 2006 electricity sales by the year 2022. The issues the Subgroup was asked to address are:

- Determination of the appropriateness of the statutorily-defined goal, or a different goal, based upon cost effectiveness test(s)
- Selection of cost-effectiveness test(s) and criteria to be applied
- Measurement and verification standards to be applied
- Level playing field applicability (e.g., for supply and demand side alternatives)
- The customers for which a goal should be applied (e.g., investor-owned, municipal-owned, cooperative utilities)
- Interaction between PJM and Virginia programs
- Determination of whether goal is to be achieved by utility-sponsored programs only or a combination of utility-sponsored and non-utility-sponsored programs.

Energy Efficiency Goal

Electric utility legislation enacted in April 2007 [cite] set a statutory goal for the state to save 10% of Virginia's total 2006 electricity sales by 2022. The legislative language is as follows:

> The Commonwealth shall have a stated goal of reducing the consumption of electric energy by retail customers through the implementation of such programs by the year 2022 by an amount equal to ten percent of the amount of electric energy consumed by retail customers in 2006.
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> The State Corporation Commission shall conduct a proceeding to (i) determine whether the ten percent electric energy consumption reduction goal can be achieved cost-effectively through the operation of such programs, and if not, determine the appropriate goal for the year 2022 relative to base year of 2006, …
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> In developing a plan to meet the goal, the Commission may consider providing for a public benefit fund and shall consider the fair and reasonable allocation by customer class of the incremental costs of meeting the goal.

This goal is estimated to total about 11 billion kWh, based on federal Energy Information Administration data for the 2006 base year.

Of particular importance to Subgroup 1, the legislation requires that the SCC "determine whether the ten percent electric energy consumption reduction goal can be achieved cost-

effectively through the operation of (fair and effective demand side management, conservation, energy efficiency, and load management programs, including consumer education) programs, and if not, determine the appropriate goal for the year 2022 relative to the base year of 2006".

The subgroup acknowledged that while the legislation focuses on an energy consumption goal, reducing peak demand is also an important consideration, and Subgroup 3 is focusing on these programs. There was no consensus on whether to set goals in both capacity and energy terms. Some stakeholders pointed out that capacity is the most important resource metric to apply, as powerplant build decisions are based on capacity needs more than energy demand. Others countered that the legislation does not call for a capacity savings target. It was generally agreed that to support the attainment of an energy savings goal, measurement and verification methods will be needed to measure the energy impacts of all programs. Demand and capacity impacts can also be estimated in such methods.

The subgroup reviewed Virginia's statutory energy savings goal in the context of goals set in other states. ACEEE tracks state energy efficiency resource goals, known generically as Energy Efficiency Resource Standards (EERS).[1] Since its 2006 report, which documents EERS developments in Hawaii, California, Washington, Nevada, Colorado, Texas, Illinois, Pennsylvania, New Jersey, Connecticut, and Vermont, on state EERS, the following additional states have established or expanded policies that incorporate quantitative, aggregate, long-term goals:

- New York—In May 2007, Governor Spitzer announced a goal of saving 15% of total state electricity usage by 2015, compared to current forecasts. The Department of Public Service is in the process of developing a plan and regulations to attain this goal
- Maryland—In July 2007, Governor O'Malley announced a goal of reducing per-capita electricity usage 15% by 2015. This is estimated to approximate a 10% reduction in total electricity usage from current forecasts, once population growth is netted out. State agencies and stakeholders are engaged in a process to implement this target.
- Texas—In 2007, the legislature doubled the current savings target of 10% of forecast load growth (measured as summer peak demand) to 20% of peak load growth. Given current trends, the new EERS requirement is estimated to save about 0.4-0.5% of load annually.
- Illinois—In July 2007, the legislature passed a bill that would require utilities to save up to 2% of total sales annually by 2020. These annual requirements cumulate, such that by 2020 total savings could be well over 10%
- Minnesota—In 2007 the legislature passed a bill that requires utilities to achieve energy savings of 1.5% annually. As in Illinois, these savings would cumulate over time.

