

US EPA ARCHIVE DOCUMENT

**BEFORE THE ADMINISTRATOR  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

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<i>In the Matter of:</i>	)	
	)	
<b>FINAL RULE,</b>	)	
<b>AIR QUALITY DESIGNATIONS</b>	)	<b>EPA-HQ-OAR-2008-0476;</b>
<b>FOR THE 2008 OZONE NATIONAL</b>	)	<b>FRL-9668-2, RIN 2060-AP37</b>
<b>AMBIENT AIR QUALITY STANDARDS,</b>	)	
<b>77 FED. REG. 30,088 (MAY 21, 2012)</b>	)	
	)	
	)	
<b>SHELBY COUNTY, TENNESSEE,</b>	)	
	)	
<i>Petitioner.</i>	)	

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**SUPPLEMENTAL PETITION FOR RECONSIDERATION**

On July 20, 2012, pursuant to Section 307 of the Clean Air Act (“CAA”), 42 U.S.C. § 7607, Shelby County, Tennessee (“Shelby County”), filed a Petition for Reconsideration of the Final Rule entitled “Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards,” 77 Fed. Reg. 30,088 (May 21, 2012) (the “Final Rule”).<sup>1</sup> Shelby County, through the undersigned counsel, now files this Supplemental Petition for Reconsideration (the “Supplemental Petition”), which provides further technical analysis in support of the legal and technical arguments set forth in Shelby County’s Petition for Reconsideration.

**INTRODUCTION**

Without the burdensome local emission reduction actions required by a nonattainment designation for the eight counties in the Memphis-TN-AL-MS Metropolitan Statistical Area (“MSA”), nitrogen oxide (NO<sub>x</sub>) emissions in the MSA already are projected to decrease by over

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<sup>1</sup> Shelby County’s Petition for Reconsideration incorporated by reference the State of Tennessee’s Petition for Reconsideration of the Final Rule, filed on July 19, 2012.

23,000 tons per year between 2008 and 2015. Similarly, volatile organic compound (“VOC”) emissions for the MSA are projected to decrease over 8,500 tons per year during the same time period.

These reductions will result from regional and national emission-reducing rules currently in place, which already pose significant economic burdens on the citizens, businesses, and local governments in a region experiencing disproportionate economic hardship. Based on EPA’s modeling, these reductions alone will result in all monitors in the MSA attaining the 2008 National Ambient Air Quality Standard (“NAAQS”) for ozone (the “2008 standard”) by 2014. A nonattainment designation for Shelby County will stigmatize the already under-resourced county and make it much harder for the area to overcome its current economic conditions. Since the issuance of the Final Rule designating the MSA nonattainment, the Greater Memphis Chamber has seen “business inquiries significantly diminish” and job creation numbers drop to less than 300 compared to 3,700 in 2011. Letter from Senior VP of Economic Development Mark Herbison to Bob Rogers, Memphis and Shelby County Health Department (Aug. 23, 2012) (attached hereto as Appendix 1).

### TECHNICAL ANALYSIS

For purposes of this Supplemental Petition, Shelby County has analyzed ozone modeling associated with (1) EPA’s Cross-State Air Pollution Rule (“CSAPR”)<sup>2</sup> and implementation of the 2008 standard; and (2) the Crittenden County Ozone Study (“CCOS”), a collaborative effort of the Arkansas Department of Environmental Quality (“ADEQ”), the Memphis and Shelby

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<sup>2</sup> In light of several petitions for review of CSAPR, the U.S. Appeals Court for the D.C. Circuit stayed CSAPR on December 30, 2011 and ordered that the Clean Air Interstate Rule (“CAIR”) remain in effect pending resolution of the petitions for review. On August 21, 2012, the D.C. Circuit vacated CSAPR and reinstated CAIR. *See Order, EME Homer City Generation, L.P. v. EPA*, No. 11-1302 (D.C. Cir. Aug. 21, 2012).

County Health Department (“MSCHD”), the Tennessee Department of Environment and Conservation (“TDEC”), and the Tennessee Valley Authority (“TVA”).

#### **I. CSAPR and 2008 Standard Modeling**

In her September 22, 2011 memorandum to EPA Regional Air Division Directors, Assistant Administrator Gina McCarthy states that “EPA’s modeling indicates that approximately half of the 52 areas [not attaining the 2008 standard] would attain the 0.075 ppm standard by 2015 (the expected deadline for Marginal areas) as a result of the emission-reducing rules already in place.” Memorandum from Gina McCarthy to Air Division Directors (Sept. 22, 2011) 2 (hereinafter, “McCarthy Memo.”). Later in that same memorandum, Ms. McCarthy lists some of the “emission-reducing rules” to which her earlier statement refers, such as CSAPR, the Portland Cement Rule, the Light and Heavy Duty vehicle standards, the Boiler Maximum Achievable Control Technology, the Mercury and Air Toxics Standards for power plants, the New Source Performance Standards for Commercial Incinerators/Solid Waste Incinerators and the Oil/Gas sector, and the Tier 3 vehicle and fuel standards. *Id.* She notes, “These federal actions will ensure steady forward progress to clean up the nation’s air and protect the health of American families, while minimizing and in many cases eliminating the need for states to use their scarce resources on local actions.” *Id.*

