Comments on Tennessee Valley Authority's (TVA) consideration of Energy Efficiency and Smart Grid Standards listed in section 111(d) of the Public Utility Regulatory Act of 1978 (PURPA) as amended by the Energy Independence and Security Act of 2007 (EISA)

Submitted by the Southern Alliance for Clean Energy

April 30, 2009

Southern Alliance for Clean Energy respectfully submits these comments regarding the following standards, as required to be considered by the Public Utility Regulatory Act of 1978 (PURPA) (Pub. L. 95-617), as amended by the Energy Independence and Security Act of 2007 (EISA) (Pub. L. 110-140):

1. Integrated Resource Planning
2. Rate design modifications to promote energy efficiency investments
3. Consideration of smart grid investments
4. Smart grid information

These standards are to be considered in the context of achieving the following purposes of PURPA:

I. To encourage the conservation of energy supplied by electric utilities
II. To optimize efficiency of electric facilities and resources; and
III. To facilitate equitable rates for electric consumers

I. Integrated Resource Planning:

Each electric utility shall (A) integrate energy efficiency resources into utility, State, and regional plans; and (B) adopt policies establishing cost-effective energy efficiency as a priority resource.

The Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written. In 2005 – 2006, TVA and its distributors achieved energy savings of 0.04% of annual sales, whereas leading utilities are achieving energy savings of 0.4% to well in excess of 1% of annual sales. Given the wide variety of utilities that are achieving these levels of demand reduction, there is ample proof that motivated utilities can achieve high levels of energy savings using energy efficiency programs on a reliable and consistent basis. While TVA has made progress in recent years towards the adoption of effective energy efficiency programs, significant gaps in TVA's planning process continue to hinder this progress and the adoption of this standard would significantly advance energy efficiency in the Tennessee Valley.

TVA's 2007 Strategic Plan states: "Improving energy efficiency and reducing peak demand are significant actions that help slow demand growth in a cost-effective manner while addressing air pollution and global climate change." The Southern Alliance for Clean

Energy agrees that the residents of the Tennessee Valley have a great deal to gain from developing robust energy efficiency programs. Creating energy efficiency programs that can continually increase reductions in overall energy demand over the next 20 years will provide a cost-effective, reliable and environmentally sound new supply of energy for TVA, its distributors and their customers. A key element to effective energy efficiency programs is the integration of energy efficiency into the resource planning process and the consideration of energy efficiency as a priority resource to meet future demand.

It is important that TVA look towards setting into motion organizational structures and a corporate culture that places energy efficiency on equal footing with supply side options, i.e. new power plants. The first step is the formalization of an integrated resource planning process to which this PURPA standard refers. Integrated Resource planning (IRP) is a transparent planning process intended to systematically consider all appropriate supply and demand resources to develop a comprehensive plan to meet current and future load requirements. This process includes monitoring and verification and a process for review and amendment to the plan at regular intervals so that new programs and technologies can be integrated into the mix of alternatives for meeting future demand.

TVA has not completed a resource plan since its 1993 resource planning process pursuant to the provisions of the Energy Policy Act of 1992. This process resulted in TVA's Energy Vision 2020 that identified the need for a flexible range of options and alternatives to meet the region's base-load power supply needs through 2020. However, since that initial planning process, TVA has not conducted any further resource planning and its generation mix continues to be dominated by traditional energy resources such as coal and nuclear power. TVA's failure to revisit their mid-nineties resource planning process has failed the people of the Tennessee Valley, resulting in the Tennessee Valley being one of the most energy intensive regions in the nation.

TVA's 2007 Strategic Plan and 2008 Energy Efficiency and Demand Response Plan should not be considered an adequate substitute for true integrated resource planning. While these plans recognize the need to deliver energy efficiency and demand response programs to consumers of TVA power, this analysis is not provided in the comprehensive fashion that is required by IRP. Nor was the planning process the open and transparent process that PURPA envisions when it speaks of IRP. TVA must first instate a transparent and continuous IRP process so that decisions regarding future energy demands can be made in the most responsible fashion.

