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FINAL ENVIRONMENTAL ASSESSMENT
TENNESSEE VALLEY AUTHORITY

Public Utility Regulatory Policy Act Standards

1.0 Purpose and Need for the Proposal

The Public Utility Regulatory Policy Act (PURPA) of 1978 created a regulatory framework for the purposes of: 1) providing for increased conservation of electric energy; 2) increasing efficiency in the use of facilities and resources by electric utilities; and 3) establishing equitable retail rates for electric consumers (16 U.S.C. Section 2611). Under PURPA, as amended by the Energy Policy Act of 2005 (EPAct), TVA is required to consider adopting five standards that carry out these purposes. The standards are described as Smart Metering (Time-Based Metering and Communications), Net Metering, Fuel Diversity, Fossil Fuel Generation Efficiency, and Interconnection. TVA must decide whether to adopt the standards, and if so, whether to implement them as is, or to modify them.

1.1 Background

TVA currently supplies all the electricity requirements of its distributors, as well as to directly-served customers in its power service area. Because of this relationship, Qualified Facilities (QFs) as defined under PURPA and other independent power producers would sell electricity to TVA rather than to its distributors. Additionally, the TVA Act delegates to the TVA Board of Directors sole responsibility for establishing the rates charged to power distributors and other customers for electric power supplied by TVA, as well as broad authority over distributor resale rates and conditions of service. This authority is exercised within the framework of, and for the purpose of carrying out, the underlying policies and requirements of the TVA Act including those in Sections 10, 11, and 15d.

TVA previously reviewed aspects of its fundamental rate structure in the following documents:

- *Rate Change (Modification to Rate Structure) for Pricing of Wholesale Electricity to Distributors within the TVA Power Service Area*. Final Environmental Assessment, 2003.

- *Alternative Electric Power Rate Structures.* Final Environmental Impact Statement, 1980.

- *Policies Relating to Electric Power Rates*. Final Environmental Impact Statement, volumes 1 and 2, 1976.

This EA tiers from TVA's Final Environmental Impact Statement, *Integrated Resource Plan (IRP)-Energy Vision 2020* (TVA, 1995). In the IRP FEIS, TVA evaluated a large number of energy resource options that could be used to respond to demands for additional energy from the TVA system in the future. This included renewable energy options, energy efficiency measures, distributed generation, and demand-side management. In other environmental reviews, TVA has assessed further the potential

impacts of different renewable energy resources and distributed generating systems. This includes reviews for the construction and operation of photovoltaic facilities in the Tennessee Valley region (TVA 2001), and landfill gas generation projects (TVA 2002). These have been identified as possible qualifying facilities (i.e., photovoltaic solar, wind, and landfill gas) under the Net Metering standard.

1.1.1 General Description of the Five PURPA Standards

Three of the five PURPA standards (i.e., Smart Metering, Net Metering and interconnection) would potentially affect TVA's rate structure relationship with distributors and consumers. These three standards would affect how consumers are billed and how power is exchanged with customers who generate some portion of their own power. Implementing actions relative to these three standards could involve invoking the rate restructuring (rate change) process under TVA-distributor contracts. Rate changes are typically structured to be revenue-neutral to TVA (i.e., only minor financial losses or gains result). One standard, Smart Metering, has the potential to affect consumer decisions about when they use electricity (Time-of-Use or TOU) and this could shift power demand from peak periods and spread it more broadly across the day (i.e., shape load). Both Smart Metering and Net Metering would help inform customers about their use and cost of electricity and provide customers more control over their use. The other two standards—fuel diversity and fossil generation efficiency—potentially affect the diversity and efficiency of TVA's generating fleet.

Smart Metering - Under the proposed Smart Metering (Time-Based Metering) standard (16 USC Section 2621[d][14]), TVA would provide "a time-based rate schedule under which the rate charged varies during different time periods and reflects the variance, if any, in the utility's cost of generating and purchasing electricity at the wholesale level." Each customer requesting a time-based rate schedule would be provided with a time-based meter capable of enabling the utility and customer to offer and accept such rates. The standard involves implementation of two components, a time-based rate structure and advanced metering and communications technology. The potential benefits of Smart Metering are that it allows utilities to set prices that reflect their cost of supplying power throughout the day; allows customers to save on their utility bills by shifting their power usage to lower-priced periods; and generates information that distributors can use to better manage their systems. This standard is further discussed under the alternatives section.