In support of these statements, Ms. McCarthy refers to modeling described in the *Spreadsheet projecting the hypothetical 8-hour ozone nonattainment areas for the 75 ppb NAAQS to 2015 to estimate the number of marginal nonattainment areas that are expected to attain the NAAQS by their attainment date of 2015*, (EPA-HQ-OAR-2010-0885-0064). In that document, EPA describes how it used CSAPR modeling to make projections for the ozone monitors across the country for 2015. Basically, the approach projects the 2008-2010 ozone

design values to 2015 using the modeled average percent per year change in ozone from the 2014 CSAPR final rule modeling (i.e., the CSAPR remedy case). The CSAPR modeling used a base year of 2005 and a future year of 2014 – a nine-year projection. EPA pro-rated the percent average annual ozone changes over the nine-year period to estimate the expected change in ozone between the 2008-2010 period and 2015, the year Marginal nonattainment counties must attain the 2008 standard. Because there are five years between 2010 and 2015, EPA used 5/9ths of the modeled percent change (between 2005 and 2014) and applied this pro-rated factor to the 2008-2010 design value for each monitor.

The CSAPR modeling is described in detail in *Air Quality Modeling Final Rule Technical Support Document*, US EPA, OAQPS, Air Quality Assessment Division, Research Triangle Park, NC (June 2011). EPA used 2005 as the base year for the CSAPR modeling because it was the most current year for which EPA had a complete National Emissions Inventory (“NEI”) available. *Id.* at 2. In addition to the 2005 base case, three future scenarios were modeled – 2012 base case, 2014 base case, and 2014 remedy. *Id.* The 2014 remedy case contained the emission reductions resulting from CSAPR plus all the other “emission-reducing rules” expected to come into effect between 2012 and 2014. *Id.* at 50 n.55. In contrast, the other future scenarios were based on just the other “emission-reducing rules” coming into effect between 2012 and 2014. *Id.*

The details of the emission inventories used in creating the emissions inputs for the modeling are described in *Emissions Inventory Final Rule Technical Support Document*, US EPA, OAQPS, Air Quality Assessment Division, Research Triangle Park, NC (June 28, 2011). According to this document, emission inputs for the 2012 and 2014 scenarios generally take into account “Federal and State measures already promulgated before emissions processing on the

Transport Rule [CSAPR] began in December, 2010.” *Id.* at 68. With respect to Electric Generating Unit (“EGU”) emissions, the document states that “the emissions reflect state rules and federal consent decrees through December 1, 2010.” *Id.* For mobile sources, “all national measures for which data were available at the time of the modeling” were included. *Id.* However, for non-EGU point sources and nonpoint sources, local control programs that might have been necessary for areas to attain the 1997 PM<sub>2.5</sub> annual NAAQS, the 2006 PM<sub>2.5</sub> 24-hour NAAQS, and the 1997 ozone NAAQS were generally *not* included in the future scenarios. *Id.* Notably, Shelby County already implements numerous voluntary actions to reduce the emission of ozone precursors, especially when high ozone levels are forecasted for the MSA. Appendix 2 to this Supplemental Petition lists Shelby County’s local actions to reduce emissions from mobile and other sources. These voluntary local actions were not included in the CSAPR modeling and result in approximate annual reductions of 62.4 tpy NO<sub>x</sub> and 78.1 tpy VOCs.<sup>3</sup>

The Emissions Inventory Final Rule Technical Support Document’s “Emissions Summaries”<sup>4</sup> spreadsheet provides the specific emission levels used in the CSAPR modeling by type of emission source and by state. Shelby County used the values in this spreadsheet to perform the technical analysis described below (supporting data tables are attached hereto as Appendix 3).

Table 1 summarizes the total NO<sub>x</sub> emission levels used in the CSAPR modeling for base case (2005 NEI), as well as the model’s projections of emissions in years 2012-2014 and the percentage of emission reductions by emission source type for the states of Arkansas,

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<sup>3</sup> These local actions help to lower ozone levels, particularly on ozone alert days, but their overall impact is dwarfed by the thousands of tons per year reductions represented by the national emission-reducing rules already in place. Further emission reductions from additional local actions required as a result of the nonattainment designation would likewise pale in comparison to the reductions attributable to these national rules.

<sup>4</sup> Available at <http://www.epa.gov/airtransport/techinfo.html>.