[1] Nadel. 2006. *Energy Efficiency Resource Standards: Experience and Recommendations.* ACEEE report no. E063.

- North Carolina—In August 2007, the legislature passed Senate Bill 3, which establishes a renewable electricity portfolio standard reaching 12.5% of electricity sales by 2021. The bill allows energy efficiency to qualify for up to 25%-40% of requirements.

Members of the subgroup suggested that while these state goals suggest a range of targets to frame the discussion, to develop a goal specific to Virginia, more detailed analysis will be needed. The 10% goal is included in the state energy plan, and some members of the subgroup expressed the goal that it is modest. Others raised the possibility that it could be too high and asked that more information be developed before concluding that the 10% goal is cost-effective for Virginia. One member of the subgroup presented information suggesting that a cost-effectiveness analysis could yield a considerably lower goal than 10%.

While consensus was not reached, there was substantial agreement that an economic potential study should be conducted to determine the state's ultimate energy savings goal.

As another point of reference, Steve Walz of the Governor's Office summarized the development of goals in the Virginia Energy Plan (VEP)'s:

> Analysis completed for the Virginia Energy Plan looked at studies of achievable, cost-effective electrical efficiency in other states to estimate the potential in Virginia. Based on this analysis, the Plan concludes that the goal of reducing electric use by 10% of 2006 consumption by 2022 can be cost-effectively achieved. The Plan also recognizes that actions are needed for both energy efficiency and demand management. Some measures will provide for both results, while other measures only result in efficiency or demand management savings.
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> The Virginia Energy Plan estimated that, based on all retail sales in Virginia, utilities would have to invest from $100 to $120 million per year on average for energy efficiency and demand management programs. This would have to be matched by consumer investments of between $180 and $200 million per year. These investments would result in a net savings (after utility and consumer costs) of between $15 and $50 million per year on average between 2008 and 2022.[2]

[2] Analysis for the Virginia Energy Plan assumed that the cost of energy efficiency measures equals 3 cents per lifetime kilowatt hour saved, based on cost estimates from the National Action Plan for Energy Efficiency and American Council for an Energy Efficient Economy. Energy efficiency measures were assumed to have a 4-year payback and a 12-year life on average. The analysis for the Plan assumed that 25% of the savings would accrue without public incentives, and that the remaining savings would require a 50% incentive level. This incentive level is based upon experience of electric efficiency programs in other states. Savings are projected using Virginia 2005 electric costs adjusted based on the Energy Information Administration's projection of future electric costs. Savings total to an average of $50 million per year if it is assumed that the full retail cost of electricity is saved. If the amount of savings is reduced to account for continued recovery of distribution system costs, then savings are reduced to an average of $15 million per year.

Subgroup 1 did not explicitly discuss this materials, which are incorporated in Subgroup 4's report, and so are included here for consistency and convenience because they address the core issue our Subgroup was asked to consider.

The savings targets established in the aforementioned state EERS policies are in many cases based on energy efficiency potential studies. Such studies typically entail detailed analysis of current market and technology conditions, identification of efficiency measures applicable to specific end-uses, estimation of energy savings performance and installation costs for measures, economic screening of measures using avoided cost parameters, bundling of measures into typical sets likely to be used in efficiency programs, and estimates of market penetration of such measures in targeted end-use markets. Because of the differences in avoided costs, markets, and other factors among these states, which have not been fully understood and assessed by the Subgroup, there was some discussion of setting a range of efficiency targets, nominally in the 5-15% range. Given the group's wide-ranging discussions and diversity of views, a Virginia-specific potential study would be helpful in determining whether the legislated 10% goal is appropriate.