Net Metering - Under the proposed Net Metering standard (16 USC Section 2621[d][11]), TVA and its distributors would provide service to electric consumers "under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the consumer during the applicable billing period." Under Net Metering opportunities, the consumer receives power from the distributor but also generates electricity, typically from a renewable source, and supplies any excess generation to the TVA grid. A meter measures the net exchange of energy with the power distributor. TVA currently has a demonstration project, Green Power Switch Generation Partners, that pays participating consumers for such energy generated by solar voltaic or wind turbine sources up to 50 kilowatts. TVA also buys larger quantities of excess generation through its Dispersed Power Production Program. This standard is further discussed under the alternatives section.

Fuel Diversity - Under the proposed fuel diversity standard (16 USC Section 2621[d][12]), "each electric utility shall develop a plan to minimize dependence on one fuel source and to ensure that the electric energy it sells to consumers is generated using a diverse range of fuels and technologies, including renewable technologies." This standard seeks to motivate utilities such as TVA to avoid reliance on one or two fuel sources and decrease risk to consumers associated with dependence upon one fuel type. In addition, new technologies and renewable energy generation are expected to be included in the generation risk.

TVA's existing decision processes satisfy this standard. TVA already has a diverse fuel mix, including 29 conventional hydropower dams, 1 pumped storage hydro-facility, 11 coal-fired plants, 3 nuclear plants, 8 combustion turbines sites, 9 diesel generators, 18 wind turbines, 1 anaerobic digestion, 16 photovoltaic (solar), demand side management, and purchase power agreements for lignite, combined cycle, and landfill gas. When developing its plan for meeting future energy demands on the TVA system, TVA evaluated a wide range of energy generation options in its IRP FEIS. TVA adopted as part of the IRP a mix of generating resource and fuel supply options. Implementation of the IRP is expected to maintain and increase the diversity of TVA's fuel mix regardless of decisions TVA may make respecting the proposed PURPA standards. Accordingly, TVA proposes to adopt the fuel diversity standard as written. TVA will continue to consider and review the fuel diversity mix on its system as part of its power supply planning activities. Because diversity of fuel mix is already a TVA goal and part of TVA's IRP and the effects of doing this have already been evaluated, this standard is not discussed further in this EA

Fossil Fuel Generation Efficiency - Under the proposed fossil fuel generation efficiency standard (16 USC Section 2621[d][13]), "each electric utility shall develop and implement a 10-year plan to increase the efficiency of its fossil fuel generation." The PURPA standard sets no specific targets for improvement.

TVA already has a continuous focus on, and makes investment on a project by project basis, to improve both the reliability and heat rate of its fossil system or the efficiency of its fossil generation. TVA's current planning horizon for such efficiency improvements is five years, but in the future may extend for varying periods consistent with the strategic and financial planning needs of the agency. In this case, the standard will conform to those actions that are already taking place at TVA, and which have been, or will be, financially and environmentally reviewed as individual opportunities are identified and arise. TVA proposes to adopt a modified version of the standard with a 5-year plan requirement instead of a 10-year. Because the standard is already being implemented on the TVA system, it is not addressed further.

Interconnection - Under the proposed interconnection standard (16 USC Section 2621[d][15]), TVA and its distributors would offer interconnection services "based upon the standards developed by the Institute of Electric and Electronics Engineers (IEEE) Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems." This standard focuses on safety and reliability and establishes a more broadly standardized approach to providing such services in the TVA region. TVA already has a Large Generator Interconnection procedure for facilities with an output of greater than 20 megawatts and is currently developing an interconnection procedure for smaller generators apart from the proposed standard.

Completely independent of this standard, TVA or its distributors are obligated under the Federal Power Act to interconnect qualifying facilities to the electric system. This proposal would simply make the standard for interconnection uniform. The standard would be implemented as part of an interconnection procedure for connecting customers with small generators (generators with output of 20 MW or less) located on their property consistent with IEEE Standard 1547. Corresponding procedures would be developed for adoption by distributors. This interconnection procedure is substantively consistent with the Federal Energy Regulatory Commission (FERC) Order 2003 for interconnection of small generators. TVA proposes to adopt the interconnection standard with modifications. Because TVA is already required to interconnect qualified facilities and it does so, adopting this standard would not result in additional environmental impacts and the standard is not discussed further.