Mississippi, and Tennessee. Table 2 similarly summarizes the VOC emission levels and percent reductions. As shown in Tables 1 and 2, emissions of ozone precursors are projected to drastically decrease across the tri-state region between 2005 and 2014 due to federal, state, and local “emission-reducing rules” included in the CSAPR modeling. NO<sub>x</sub> emissions are projected to decrease by 18 to 33% in that timeframe, while VOC emissions are projected to decrease 14 to 19% during the same period.

Using an approach similar to that taken by EPA for comparison with the 2008 ozone NAAQS, Shelby County extrapolated the CSAPR modeling for 2014 to 2015<sup>5</sup> by taking the average annual 2005 to 2014 emission reduction percentages for each of the three states listed in Tables 1 and 2 and applying them to the corresponding 2008 emissions for the eight counties in the Memphis MSA. In other words, Shelby County divided the 2005 to 2014 emission reduction percentages in Tables 1 and 2 by 9 (for the nine-year period between 2005 and 2014) and multiplied the resulting average annual emission reduction percentage by 7 (for the seven years between 2008 and 2015). The county-level emissions used in the analysis are from the 2008 NEI, v2.<sup>6</sup> These 2008 emission levels vary somewhat from the emission levels referenced by EPA in its attachment to Gwendolyn Keyes Fleming’s December 8, 2011 letter to Governor Bill Haslam (concerning EPA’s intentions to designate certain counties in Tennessee as nonattainment) due to EPA’s use of an earlier version (v1.5) of the 2008 NEI. Version 1.5 is no longer available. Tables 3 and 4 summarize the results of Shelby County’s analysis of the projected NO<sub>x</sub> and VOC reductions in the MSA from 2008-2015.

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<sup>5</sup> See pages 3-4 *supra*, describing the approach used in *Spreadsheet projecting the hypothetical 8-hour ozone nonattainment areas for the 75 ppb NAAQS to 2015 to estimate the number of marginal nonattainment areas that are expected to attain the NAAQS by their attainment date of 2015*, (EPA-HQ-OAR-2010-0885-0064))

<sup>6</sup> <http://www.epa.gov/ttn/chief/net/2008inventory.html>.

With regard to EGU emissions in Shelby County, TVA already has reduced NO<sub>x</sub> emissions at its Allen Power Plant by about 70%, far more than the 55.7% of EGU emission reductions assumed in Shelby County's analysis. These reductions have been achieved by adding selective catalytic reduction ("SCR") to all three units at the plant. Table 5 summarizes the NO<sub>x</sub> emissions levels for the Allen Power Plant for the last four years and shows that the NO<sub>x</sub> emission rate has also decreased approximately 65%. Neither NO<sub>x</sub> emissions nor the NO<sub>x</sub> emission rate from the Allen Power Plant is expected to increase through the foreseeable future due to (1) the continued effect of CAIR<sup>7</sup>; (2) the requirements of a federally enforceable consent decree (*See* Consent Decree, *Alabama v. TVA*, No. 3:11-cv-00170 (E. D. Tenn. June 6, 2011) (requiring TVA to, *inter alia*, install and operate SCRs on all three units at the Allen Power Plant and cap system-wide NO<sub>x</sub> emissions through 2018 and each year thereafter); and (3) TVA's own commitments to reduce its load growth and install emission reduction equipment and new technology to control emissions from over eighty percent of fossil generation in the next ten years. (*See* "2010 Review of TVA's 2008 Environmental Policy" 8, attached hereto as Appendix 4).

Table 6 summarizes the results of the modeling done for CSAPR and the extrapolations made by EPA for the 2008 ozone NAAQS for the MSA.<sup>8</sup> These ozone levels represent the improvements to air quality expected from the emission reductions projected by EPA to be made in the MSA and across the region. As shown in Table 6, all four ozone monitors in the MSA are

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<sup>7</sup> On August 21, 2012, the D.C. Circuit vacated CSAPR and reinstated CAIR. *See* Order, *EME Homer City Generation, L.P. v. EPA*, No. 11-1302 (D.C. Cir. Aug. 21, 2012).

<sup>8</sup> *Spreadsheet projecting the hypothetical 8-hour ozone nonattainment areas for the 75 ppb NAAQS to 2015 to estimate the number of marginal nonattainment areas that are expected to attain the NAAQS by their attainment date of 2015*, (EPA-HQ-OAR-2010-0885-0064).

projected to be well below the 2008 ozone NAAQS by 2014 and 2015 based on EPA's modeling.