TVA should strive to include all stakeholders in a new integrated resource planning process. Because the TVA region encompasses parts of seven southeastern states, it is important that the IRP process include input from these state governments, especially with respect to coordinating efforts on energy efficiency, renewable energy and cost-effective fuel switching to improve efficiency, such as solar hot water and natural gas. In addition, the IRP process should take advantage of the wealth of region-specific knowledge that exists in the Tennessee Valley with respect to environmental and consumer interests, industrial and business representatives, and local governments. By including a diverse

array of stakeholder interests, the IRP process becomes both transparent and comprehensive.

In addition, energy efficiency must be included as a priority resource in this planning process. Available research clearly shows that energy efficiency and conservation programs can deliver energy savings at a price well below that of traditional generation resources. The most recent study completed by Lazard Ltd.[1], one of the worlds most respected investment banks, estimated the cost of delivering energy efficiency to range from zero to five cents per kWh, while the cost of traditional forms of new generation range from 7.5 to over 34 cents per kWh. Further, a study conducted by the Appalachian Regional Commission concluded that states across the nation are meeting one to two percent of their electricity consumption each year with energy efficiency at a cost of approximately 3 cents per kWh compared with costs of 5 cents or higher for electricity from existing coal, gas or nuclear plants. This cost-based analysis shows that energy efficiency can be delivered cheaper than new or existing traditional energy options.

Energy efficiency also provides benefits that other resources do not, such as environmental benefits, reducing customer costs and spurring economic growth, creating more jobs than traditional generation resources, and keeping economic investments within the region. Energy efficiency is a clean, affordable, and feasible energy resource. However, this resource has not been placed in an appropriate framework for evaluating its cost-effectiveness.

Typically, TVA compares the cost of energy efficiency to its average avoided costs (about 5 cents per kWh), its cost of coal generation (about 4 cents), or its marginal avoided costs (3 to 6 cents). Even using this highly conservative value for energy efficiency, utilities that have published studies of energy efficiency potential find that demand can be reduced by over 15% within 5 to 10 years. However, it is widely recognized that the cost of new generation is much higher than these benchmarks; TVA is currently considering building new nuclear capacity that is considered to have a levelized cost of 11 to 15 cents per kWh. TVA should value energy efficiency at the cost of new generation. This levelized cost comparison would make many energy efficiency programs cost-competitive with even the cheapest generation resources.

The integration of energy efficiency into resource planning and its designation as a priority resource will also foster the economies of scale necessary to achieve full cost-effectiveness. Much like building a new coal plant to provide energy for a single home is not cost-effective, implementing pilot programs that are only available to small segments of the population will not achieve the cost effectiveness that larger programs will achieve at economies of scale similar to those used to analyze other resource options.

For all of these reasons, there is a strong rationale for viewing energy efficiency as a priority resource in integrated resource planning processes. Unfortunately TVA continues to make half-hearted attempts at energy efficiency while aggressively pursuing the permits

[1] Lazard Ltd., Levelized Cost of Energy Analysis – Version 3.0. February 2009.

to construct nuclear reactors that will cost ratepayers tens of billions of dollars. The failure to undertake integrated resource planning and refusal to prioritize energy efficiency continues to place the Southeast at a disadvantage to the rest of the nation with regards to wise energy use, greenhouse gas emissions, and economic development.

The Southern Alliance for Clean Energy strongly encourages TVA to officially adopt the PURPA standard being considered here and to initiate a comprehensive integrated resource planning process as soon as possible that includes meaningful input from stakeholders and includes energy efficiency as a priority resource.

II. Rate design modifications to promote energy efficiency investments:

(A) The rates allowed to be charged by any electric utility shall (i) align utility incentives with the delivery of cost-effective energy efficiency; and (ii) promote energy efficiency investments.

Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written. There are two elements to this standard in the context of TVA. First, that rates charged to TVA's distributor utilities should incentivize the delivery of cost-effective energy efficiency; and second that rates charged by TVA's distributor utilities should be designed to incentivize the achievement of energy efficiency by end-use consumers of TVA power.