Administration/Implementation

Because the legislation is unspecific on how Virginia's savings goal is to be achieved, the working group is exploring various policy and program channels for attaining this goal. Two key choices in this realm are (1) whether to rely solely on utility-sector programs or include broader policy avenues such as building codes, standards, and tax incentives, and (2) in the utility sector, whether to rely solely on direct utility administration or use other parties for program administration and delivery. For statewide market transformation and consumer education programs, there was a preponderance of support in the subgroup for a non-utility, third-party administration approach. This would be contingent on a public-benefit fund collected through utility bills and administered through third parties. Utility representatives expressed interest in directly administering demand-reponse/load management programs.

On the first question, other states, including New York, are including building codes, appliance standards, and other statewide policies to complement utility programs. In California, which has been pursuing these policies longer than any state, it is estimated that almost half of total energy savings over the last 30 years have been attained through building codes and appliance standards. California has a uniquely aggressive set of policies in these areas, however, and it is unlikely that Virginia could realize a similar proportion of savings. Nonetheless, we recommend that non-utility sponsored programs also be implemented to contribute to the achievement of the goal. In addition to strengthening and enforcing building codes and appliance standards, state and local governments can set energy efficiency requirements for their own buildings, can offer sales tax holidays for customers to buy higher efficiency appliances, etc., as are advocated by the Virginia Energy Plan.

To the extent that utilities do administer efficiency programs, the state should consider new business/regulatory models that provide the cost recovery, revenue stability, and shareholder returns that are necessary to make demand-side investments attractive to utility shareholders. Subgroup 4 is addressing these issues, but we want to endorse the importance of this area. Utilities and others believe it is extremely important from a policy perspective that utility expenditures on DSM options and expenditures on supply side resources be on equal footing with respect to investment return.

We include part of Subgroup 4's report language on the issue of regulatory incentives for utilities, again for consistency and convenience. Below is a summary of the statutory basis in current Virginia law:

> Incentives are provided to utilities for energy efficiency and demand-management programs through two mechanism, one direct and one indirect.
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> Incentives are directly provided for as follows:
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> Section 56-56-585.1.A.5.b of the *Code of Virginia* provides for timely and current recovery of projected and actual costs of providing incentives for the design and operation of fair and equitable demand-management, conservation, energy efficiency, and load-management programs. Utilities may, no more than once in any 12-month period, petition the State Corporation Commission for a rate adjustment clause to recover these costs. The Commission is to approve the rate adjustment clause if it finds such recovery is in the public interest and the need is demonstrated with reasonable certainty. The Commission is to allow the recovery of all such costs it finds are reasonable.
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> Incentives are provided for indirectly as follows:
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> Section 56-585.1.A of the *Code of Virginia* provides that the Commission may increase or decrease the formula-based combined rate of return by plus or minus 100 basis points based on the generating plant performance, customer service, and operating efficiency of a utility, as compared to nationally recognized standards. The operating efficiency of a utility's energy efficiency and demand-management programs may be one factor when considering the operational efficiency adjustment.

Subgroup 4's recommendations on incentives issues, while considerably more detailed, appear to be generally consistent with the views expressed in Subgroup 1.

On the second question—whether to rely on utility direct administration or use other parties—we recommend the SCC consider several alternative arrangements. For program approaches, especially market transformation, defined as broader, longer-term efforts to change markets without primarily targeting individual customer transactions. One of the programs briefly discussed by the Subgroup for <u>possible</u> third-party, state-wide administration was low income housing/weatherization. Customer education can also be

more successful and more cost-effective when pursued on a statewide basis, and the group suggests that a third-party administration approach is preferable. Third parties in this context could include state agencies, non-profit organizations, or private contractors.

For programs that are better suited to specific geographic areas and customer segments, we suggest that utilities are best suited to administer these programs. Demand response/load management programs are especially appropriate in this respect. Other examples include customized efficiency initiatives with larger customers that entail more complex projects. It is recognized, however, that residential, commercial, and industrial energy-efficiency initiatives may also be led by utilities. Utilities can select third party contractors to implement and, for the most part, administer programs to ensure a low cost approach. This methodology allows program oversight by the utilities to ensure maximum customer satisfaction and to quickly address customer concerns with process-related issues, including contractor performance and installation quality.