As described above and mentioned in Ms. McCarthy's September 22, 2011 memorandum, these monitors are projected to be 8-12% below the 2008 standard by 2015 due to "emission-reducing rules already in place" and without "the need for states to use their scarce resources on local actions." McCarthy Memo. 2. In making its 2012 ozone designations, EPA promised to be "mindful of the President's and Administrator's direction that in these challenging economic times, EPA should reduce uncertainty and minimize the regulatory burdens on the States." *Id.* at 1. Here, all MSA monitors are projected to be in compliance with the 2008 standard by 2015 without further local actions to reduce emissions. EPA is not "minimiz[ing] the regulatory burdens on the States" by imposing a nonattainment designation on Shelby County, an area (1) already in attainment based on 2009-2011 monitoring data;<sup>9</sup> and (2) projected to be in attainment in 2015. EPA therefore acted arbitrarily, capriciously, in abuse of its discretion, or otherwise not in accordance with law by designating Shelby County nonattainment for the 2008 standard.

## II. CCOS Modeling

During the 2005-2007 timeframe, ADEQ, in collaboration with MSCHD, TDEC, and TVA, conducted the CCOS to better understand the sources and mechanisms causing high ozone concentrations at the Crittenden County monitor. In addition to collecting additional ozone and meteorological data during 2005, CCOS consultant ICF International ("ICF") modeled three high-ozone episodes during the 2005 ozone season. Results of the monitoring and modeling

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<sup>9</sup> See Shelby County's Petition for Reconsideration 10-11.

conducted for CCOS are described in *Analysis of Three 2005 Crittenden County Ozone Study (CCOS) Episodes Using Air Quality Modeling Tools* (June 2007).

As an important component of the CCOS, ICF used the Ozone and Precursor Tagging Methodology (“OPTM”) to estimate the contributions to ozone formation from various sources, source categories, or source regions. The OPTM tags ozone formed during the chemistry step of the modeling and attributes it to the sources of NO<sub>x</sub> and VOCs that contributed to its formation. In this way, the model is capable of identifying the primary sources of NO<sub>x</sub> and VOCs creating the high-ozone episodes at the Crittenden County monitor.

Among the key findings of the study, ICF concluded the following, based on the modeling, including the use of the OPTM:

The 2005 ozone episode periods were associated with a regional build-up of ozone and high ozone concentrations in several surrounding areas. It follows that the centralized location of Memphis within the mid-South increases the likelihood that emissions and resulting ozone concentrations from one or more surrounding urban areas including Dallas, Little Rock, St. Louis, Nashville, Knoxville, Louisville, Birmingham, Atlanta, and Baton Rouge contribute to high ozone in the Memphis area.

*Id.* at 1-5. ICF concluded, “Sources outside of the three-county [Crittenden, DeSoto, and Shelby] Memphis area *contribute significantly* to the daily maximum 8-hour ozone concentrations in the Memphis area.” *Id.* at 5-2 (emphasis added). ICF also found that the local contribution to the Crittenden County monitor is only about 22 percent, with only 13-14 percent coming from Shelby County. *Id.* at 5-8, 5-2. Emissions from on-road motor vehicles and non-road sources comprise the majority of the local contribution to the Crittenden County monitor’s ozone levels. *Id.* at 5-5. Further, only a very small percentage of Shelby County’s minor contribution to ozone levels at the Crittenden County monitor is from sources in the southwest industrial area, including TVA’s Allen Power Plant. *Id.* at 5-5, 5-10.

From Shelby County's analysis described above, EPA's CSAPR modeling projects that on-road and non-road emissions of NO<sub>x</sub> and VOCs will decrease across the eight-county Memphis MSA by over 18,000 and 7,000 tons per year, respectively. According to the 2008 NEI v.2, EGU, non-road, and on-road NO<sub>x</sub> emissions from Shelby County accounted for 59.9% of the anthropogenic emissions in the MSA. As shown in Table 3, those emissions are projected to decrease by 34.7% (or about 15,900 tons per year) between 2008 and 2015. These important projected reductions are expected to occur even though some of the rules used in the CSAPR modeling have been stayed or vacated; as noted above, TVA has already made significant reductions at the Allen Power Plant, and the rules affecting non-road and on-road mobile emissions are not stayed. These projected reductions represent a drastic reduction in ozone precursor emissions in the MSA. Based on the CCOS results, these emission reductions should have a substantial impact on ozone levels at the Crittenden County monitor.

Because all monitors in Shelby County met the 2008 standard in 2009-2011, EPA could designate Shelby County nonattainment only if it found that Shelby County "contributed meaningfully" to violations at the Crittenden County monitor.<sup>10</sup> The CCOS results indicate that Shelby County has minor impact on the Crittenden County monitor during high-ozone events, and EPA's own emissions projections and modeling indicate that Shelby County will have far less of an effect on the monitor in the future. EPA therefore acted arbitrarily, capriciously, in abuse of its discretion, or otherwise not in accordance with law by designating Shelby County nonattainment.

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<sup>10</sup> Shelby County Petition for Reconsideration 11.