With regard to the first element, TVA should establish rate structures that incentivize the adoption by distributor utilities of cost-effective energy efficiency programs. TVA currently charges its utilities a uniform rate for energy independent of the variable costs of delivering that energy. This rate structure maintains the throughput disincentive for utilities to engage in meaningful energy efficiency programs because reductions in energy demand created by energy efficiency programs lead directly to reductions in revenue. TVA should redesign rates charged to distributors in such a way as to remove this throughput disincentive and provide incentives for the successful management of energy efficiency programs. Such a rate design should allow for recovery of energy efficiency related costs and reward the achievement of aggressive energy efficiency goals.

In order to offer effective and substantial energy efficiency and demand side management programs, electricity distributors need to establish rates that reflect a diminished financial reliance on electricity consumption, favoring instead electric rates that empower customers to make their homes and businesses as energy efficient as possible while keeping their distributor utility financially solvent.

Utilities should be encouraged to develop special services, rates, loan programs, and acquire equipment for delivery of cost-effective energy efficiency and distributed generation programs for customers. The redesign of rate structures applied to TVA's distributors would send a strong signal to distributor utilities that TVA considers energy efficiency to be a priority resource and would serve to remove many of the institutional

barriers to widespread adoption of effective energy efficiency programs by TVA's distributors.

With regard to the second element of this standard, TVA should work with distributors to design rate structures that incentivize the achievement of energy efficiency by end-use consumers of TVA power. Removing declining block rate structures that discourage energy efficiency by decreasing rates as more electricity is consumed is an initial first step. However, rate designs with clear and meaningful price signals to customers, through time- or usage-sensitive rates, can encourage greater energy efficiency from the consumer.

The Southern Alliance for Clean Energy recommends that TVA and its distributors develop rate packages that would:

- Incentivize reductions in overall energy use
- Incentivize reductions in peak energy use
- Pay customers a price for excess energy generated by the customer that accurately reflects the full value of energy displaced at the time the energy is generated.

Rate packages should be offered that utilize time of use structures, reflecting the distributors' and TVA's actual costs of buying or producing energy in real time, or at least in blocks for peak time, shoulder hours, and at base.

TVA's 2008 Draft Energy Efficiency and Demand Response Plan recognizes the need for new rate structures to encourage energy efficiency and provide the price signals to end-use consumers. The pilot programs that TVA has implemented in recent months will begin the evaluation of how best to approach these issues. However, TVA should aggressively pursue rate designs that encourage energy efficiency and peak demand reductions in the long term through an open engagement of end-users and with full participation by the public.

The structure of rates charged for electric power can have a significant impact on how aggressively energy efficiency measures are pursued. Rate structures can indicate to the utility and end-use consumer the value of conservation and demand reduction and also the timing when such activities are most beneficial to the power system. Often, ratemaking practices do not encourage, or could even discourage, utilities from adopting energy conservation measures. The Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written and design rate structures that incentivize energy efficiency at both the utility and end-use level.

III. Consideration of smart grid investments:

Each State [TVA as the regulatory authority] shall consider requiring that, prior to undertaking investment in non-advanced grid technologies, an electric utility of the State demonstrate to the State that the electric utility considered an investment in a qualified smart grid system based on appropriate factors, including (i) total costs; (ii) cost-effectiveness; (iii) improved reliability; (iv) security; (v) system performance; and (vi) societal benefits.

Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written and require the consideration of investment in qualified smart grid systems before a distributor-utility undertakes investment in non-advanced grid technologies. We encourage TVA to adopt similar criteria as that put forward by the National Association of Regulatory Utility Commissions and the Federal Energy Regulatory Commission concerning smart grid investment. This analysis could then serve the duel purpose of satisfying this PURPA standard and positioning the distributor to take advantage of federal assistance in the development of smart grid technologies.[2]

The continued investment in non-advanced technologies will significantly diminish the region's ability to adopt energy efficiency and renewable energy technologies. In contrast, the adoption of smart grid technologies will result in lower overall costs to consumers, provide valuable information to consumers about the impacts of their energy choices, allow the integration of new technologies that can reduce overall and peak energy demand, and allow the integration of new lower cost and lesser-polluting energy resources.