2.0 Issue Identification

The new standards are intended to further the goals of PURPA, as amended. Among these goals are increasing electricity transmission capacity and reliability, increasing energy efficiency, providing equitable retail rates for electric consumers, and promoting renewable energy.

The Smart Metering standard, which includes the advance of technological capabilities, is expected to affect consumer behavior and result in changes in the timing and demand for electricity. This results from setting higher prices for electricity used during peak periods (Time of Use pricing) so that customers will be encouraged to use less electricity during peak periods and more electricity during cheaper off-peak periods. The Net Metering standard could encourage generation by others. Both of these standards could affect TVA's existing generation profile and the need for more, or less, generating and transmission capacity on the TVA system. From a potential environmental impact standpoint, customer responses to these two standards could: 1) have socio-economic effects; 2) alter the timing and makeup of air emissions in the Tennessee Valley region; and 3) possibly substitute footprint impacts from many smaller distributed generating facilities for the footprint impacts associated with constructing larger generating and transmitting infrastructure to help meet energy demands.

Forecasting such customer responses and potential impacts involves substantial speculation. Customer responses which drive potential impacts depend on the decisions of others over which TVA has no control. While Smart Metering and Net Metering are expected to induce certain behavior and action by customers, other factors will also influence customer decisions such as the state of the economy. Analyses of potential impacts must be based on reasonable assumptions, as described in the following sections of this EA. Trying to predict the potential footprint impacts of siting and operating small distributed generating facilities is especially difficult and speculative.

3.0 Alternatives

For each standard, TVA's alternatives are: 1) to decline to adopt the standard (No Action Alternative), or 2) to adopt the standard verbatim or with modifications (Action Alternative). As explained in the descriptions in the background section of this EA, ongoing TVA activities already address and are essentially implementing three of the standards (fuel diversity, fossil fuel generation efficiency, and interconnection). TVA is proposing to adopt these standards but doing so would not change the environmental status quo because they basically are already a part of TVA's current operations.

For the remaining two standards, i.e., Smart Metering and Net Metering, TVA proposes to adopt the standards in order to encourage different classes of customers to modify their time-of-use for electricity to shape load demand, or to promote energy conservation and renewable energy generation. The Action Alternative and the subsequent analyses describe the potential impacts of fully implemented programs.

3.1 No Action Alternative - Do Not Adopt and Implement Smart or Net Metering Standards.

Under the No Action Alternative, TVA would not implement the Smart Metering or Net Metering standards. Under this alternative, TVA would decide not to adopt these standards. If it did this, TVA would address increased peaking power needs using one or more of the alternative approaches discussed and analyzed in the IRP (TVA 1995). TVA also would continue to encourage some use of Net Metering through its existing TVA Green Power Switch Generation Partners program that uses Net Metering to encourage residential solar and wind generation.

3.2 Action Alternative - Adopt and Implement the Smart and Net Metering Standards

For its customers, under the Smart Metering standard, TVA would implement seasonal and/or time-of-use differentiated pricing at the wholesale level in a manner that would encourage a shift in use of electricity from peak to off-peak periods,

Under this alternative to address the intent of Net Metering standard, TVA would purchase power, if requested, only from certain qualifying distributed generation (DG) facilities, if it is technically feasible to do so. TVA would use its current Generation Partners program as the model for the Net Metering standard. Net Metering participants would be limited to small renewable producers of electricity in the implementation of this standard. Larger DG facilities and non-renewable energy facilities would not be considered for participation in the Net Metering program. If other kinds of qualifying facilities wanted to sell power to TVA, arrangements to accommodate this would be made as required by the Federal Power Act.

If TVA decides to adopt these standards, it is anticipated that it would work with its distributors over the next several years to implement the standards in an adaptive manner (a manner that responds to events and issues that arise during implementation). As long as any adaptations continue to fall within the scope of this EA, including assessed impacts and benefits, additional environmental review of any adaptations is not anticipated.