## CONCLUSION

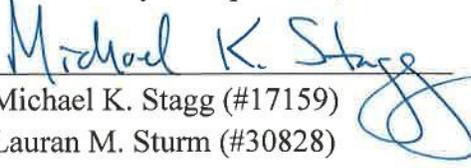
As shown above, EPA's modeling for CSAPR projects significant NO<sub>x</sub> and VOC emission reductions in Tennessee, Arkansas, and Mississippi between 2005 and 2014. EPA's modeling for implementation of the 2008 standard extrapolated the CSAPR modeling to 2015 and found that approximately half of all currently nonattaining areas nationwide would meet the 2008 standard in 2015, due to national and regional "emission-reducing rules already in place" and without "the need for states to use their scarce resources on local actions." McCarthy Memo. 2. Shelby County calculated the county-by-county emissions projected for the MSA by 2015 and found that NO<sub>x</sub> emissions in the MSA are projected to decrease by over 23,000 tons per year or about 31% between 2008 and 2015 and that VOC emissions are projected to decrease by over 8,500 tons per year or about 18% over the same time period. *See* Tables 3 and 4. Based on the CSAPR modeling and EPA's 2008 ozone standard modeling, all monitors in the Memphis MSA are projected to be well below the 2008 ozone NAAQS by 2014 and 2015.

Further, the CCOS modeling concluded that sources outside of the three-county Memphis area *contribute significantly* to the daily maximum 8-hour ozone concentrations during high-ozone episodes in the MSA. At the Crittenden County monitor, the local contribution during these high-ozone episodes was estimated to be only about 22 percent, with approximately 13-14 percent coming from Shelby County. Regarding Shelby County's minor impact on ozone levels at the Crittenden County monitor during those high-ozone episodes, ICF found that only a small percentage came from sources in the southwest industrial area, which includes TVA's Allen Power Plant. As shown above in Table 5, TVA already has reduced NO<sub>x</sub> emissions at the Allen Power Plant, Shelby County's largest single point source of NO<sub>x</sub> emissions, by adding SCR to all three of the plant's units. Thus, the industrial area's contribution to the Crittenden County monitor has decreased since the 2007 CCOS.

Based on 2009-2011 monitoring data, Shelby County is in attainment with the 2008 standard. As such, EPA can designate Shelby County nonattainment only if it finds that Shelby County “contributes meaningfully” to the violating monitor in Crittenden County. The modeling described in this Supplemental Petition indicates that (1) Shelby County is currently in attainment of the 2008 standard and should be in attainment in 2015; (2) Shelby County does not contribute meaningfully to violations in Crittenden County; and (3) the entire MSA likely will be in attainment in 2015 due to already existing rules and without further local actions.

EPA promised to “minimize the regulatory burdens on the States” in making its ozone designations. *Id.* at 1. Nonetheless, EPA has designated Shelby County nonattainment when 2009-2011 monitoring data shows that Shelby County meets the 2008 standard and when modeling shows that Shelby County does not meaningfully contribute to any violations in Crittenden County. EPA’s designation is even more burdensome when its own modeling shows that the entire MSA will be in attainment with the 2008 standard in 2015. EPA has acted arbitrarily, capriciously, in abuse of its discretion, and otherwise not in accordance with law in designating Shelby County nonattainment, and Shelby County asks for reconsideration of the Final Rule.

Respectfully submitted and signed on this 18<sup>th</sup> day of September, 2012.

  
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**Appendix 1**

**Letter from Mark Herbison, Greater Memphis Chamber, to Bob Rogers,  
Memphis and Shelby County Health Department (Aug. 23, 2012)**



GREATER MEMPHIS CHAMBER

August 23, 2012

Bob Rogers  
Manager-Pollution Control  
Memphis and Shelby County Health Department  
[Bob.rogers@shelbycountyttn.gov](mailto:Bob.rogers@shelbycountyttn.gov)

Dear Bob:

Thank you for giving us the opportunity to address the impact that the potential designation of "non-attainment" is having on our ability to recruit new business or the expansion of existing businesses in our community. In 2011, while designated "attainment", Memphis experienced one of the best years for the recruitment of new businesses and expansions of existing companies with over 3,700 new jobs created and over \$1 billion dollars of new private capital invested. As we speak, Memphis has over four major manufacturing plants under construction that will employ over 3,000 Memphians in 2013 alone. These companies include Electrolux, Mitsubishi Electric, Kruger Tissue Group and City Brewing Company.

Since being notified about the potential for being designated "non-attainment", we have seen our business inquiries significantly diminish and as of August 15, 2012, less than 300 new jobs have been created by expanded or recruited companies in Memphis.

A formal designation of "non-attainment" would surely limit our ability to bring new jobs and investment in our community and make it exponentially more difficult to bring opportunities to the citizens of Memphis and Shelby County. Again, thanks for all the assistance you provide to our Chamber.