Third parties can participate in program administration and delivery in several ways.

- They can administer whole programs or program portfolios under contract with a statewide administrator.
- They can deliver services under contract with individual utilities.
- They can contract privately with customers, helping them to participate in various state/utility programs.

We also want to highlight the need for a strong state planning and coordination role, in whatever constellation of programs the state ultimately deploys. Given the 15-year time horizon for achievement of the goal, one or more state agencies must be tasked, and funded, sufficiently to play an effective role in sustaining the various efforts needed to reach the overall goal. This is especially true with statewide consumer education and market transformation initiatives.

Interaction between PJM and Virginia programs

The subgroup did not have time to discuss this set of issues in any depth. We attempt here to summarize what is known, and defer to other subgroups on detailed recommendations.

In brief, the PJM wholesale power market, in which Virginia utilities and some large customers participate, has its own set of planning, demand response, and regulatory activities that would likely affect several aspects of Virginia's demand-side resource programs and policies. PJM's demand response programs, and its forward capacity market, are likely to be the most important and visible initiatives for the purposes of the SCC's working group. These programs allow larger customers and Curtailment Service Providers to participate in PJM's emergency and price-based demand response programs. The PJM forward capacity market, or Reliability Pricing Model (RPM), allows demand-side resources to participate in capacity planning for the region. While at present, RPM is limited to demand-response options on the demand side, PJM is under FERC order to

include energy efficiency as an specific eligible resource category for future RPM resource acquisition.

While Subgroup 1 voiced no consensus recommendations on PJM market issues, it is safe to say that they will be an important part of utilities' and the SCC's considerations in planning demand response programs, and possibly energy efficiency programs. Other subgroups are focusing more explicitly on demand response, load management, and related issues, and we defer to them on the details of this set of concerns.

Cost-Effectiveness

The state needs to establish a cost-effectiveness framework and specific tests for determining which efficiency programs and policies are cost-effective for purposes of establishing an appropriate efficiency goal. While the 10%/2022 goal appears to be generally well within the range of cost-effectiveness potential found in other states, it will be imperative that the goal that is ultimately set involve efficiency measures that in the aggregate evolve from the prudent expenditure of public/ratepayer funds.

This is what the VEP says about cost-effectiveness:

> The State Corporation Commission has historically given different weights to financial tests when considering the cost effectiveness of energy-efficiency programs. It historically has used the Rate Impact Measure Test as the primary test of cost effectiveness. The Total Resource Cost Test indicates whether an energy-efficiency measure or program has a cost per lifetime-kilowatt-hour-saved less than the avoided cost of electric generation, transmission, and distribution. The Societal Test assesses costs not directly attributed to utility services. A 2004 study found that twenty-eight states used either the Total Resource Cost or Societal Test as the main determinate of the cost effectiveness of energy-efficiency programs or measures. Virginia should use a mix of the Total Resource Cost Test, Societal Test, Utility/Program Administrator Test, Participant Test, and Rate Impact Measure Test. No one tool should be used solely as a go–no go decision point.

One helpful step in this area would be to conduct a statewide energy efficiency potential study. Many states have taken this step as a basis for guiding program design and targeting. The National Action Plan for Energy Efficiency is developing a guidebook for states in this area.

The principal tests used by state utility commissions include the Total Resource Cost, Utility Cost, Rate Impact Measure, Participant, and Societal tests. The Total Resource Cost (TRC) test, which was discussed rather extensively by the Subgroup and is used rather widely as a cost effectiveness measure, compares the total costs and benefits of a program, including costs and benefits to the utility and the participant and the avoided costs of energy supply. A key element of this test ~~all these tests~~ is a determination of

avoided costs, because they determine the economic benefits side of the benefit-cost calculation in these tests. The state should consider avoided costs in at least three ways:

- For individual utilities—Each regulated utility will have a set of generation, transmission, and distribution costs to use as the basis for avoided costs within its service area.
- Statewide—To the extent that the state sets policies that are not focused on jurisdictional utilities, such as building codes or appliance standards, it has more flexibility to determine avoided costs.
- PJM market considerations—Because significant developments in energy efficiency and demand response can affect PJM market prices, both short-term under demand-response activation periods, and longer-term as demand and energy use moderates, the state should consider wholesale price benefits of demand-side resources.