Smart Metering (Time-Based Metering) standard. Implementation of this standard involves two components: (1) a time-based rate structure (e.g., which may include time-of-use pricing, critical peak pricing, real-time pricing, or peak load reduction credits); and (2) an advanced metering and communications technology. TVA could choose to set in advance time-of-use pricing and change its time-of-use rates only once or twice a year. Alternatively, time-of-use pricing could be only in effect for certain peak days, or rates could change on a real-time basis as often as hourly. TVA could choose to make the time-of-use rates and communication mandatory for certain classes of customers such as large industrial customers and optional for of other customers. In addition, TVA could

work with distributors to implement retail time-based rates and to assist with implementation of smart technologies via marketing incentives. TVA anticipates exploring with its distributors various methods of "packaging" of Smart Metering program initiatives through an adaptive approach to implementation.

Net Metering standard. TVA would limit eligible customers participating in Net Metering standard program to wind, solar and renewable energy generation participants, similar to the types in its current Generation Partners program. Qualifying facilities using other types of technologies, such as fuel cells, micro-turbines, combined heat and power (CHP) systems, solar heating of water, etc., would not be part of the program but would continue to be addressed as required by the Federal Power Act.

If TVA chooses the action alternative, TVA would offer power distributors voluntary participation in a dual-metering purchase program under which TVA purchases all energy outputs from eligible generation sources, and all energy used by the customer is billed at the applicable retail rate. This approach is necessary because of the unique "all requirements" agreements that TVA currently has with its distributors.

3.3 TVA's Preferred Alternatives for the Smart and Net Metering Standards

TVA's preferred alternative for the Smart Metering standard is to initiate a rate change process in accordance with the provisions of its wholesale power contract with the distributors of TVA to assess in detail: 1) the benefits and costs of implementing a time-based rate schedule for wholesale customers, under which rates reflect seasonal and time-of-day variations in the cost of generating and purchasing electricity and retail customers can voluntarily choose to move to TOU rates and install smart meters, 2) the benefits and cost of implementing advanced metering and communications technology to help the electric consumer who chooses to participate manage energy use and cost, and 3) other factors affecting the implementation of such structures.

TVA's preferred alternative for the Net Metering is also to implement the standard with modifications. Under this standard, as modified, TVA would make available to distributors of TVA power upon request the option to participate in a dual-metering purchase program modeled after TVA's current Generation Partners pilot program. This approach would, in effect, promote renewable energy. Under this dual metering purchase program, TVA would purchase all electric energy generated by an electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities. Two meters would be used to separately measure electricity usage and electricity production. TVA would from time-to-time evaluate the effectiveness of the program and determine whether or not it should be modified or discontinued.

As described in Section 3.2 TVA would engage in an adaptive process to fully implement these preferred alternatives.

4.0 Environmental Impacts

Based upon the issues identified in Section 2.0 of this EA, TVA evaluated the potential for socio-economic and air quality impacts in further detail. The potential for other kinds of impacts associated with encouraging the construction and use of renewable energy technologies, demand-side management activities, and energy efficiency improvements was previously evaluated in other environmental reviews identified above, including the IRP EIS. There would likely be differing site-specific impacts from customers constructing some of the qualifying facilities in response to the adoption of the Net Metering standard, but these cannot be reasonably foreseen and would likely be insignificant. There are various laws, regulations, ordinances, and federal Executive Orders that address and control most kinds of environmental impacts and that help hold possible impacts to environmentally acceptable levels.

4.1 Socio-economics

TVA analyzed the potential changes in energy use and resulting effect on socioeconomic conditions from adopting the Smart Metering and Net Metering standards. This analysis is based on estimates of how many customers would participate in the programs designed to meet the standards, how much their energy use would change, and how much customers and TVA would save by participating.

4.1.1 Smart Metering

Energy Use--The primary purpose of the Smart Metering standard is to reduce peak energy consumption. Serving peak load requires investment in less frequently used generating assets and use of more expensive fuels (typically natural gas). By setting optional TOU rates and letting consumers install smart meters so they can determine how much expensive peak energy they are using, TVA would encourage customers to reduce peak energy use.

The peak use of electricity on the TVA system, over 30,000 MW, has historically occurred in the middle of the hottest afternoon of mid to late summer as residents return home from work and increase their energy usage. A winter peak, which tends to be slightly lower than the summer peak, occurs in the early morning of the coldest winter day as residents turn up their heat when they wake up and schools, offices, and factories begin operation.