Sincerely,

Mark Herbison  
Sr. VP of Economic Development

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## Appendix 2

### **Local Emissions-Reduction Actions by Shelby County**

#### **Shelby County projects for emission reductions from mobile sources:**

- 1) Shelby Farms Greenline – Dedicated 6.5 mile bike path from an inner city neighborhood to Shelby Farms Park. Funding has been secured to extend the Greenline 4.3 miles further East to near the County line.
- 2) Main Street to Main Street Project – Funding has been secured for this \$30 million project to connect downtown Memphis with downtown West Memphis Arkansas with a bicycle/pedestrian path utilizing the Harahan bridge across the Mississippi River.
- 3) Shelby County School Bus diesel retrofit. Retrofitted approximately 150 school buses with pollution reducing controls.
- 4) COMCAST commercials in heavy rotation on local television focusing on pollution reducing activities.
- 5) City of Memphis Sanitation Trucks diesel retrofit. Retrofitted approximately 150 sanitation trucks with pollution reducing controls.
- 6) The City of Memphis now has catalogued 149 miles of bike/pedestrian facilities, including: 37 miles of bike lanes, 69 miles of shared lanes, 13 miles of shared use paths and 30 miles of walking paths. The majority of the bike lanes and shared use paths have been installed within the last 18 months. Funding has been secured for another approximately 100 miles of on-road bike lanes within the next 2 years.
- 7) Installation of bike racks on all MATA buses to allow for dual commuting.
- 8) Reduced transit fare (\$0.25) on forecasted Ozone Alert days.
- 9) Clean air materials including the “Cool-Five” tips to reduce air pollution have been given to administrators at all Memphis and Shelby County Schools and at numerous community events including Earth Day celebrations, school career days and fairs, and other civic events.
- 10) The Pollution Control Section fully utilizes the Tennessee Department of Transportation’s (TDOT) intelligent transportation system (ITS) to promote clean air messaging during air quality alerts.
- 11) WKNO radio (local NPR affiliate) drive time clean air radio messaging.
- 12) Memphis Area Transit Authority (MATA) bus wraps with clean air messaging in partnership with TDOT.
- 13) Vanpool contract with VRide to promote and provide vans for vanpooling.
- 14) Free web-based commuter matching service provided by the Pollution Control Section.
- 15) Guaranteed ride home is provided by the Pollution Control Section for all registered carpoolers and vanpoolers.

- 16) Utilizing a TDOT grant, an electric maintenance vehicle was purchased to replace a gasoline powered utility vehicle for the Shelby Farms Greenline.

**Shelby County projects for emission reductions from other sources:**

- 1) The new Unified Development Code was adopted in 2010 which is intended to reduce sprawl, encourage renewed urban development and make communities more people focused. The stated purpose of the code is as follows:

“This development code is designed and enacted for the purpose of promoting the health, safety and welfare of the residents of the City of Memphis and Shelby County by lessening or preventing congestion in the public streets; securing safety from fire and other dangers; furthering the provision of adequate light and pure air; avoiding excessive concentrations of population and wasteful scattering of population; encouraging such distribution of population and such classification of land uses as will tend to facilitate and conserve adequate provisions for transportation, water supply, drainage, sanitation, educational opportunity, and recreation; protecting and promoting both urban and nonurban development; and preserving landmark buildings, objects and sites.

- 2) Shelby County Office of Sustainability – Set up in 2011 to promote regional sustainable initiatives which normally reduce energy consumption. Current major project is managing a \$2.6 million HUD Regional Greenprint Planning grant.
- 3) Open burning permits issued by the Department are suspended when air quality forecasts indicate alert conditions.
- 4) All permits for standby electric generators now include a prohibition on testing or maintenance operation on forecasted air quality alert days. This includes the large bank of turbine generators operated by TVA at the Allen Steam Plant.
- 5) The Pollution Control Section employs a meteorologist to produce local air quality forecasts which are disseminated to the public in a variety of ways.
- 6) Installation and operation of two solar farms, rated at 1000 kW and 750 kW in 2011 and 2012.

Mobile Source Project	Estimated Emission Reductions	Basis
1 Shelby Farms Greenline	<b>4.45 lbs/day VOC</b> <b>3.37 lbs/day NOx</b>	<b>Actual Bicycle Count by Pollution Control Section</b>
2 Mississippi Bridge Project	<b>8.90 lbs/day VOC</b> <b>6.74 lbs/day NOx</b>	<b>Basis from utilizing factor from item 1 with approximately double</b>