These issues bear further clarification and discussion.

The subgroup discussed whether or not the state should assess cost-effectiveness on a portfolio basis rather than access individual technologies, measures or programs. The basis for such an approach is that it may reduce administrative costs and delays, and provides more flexibility in designing suites of programs. Although preliminary evaluation on a portfolio basis may be reasonable -- such an approach may be advocated by some members of the Subgroup -- it's imperative that each energy efficiency measure and/or program pass the appropriate economic test. Even though the entire portfolio may be deemed cost effective, implementing demand side management and/or energy efficiency initiatives that are not cost effective is not in the best interest of the Commonwealth. Programs should be provided on a priority basis with those deemed to have the most significant potential energy impacts implemented first. Furthermore, recognizing that each technology, program or measure must stand on its own merit should ultimately lead to lower costs for consumers and ensure, to the extent possible, a lowest cost approach to a comprehensive energy plan for Virginia.

It was also suggested that the state consider including risk assessment and uncertainty analysis in its cost-effectiveness approach. For example, the "hedge" value of demand side resources can be estimated in some conditions.

Resource Planning: Leveling the Playing Field

The subgroup spent a limited amount of time on this issue, primarily for schedule reasons. One issue that emerged in the discussion was reconciling the timeframe of demand side and supply side resource commitments. A preference for costing supply and demand side options on a life-cycle basis was suggested. The subgroup also reiterated its support for treating supply and demand investments on an equal footing.

It was suggested that the state needs some flexibility in planning for resource acquisition and cost recovery over a 10-15 year planning horizon. Making all resources commitments

at the beginning of the period and leaving them unchanged may result in unintended economic consequences. The subgroup thus discussed the need for milestones and adjustment mechanisms, so that resource decisions can be made soundly at the appropriate time.

Measurement & Verification

The subgroup discussed M&V issues on two levels:

- Macro level—This entails measuring progress toward the ~~statutory 10%~~ goal. Such an approach can use simple forecast/review methods based on periodic assessment of resource impacts, forecast changes, etc.
- Micro level—This involves more detailed M&V of programs and measures, and requires more technical specificity. We touched on four major types of M&V techniques
  - Project M&V—This involves customized plans for major projects, typically at larger customer sites, or multiple sites
  - Market transformation—This approach typically uses market share benchmarking methods. For example, one can track the market share of Energy Star clothes washers versus baseline assumptions to estimate program impacts
  - Measure deemed savings—This applies to simple, common measures like typical lighting fixtures. It sets per-measure deemed savings values, verifies installations, and uses a portfolio statistics approach to account for measure failure and other "erosion" factors.
  - Simulation—Software simulation is the typical approach used for new buildings energy savings calculations. A reference building is specified in detail so that designers can measure energy performance of advanced designs against the reference building.

The subgroup discussed metering issues briefly in the context of M&~~C~~V. Digital metering, if it were widely deployed, would help with M&V by providing consistent, accurate, and hourly impact data. This would be especially helpful for verifying the capacity/coincident peak impacts of energy efficiency and demand response techniques that are not easily monitored through conventional metering technology. The group suggested that metering policies and practices in Virginia will need clear and consistent policies on technical specs, so that needs match capabilities over the mid and long term.

Finally, it was recommended that the state draw on national best practice resources in developing its M&V procedures. NAESB (North American Energy Standards Board) and NAPEE (National Action Plan for Energy Efficiency) were mentioned as good sources.