TOU rate design must avoid creating new peaks as people try to avoid the absolute peak time by turning on appliances before the peak, turning them off just before the peak, and turning them back on just after the peak. Therefore, TVA has established its Action Alternative rate analysis to reflect a summer peak period over a relatively long period during the day. For this analysis the summer peak period is defined as every day from June through September between 11 A.M. and 8 P.M. Central Time. The winter peak period is defined as weekdays from 5 A.M. until noon Central Time. The cost of electricity during the summer peak period would be higher than the cost during the winter peak period. Because the summer peak is higher and requires the most generating capacity to be available, the analysis described below highlights the results for the summer peak.

TVA analyzed how much summer peak generation (MW) and total annual energy use (GWh) would be reduced, how much money customers would save, and the financial

effect on TVA by implementing the Smart Metering standard. The analysis was based on the assumption that customers would choose to participate in Smart Metering only if the participation made economic sense to them. The estimates of participation rates in the proposed Smart Metering program are driven primarily by the likely costs of meters and whether the monthly electric bill would be large enough that the customer could save enough to pay back the cost of the meters over a reasonable period of time. The market potential for residential and commercial classes was determined by identifying those consumers with large square footage homes and buildings. Industrial customers were identified as those manufacturers with the larger minimum kW demands.

Based on customer size and share of adopters by class, TVA has estimated that about 26 percent of residential customer load, about 25 percent of commercial customer load, and about 37 percent of industrial customer load would be likely to participate in a Smart Metering program. The expected changes in energy use resulting for different types of participating customers are shown in Table 1.

Table 1. Expected Changes in TVA System Peak Demand for Electricity and Total Energy Use for Different Classes of Customers Participating in a Smart Metering Program (Action Alternative)

	Residential Customers	Commercial Customers	Industrial Customers
Change in TVA system summer peak (MW)	**-245 (1.6 %)**	**-205 (2.4 %)**	**-313 (4.8 %)**
Annual change in total energy use (GWh)	**-241 (0.4 %)**	**-69 (0.1 %)**	**-82 (0.2 %)**

With the reductions from each class of customers, the total reduction in the system summer peak potentially affected by Smart Metering is estimated to be about 763 MW, when full participation is achieved in approximately 5-10 years. This would be about 2.5 percent of the current summer peak. However, TVA expects that its overall and peak loads will continue to grow over time, in which case the reduction would be a smaller percentage of the peak at that time.

In addition to shifting electricity use from peak hours to off-peak hours, TVA also expects Smart Metering would result in a reduction in total energy use because investment in conservation measures would become more economical. Table 1 also shows the expected annual energy savings for each class of customer, for a total savings of 392 GWh. This would be about 0.7 percent of the current total generation. As with peak loads, expected growth in overall electricity use by the time there is full participation in Smart Metering means that the energy savings would be a smaller percentage of the overall generation than calculated for this analysis.

Socioeconomic Impacts--The potential for socioeconomic impacts from implementing Smart Metering under the proposed PURPA standard is related to the amount of money saved by consumers and/or TVA due to reduced energy use. As Table 2 shows, all classes of customers are estimated to save money on their electric bills. The average cost of the smart meter is expected to be slightly higher than the annual savings for both average residential and commercial customers, so it would take over a year for the

savings to cover the cost of the meter. However, the meters are expected to last over 15 years, so over time the cost of the meter would be recovered long before it would need to be replaced. (Several types of smart meters are available, so an average was used in this analysis.)

Table 2. Average Annual Monetary Savings for Different Classes of Customers

	Residential Customers	Commercial Customers	Industrial Customers
Number of participating customers	**663,700**	**220,900**	**20,900**
Total savings	**$40,333,000**	**$29,105,700**	**$49,459,900**
Average annual savings per customer	**$61**	**$132**	**$2367**
Average annual savings per customer (percent of bill)	**4.4 percent**	**4.8 percent**	**6.4 percent**
Average cost of meter (installed)	**$77**	**256**	**$599**

The small overall average savings would be beneficial to customers but insignificant given the size of the overall amount spent for TVA electricity (over $9 billion per year) or the economy of the TVA region as a whole (over $300 billion). However, the largest commercial and industrial customers could benefit substantially from the monetary savings, so their profits might allow additional investment and job creation, benefiting local economies. Perhaps more important is that as utilities in other areas also adopt TOU pricing, TVA's adoption would allow the region's commercial and industrial customers to remain economically competitive and lessen the likelihood that they would

leave the region for locations with lower prices. However, current estimation of that benefit would be highly speculative.