Mobile Source Project	Estimated Emission Reductions	Basis
		mileage
3 School Bus Diesel Retrofit	26.30 lbs/day VOC	Factors utilized for application for TDOT grant
4 City of Memphis Sanitation Trucks	26.30 lbs/day VOC	Approximately same number of diesel retrofits as item 3
5 Bicycle Paths	205 lbs/day VOC 155 lbs/day NOx	Estimates based on approximately 300 miles utilizing item 1 emission factor
6 Reduced Transit Fares	151 lbs/day VOC 112 lbs/day NOx	Based upon MATA factor of 7% increase in ridership, and mobile 6 default values.
7 Vanpools	2.65 lbs/day VOC 1.96 lbs/day NOx	Based upon currently 7 vanpools and mobile 6 default values
8 Electric Utility Vehicle	25.0 lbs/day VOC 0.49 lbs/day NOx	Based upon factors from TDOT grant application.
Total from Mobile Reductions	449.6 lbs/day VOC 279.56 lbs/day NOx	
<b>Other Emission Reductions</b>		
1 Code Orange Day Generator Reductions	6,000 lbs/day potential VOC 228,720 lbs/day potential NOx	
2 Solar Farms	63 lbs/day NOx	Coal burning emission

Mobile Source Project	Estimated Emission Reductions	Basis
		<b>factors</b>
Total Other	<b>6,000 lbs/day VOC</b>	
	<b>228,783 lbs/day NOx</b>	
Total	<b>6,449.6 lbs/day VOC</b>	
	<b>229,062.6 lbs/day NOx</b>	

**Appendix 3**

**Data Supporting Shelby County's Technical Analysis**

<b>Table 1: NO<sub>x</sub> Emission Levels and Emission Reduction Percentages Used in CSAPR Modeling by Source Type and State for the Memphis MSA</b>			
<b>Year/Emission Source Type</b>	<b>Emissions (TPY)</b>		
	<b>Arkansas</b>	<b>Mississippi</b>	<b>Tennessee</b>
2005 EGU	35,407	45,166	102,934
2005 Non-EGU Point	35,846	53,985	54,255
2005 Nonpoint	21,453	12,212	18,676
2005 Nonroad	63,493	79,288	82,331
2005 Onroad	106,127	130,111	267,818
2005 Fires	2,654	3,833	1,012
<b>2005 Total</b>	<b>264,980</b>	<b>324,595</b>	<b>527,026</b>
<b>Emissions (TPY)/Emission Reduction From 2005 (%)</b>			
2012 EGU	33,540/ 5.3	23,655/ 47.6	37,694/ 63.4
2012 Non-EGU Point	34,685/ 3.2	51,634/ 4.4	51,355/ 5.3
2012 Nonpoint	21,194/ 1.2	12,073/ 1.1	18,483/ 1.0
2012 Nonroad	48,348/ 23.9	63,900/ 19.5	65,209/ 20.8
2012 Onroad	65,252/ 38.5	76,914/ 40.9	164,294/ 38.7
2012 Fires	2,654/ 0.0	3,833/ 0.0	1,012/ 0.0
<b>2012 Total</b>	<b>205,673/ 22.4</b>	<b>232,009/ 28.5</b>	<b>338,047/ 35.9</b>
<b>Emissions (TPY)/Emission Reduction From 2005 (%)</b>			
2014 EGU	36,347/ -2.7 <sup>1</sup>	26,294/ 41.8	29,276/ 71.6
2014 Non-EGU Point	32,253/ 10.1	49,191 /8.9	49,126/ 9.5
2014 Nonpoint	20,464/ 4.6	11,818/ 3.2	18,184/ 2.6
2014 Nonroad	45,075/ 29.0	59,663/ 24.8	60,111/ 27.0
2014 Onroad	56,878/ 46.4	65,639/ 49.6	144,394/ 46.1
2014 Fires	2,654/ 0.0	3,833/ 0.0	1,012/ 0.0
<b>2014 Total</b>	<b>193,671/ 26.9</b>	<b>216,438/ 33.3</b>	<b>302,103/ 42.7</b>

1. A negative reduction percentage indicates a projected increase in emissions rather than a decrease.

<b>Table 2: VOC Emission Levels and Emission Reduction Percentages Used in CSAPR Modeling by Source Type and State for the Memphis MSA</b>			
<b>Year/Emission Source Type</b>	<b>Emissions (TPY)</b>		
	<b>Arkansas</b>	<b>Mississippi</b>	<b>Tennessee</b>
2005 EGU	480	574	798
2005 Non-EGU Point	34,995	42,117	79,846
2005 Nonpoint	96,805	145,945	143,122
2005 Nonroad	37,068	37,238	58,612
2005 Onroad	44,446	48,728	100,951
2005 Fires	28,327	40,910	10,803
<b>2005 Total</b>	<b>242,121</b>	<b>315,512</b>	<b>394,132</b>
<b>Emissions (TPY)/Emission Reduction From 2005 (%)</b>			
2012 EGU	597/-2.4 <sup>1</sup>	352/38.7	863/-8.1 <sup>1</sup>
2012 Non-EGU Point	31,929/8.8	38,853/7.7	66,682/16.5
2012 Nonpoint	93,255/3.7	141,908/2.8	136,736/4.5
2012 Nonroad	28,880/22.1	28,908/22.4	42,527/27.4
2012 Onroad	27,307/38.6	27,321/43.9	62,182/38.4
2012 Fires	28,327/0.0	40,910/0.0	10,803/0.0
<b>2012 Total</b>	<b>210,295/13.1</b>	<b>278,252/11.8</b>	<b>319,793/18.9</b>
<b>Emissions (TPY)/Emission Reduction From 2005 (%)</b>			
2014 EGU	639/-33.1 <sup>1</sup>	399/30.5	773/3.1
2014 Non-EGU Point	31,839/9.0	38,561/8.4	66,476/16.7
2014 Nonpoint	91,449/5.5	139,519/4.4	133,244/6.9
2014 Nonroad	25,660/30.8	25,643/31.1	37,647/35.8
2014 Onroad	24,289/45.4	23,674/51.4	56,570/44.0
2014 Fires	28,327/0.0	40,910/0.0	10,803/0.0
<b>2014 Total</b>	<b>202,203/16.5</b>	<b>268,706/14.8</b>	<b>305,513/22.5</b>