Further, the installment of smart grid technologies is an essential element to the widespread adoption of plug-in electric vehicles that will reduce this nation's dependence on foreign oil and significantly reduce greenhouse gas emissions. As the use of plug-in electric and hybrid vehicles increases, new grid interfaces will have to be developed such as outdoor plugs, interfaces tied to timers to take advantage of off-peak rates, solar covered parking areas to recharge cars during the day, or parking lot plugs that allow car batteries to be used as resources to avoid micro-peaks and increase grid stability. By 2020 it is estimated that one-fifth to one quarter of all new cars will be plug-in hybrids. The success of integrating this demand into the electricity grid will require smart grid applications to maximize the off-peak benefits and minimize the on-peak loads.

The benefits of widespread adoption of smart grid technologies cannot be understated. Smart metering capabilities include price-based options such as time-of-use control, real-time pricing and critical peak pricing. Smart metering can also provide incentive based programs such as direct load control, interruptible/curtailment services, demand bidding/buyback programs, emergency demand response programs, and capacity market programs.

In addition, smart grid technologies can increase system reliability by incorporating extensive measurements, rapid communications, centralized advanced diagnostics, and feedback controls that quickly return the system to a stable state after interruptions or disturbances; re-routing power flows, changing load patterns, improving voltage profiles, and taking other corrective steps within seconds of detecting a problem; and enabling distributed resources to participate in operations.

[2] These recommendations can be found at: http://www.ferc.gov/industries/electric/indus-act/smart-grid/FERC-NARUC-collaborative.pdf

In all, advanced metering can be used to help identify and promote energy efficiency opportunities in addition to enhancing system reliability and reducing peak demand. TVA should adopt this standard as written and review considerations of investment in smart grid technologies based on the characteristics of a smart grid as described by Title XIII of the Energy Independence and Security Act of 2007, which include:

- Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid;
- Dynamic optimization of grid operations and resources, with full cyber-security;
- Deployment and integration of distributed resources and generation, including renewable resources;
- Development and incorporation of demand response, demand-side resources, and energy efficiency resources;
- Deployment of "smart" technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation;
- Integration of "smart" appliances and consumer devices;
- Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal storage air conditioning;
- Provision to consumers of timely information and control options;
- Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid; and
- Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.

By adopting these criteria in its review of smart grid investment potential, TVA will ensure that individual distributors make investment decisions in a way that provides the maximum benefits to end-use consumers and minimizes inefficiencies caused by the adoption of different or outdated technologies.

The Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written and to adopt the "technology plan" alternative to a case-by-case review, as outlined in the *Reference Manual and Procedures for Implementation of the "PURPA Standards" in the Energy Independence and Security Act of 2007.* This "technology plan" list several factors to be considered in developing a comprehensive plan among utilities to implement smart grid technologies. This planning option takes into account the reality that smart grid programs are made up of many components that will require an incremental approach to adoption and is well tailored to TVA's position as a regulator of 159 individual distributor utilities. TVA should work with these utilities to develop a technology plan that will lead to the coordinated adoption of smart grid technologies throughout the Tennessee Valley.

IV. Smart grid information:

(A) All electricity purchasers shall be provided direct access, in written or electronic machine-readable form as appropriate, to information from their electricity provider as provided in subparagraph (B).

Southern Alliance for Clean Energy strongly encourages TVA to adopt this rule as written. Providing detailed usage information to end-use consumers could have an enormous impact on the efficient use of energy. Most domestic energy use is invisible to the consumer who has only a vague idea of how much energy they are using for different purposes and what sort of difference they could make by changing day-to-day behavior or investing in efficiency measures. Clear feedback is a necessary element in learning how to control fuel use more effectively over the long term and is necessary for sustained demand reduction.

Usage information provides the consumer with information that allows them to adjust their behavior to reduce energy consumption and transfer demand to off-peak times. Studies have shown that providing this information to consumers leads to direct energy savings ranging from 5 to 15%. When combined with innovative rate designs and energy efficiency incentive programs, greater overall energy savings are achieved as the consumer is better able to identify those actions that will provide the most benefits at minimal cost.

To the extent practicable, each of the four categories of information specified in the standard, (prices, usage, intervals, and sources), should be provided to the consumer. In addition, TVA should disclose the pollution resulting from the use of electricity each month on consumers' electric bill in two different ways:

- The overall number of pounds of each pollutant – carbon, nitrogen oxides, sulfur, mercury, and fine particles – per month based on the amount of energy consumed.
- The gross emissions from TVA, broken out by generating plant type

This data will allow customers to see both individually and on a utility scale how their energy consumption choices impact air pollution and climate change, thereby allowing the customer to make informed choices about their energy usage.