The aggregate annual savings on energy use by customers would translate into lower revenues, and thus an annual monetary loss of about $119 million to TVA. However, these losses would be offset by annual savings of about $77 million in generation cost and/or purchased power, including transmission and line losses. There would also be annual savings estimated at approximately $47 million from the deferral of costs for building new capacity. Overall net annual savings to TVA are estimated to be about $5 million. Distributors of TVA power are projected to experience savings from implementation of Smart Metering through benefits such as reduced meter reading expenses, billing savings, improved outage reporting and response, and better load information. These projected savings are relatively minuscule and within the uncertainty of the estimates so it is possible that TVA and its distributors could lose revenue in the implementation of the Smart Metering standard. If this occurs, there could be some small job losses at TVA or its distributors as a result. This is not expected to happen, however. Moreover, should revenue losses begin to occur, adaptive implementation of the adopted standards may enable TVA and its distributors to address weaknesses that are resulting in loss of revenue and thereby avoid this.

4.1.2 Net Metering

TVA expects that a voluntary Net Metering program implemented in accordance with the PURPA standard would be limited to the type of facilities in its existing Green Power Switch Generation Partners program. These would consist of small solar, wind, or landfill gas facilities at homes or businesses which would supply electricity to TVA when that electricity was not needed by the facility owner. Facilities can be up to 50 kW in size. The present generation partners program includes 214 kW of capacity at 24 sites. There are 19 residential solar systems totaling 118 kW, two residential wind systems totaling 26 kW, and three commercial solar facilities totaling 70 kW.

TVA has estimated how many customers might participate, and the ultimate capacity, based on its existing Green Power Switch program, in which participants pay a surcharge to buy certified green power. That program now has about 10,000 participants, and TVA estimates that it has an ultimate size of about one percent of total customers, or 50,000 out of a total of about 5,000,000 customers. Based on this small level of interest in the simpler Green Power Switch, even less interest expressed to this point in Net Metering, and the expense of building the facilities needed to participate, TVA estimates that participation in the Net Metering program might ultimately be about one percent of the Green Power Switch program, or about 500 participants (a 20-fold increase from the current participation level of the generation partners program). Typical system size is 1-2 kW, but factoring in some customers who might install the 50kW maximum size, TVA expects that the average size of system would be 5kW. Based upon these numbers, the ultimate capacity would be about 2.5 MW and it would take perhaps two years to reach this level of participation. (The technology is readily available now, but the degree of interest is uncertain and may take time to develop.) Based on TVA's experience with Green Power Switch and the ongoing Generation Partners pilot program, it is highly unlikely that participation would ever exceed 5 MW absent some unexpected major improvement in renewable energy technologies or very large increases in energy costs.

TVA expects the participants in Net Metering to be residential and commercial customers. Larger industrial customers would have very little capacity for generation which would be sold to TVA during peak times. They are much more likely for financial reasons to prefer to use their capacity for their own needs and avoid paying high demand charges to TVA rather than participating in a Net Metering program,

Energy Use—A Net Metering program would not have a direct effect on energy use. It would either add to, or substitute for, production at distributed non-TVA facilities for production at centralized TVA facilities. It could be that individual owners of the facilities might reduce their own energy use to limit the size of the system they would have to install. However, this would in aggregate be a very small amount of conservation not measurable in comparison to overall customer energy use. The solar facilities in particular might generate preferentially during the summer peak hours, so there could be some net production at that time which would help TVA reduce its peak generation, but even if the entire 2.5 MW were available at that time, it would only be 0.3 percent of the 762 MW reduction of the TVA system peak estimated from the Smart Metering program

Socioeconomic Impacts—In FY 2006, the existing Generation Partners program sold TVA approximately 91,000 kWh of production at a total purchase price of $15,000. This was less than $1,000 per partner. Because the cost of the systems can be expensive, most of these partners probably will not break even for some years. Thus on a net basis the socioeconomic benefits would be small for the facility owners. Extrapolating an approximately 20-fold expansion (see above discussion) from 24 current sites to the projected 500, the total annual benefit would be approximately $300,000. This would be beneficial but very small for the region as a whole.