The Southern Alliance for Clean Energy strongly encourages TVA to adopt this standard as written. A commitment to providing this information to consumers will provide significant benefits in the form of reduced energy demand, reduced peak demand and a better informed public that will embrace energy efficiency programs.

V. Conclusion

The Southern Alliance for Clean Energy urges TVA to adopt the above PURPA standards, as written, in order to advance to goals of PURPA to encourage the conservation of energy supplied by electric utilities, optimize efficiency of electric facilities and resources, and facilitate equitable rates for electric consumers. The implementation of a transparent integrated resource planning process that includes energy efficiency as a priority resource,

along with rate designs that encourage energy efficiency investments by utilities and end-use consumers will lead to significant near-term reductions in energy demand throughout the Tennessee Valley. Further, the adoption of smart grid technologies, combined with the provision of energy usage information to consumers can ensure long-term efficient use of energy and the development of clean, renewable energy resources at the scale necessary to achieve a clean-energy future necessary and addressing the global warming crisis.

The Southern Alliance for Clean Energy stands ready to meaningfully engage in TVA's IRP process and to assist TVA in implementing these standards set forth by the Public Utility Regulatory Act of 1978 as amended by the Energy Independence and Security Act of 2007.

Respectfully submitted,

Southern Alliance for Clean Energy
P.O. Box 1842
Knoxville, TN 37901
(865) 637 – 6055
www.cleanenergy.org

Addendum to:

Comments on Tennessee Valley Authority's (TVA) consideration of Energy Efficiency and Smart Grid Standards listed in section 111(d) of the Public Utility Regulatory Act of 1978 (PURPA) as amended by the Energy Independence and Security Act of 2007 (EISA)

Submitted by the Southern Alliance for Clean Energy

May 5, 2009

Southern Alliance for Clean Energy respectfully submits this addendum to our comments submitted April 30, 2009 regarding the following standard currently being considered by the TVA, as required by the Public Utility Regulatory Act of 1978 (PURPA) (Pub. L. 95-617), as amended by the Energy Independence and Security Act of 2007 (EISA) (Pub. L. 110-140):

1. Integrated Resource Planning

When formalizing the Integrated Resource Planning (IRP) process, TVA should model their criteria after those promulgated for the Northwest Power and Conservation Council under the Pacific Northwest Electric Power Planning and Conservation Act [Pub. L. 05-501], §839(b)(d).

The Southern Alliance for Clean Energy urges TVA to adopt a transparent and comprehensive integrated resource planning process that includes energy efficiency as a priority resource. To further this end, we recommend modeling this process on the process established for the Northwest Power and Conservation Council (NPCC) by the Pacific Northwest Electric Power Planning and Conservation Act.

This Act directs the council to adopt a regional conservation and electric power plan that describes how the Council will implement conservation measures and develop resources over the following twenty years. Before adoption of the plan, public hearings are held in any state in which the plan will have an impact. The Council then reviews the plan at least every five years.

The Act also mandates the priorities and features of the plans developed by the Council. Those resources that are cost-effective are given priority. However, among the cost-effective resources, conservation is given top priority, followed by the development of reviewable resources, the utilization of waste heat and then resources of high fuel conversion efficiency. The Act then describes certain features that must be included in the plan, including a conservation program, demand forecast, and an analysis of reserve and reliability requirements and cost-effectiveness methods.

In short, the process mandated by the Northwest Electric Power Planning and Conservation Act is a transparent integrated resource planning process that ensures good decision making in addressing electricity demand throughout the region. Such a process would translate well to TVA and the southeastern United States. This process allows for stakeholder input, prioritizes energy efficiency, and includes a regular review process. The Southern Alliance for Clean Energy strongly urges TVA to adopt a similar IRP process.

Respectfully submitted,

Southern Alliance for Clean Energy
P.O. Box 1842
Knoxville, TN 37901
(865) 637 – 6055
www.cleanenergy.org