4.2 Air Quality

4.2.1 Smart Metering

The primary purpose of Smart Metering is to inform consumers so that they can alter behavior to shift their demand for electricity in response to time-based pricing of electricity seasonally or throughout the day. The main effect of this change would be a projected small shift in energy usage from peak hours to off-peak hours (Table 1) that would result in slightly reduced need for TVA to construct, purchase or operate peaking units, and a slightly greater need for and use of intermediate or baseload generating capacity. On the TVA system, intermediate capacity would largely be coal-fired generating units. Baseload generation would be a mix of nuclear and coal-fired generation.

The generation source for peaking power being off-set would most likely be a peaking, gas-fired combustion turbine (CT) facility. Characteristic emissions from CT sources typically include nitrogen oxides (NO_X), carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compounds (VOCs). The reduction in the amount of emissions off-set from peaking sources would be small compared to TVA's total air emissions. The additional amount of air emissions resulting from increased use of intermediate or baseload generating facilities would also be correspondingly small and minor, and well within the normal operating variability exhibited for the TVA system on a year to year basis. The source for the minor amount of additional replacement intermediate or baseload capacity could be from any of the generating sources identified and evaluated in TVA's Integrated Resource Plan (IRP - Energy Vision 2020) EIS (TVA 1995). Regardless of the generation source, the emissions from any replacement generation,

assuming it is not nuclear, would be limited by applicable state and federal standards and permit requirements in effect at that time. These are formulated to help ensure that EPA's national air quality standards are met.

The shift in generation would be so small it would likely not be an important reason for adding new intermediate or baseload generation to the TVA system. Continued demand growth irrespective of adoption of the two standards here would drive this. The IRP FEIS addresses the impacts from adding new generating capacity to the system. Currently, it appears likely that TVA will meet future baseload capacity needs with more nuclear generation. This includes the recent restart of BFN Unit 1 and the planned uprating the power output of BFN Units 1, 2, and 3. TVA also has under consideration the completion of the partially-finished Unit 2 at Watts Bar Nuclear Plant, and the construction of a pair of advanced reactors (Westinghouse AP1000) at the existing TVA Bellefonte site. Air emissions from operation of these non-fossil fuel generation sources to meet baseload demand would be none to minor. Intermediate capacity needs are likely to be met with the addition of natural gas combined cycle facilities. Any emissions from these facilities would be very small and would be similar to those from CT generation that they would be replacing.

4.2.2 Net Metering

Adopting the proposed Net Metering standard is expected to result in the connection of a small amount of qualifying renewable energy facilities to the TVA system. These would be limited largely to non-emitting technologies such as solar or wind, but could involve small amounts of other kinds of renewables with some emissions such as landfill gas generation. Any such emissions are expected to be small with insignificant impacts based on the small number of facilities and TVA's earlier assessments of impacts from similar actions. The level and rate at which these kinds of distributed generation facilities come on line is expected to be higher than now occurring under TVA's Generation Partners program, but would still be very low and as identified in Section 4.1 Socio-economics, would occur over an extended period of time. Because the amount of projected generation from these facilities is expected to be small and their reliability is typically low, it is unlikely that any displacement of current TVA generation would occur. Since large DG generators would not be involved with the Net Metering program, air emissions would likely be slightly less for the Action Alternative.

5.0 Agencies and Persons Consulted

As part of its scoping process for the PURPA standards, TVA held several public meetings in 2006-2007 to receive comments from across the Tennessee Power Service Area, as well as held multiple meetings with individual power distributors and the Tennessee Valley Public Power Association to receive input on whether or not to implement and how to structure or modify standards.

6.0 References

Tennessee Valley Authority. 1995. Integrated Resource Plan--Energy Vision 2020 Final Environmental Impact Statement and Record of Decision. TVA, Knoxville, Tennessee.

Tennessee Valley Authority. 2001. Construction and Operation of photovoltaic facilities within the Tennessee Valley Power Service Territory. Final Generic Environmental Assessment and Finding of No Significant Impact (FONSI). TVA, Knoxville, TN.

Tennessee Valley Authority. 2002. Summit Landfill Gas Generation Project. Final Environmental Assessment and FONSI. TVA, Knoxville, TN.

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