1. A negative reduction percentage indicates a projected increase in emissions rather than a decrease.

**Table 3: Projected 2008-2015 NO<sub>x</sub> Emission Reductions By County and Source Type for the Memphis MSA Based on CSPAR Modeling and the 2008 NEI**

State/County/ Emission Source Type	2008 NO <sub>x</sub> Emissions <sup>1</sup>	2008-2015 Percent NO <sub>x</sub> Emission Reduction <sup>2</sup>	Projected 2015 NO <sub>x</sub> Emissions <sup>3</sup>	Projected 2008-2015 NO <sub>x</sub> Emission Reduction <sup>4</sup>
	(TPY)	(%)	(TPY)	(TPY)
<b>Arkansas</b>				
<b>Crittenden</b>				
EGU	2.43	-2.1	2.5	-0.1
Non-EGU Point	242.85	7.8	223.9	18.9
Nonpoint	10.69	3.6	10.3	0.4
Nonroad	3,362.02	22.6	2,575.6	750.4
Onroad	2,914.52	36.1	1,862.6	1,052.0
Fires	186.50	0.0	186.5	0.0
<b>Total</b>	<b>6,719.01</b>	<b>--</b>	<b>4,888.0</b>	<b>1,831.0</b>
<b>Average percent reduction</b>		<b>27.3</b>		
<b>Mississippi</b>				
<b>Desoto</b>				
EGU	96.14	32.5	64.9	31.3
Non-EGU Point	433.04	6.9	403.1	29.9
Nonpoint	85.33	2.5	83.2	2.1
Nonroad	1,556.87	19.3	1,257.1	299.7
Onroad	4,467.92	38.5	2,746.0	1,722.0
Fires	38.28	0.0	38.3	0.0
<b>Total</b>	<b>6,677.58</b>	<b>--</b>	<b>4,592.6</b>	<b>2,085.0</b>
<b>Average percent reduction</b>		<b>31.2</b>		
<b>Marshall</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	24.88	6.9	23.2	1.7
Nonpoint	24.19	2.5	23.6	0.6
Nonroad	474.88	19.3	383.5	91.4
Onroad	1,892.94	38.5	1,163.4	729.5
Fires	49.16	0.0	49.2	0.0
<b>Total</b>	<b>2,466.05</b>	<b>--</b>	<b>1,642.9</b>	<b>823.2</b>
<b>Average percent reduction</b>		<b>25.9</b>		
<b>Tate</b>				

EGU	0.0	--	0.0	0.0
Non-EGU Point	2,082.19	6.9	1,938.4	143.8
Nonpoint	17.63	2.5	17.2	0.4
Nonroad	263.99	19.3	213.2	50.8
Onroad	1,134.49	38.6	697.3	437.2
Fires	34.45	0.0	34.4	0.0
<b>Total</b>	<b>3,532.75</b>	<b>--</b>	<b>2,900.5</b>	<b>632.2</b>
<b>Average percent reduction</b>		<b>17.9</b>		
<b>Tunica</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	8.64	6.9	8.0	0.6
Nonpoint	6.17	2.5	6.0	0.2
Nonroad	1,024.25	19.3	827.1	197.2
Onroad	854.87	38.5	525.4	329.5
Fires	73.68	0.0	73.7	0.0
<b>Total</b>	<b>1,967.61</b>	<b>--</b>	<b>1,440.2</b>	<b>527.5</b>
<b>Average percent reduction</b>		<b>26.8</b>		
<b>Tennessee</b>				
<b>Fayette</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	143.42	7.4	132.8	10.6
Nonpoint	57.17	2.0	56.0	1.1
Nonroad	638.47	21.0	504.4	134.1
Onroad	2,240.17	35.8	1,438.2	802.0
Fires	18.07	0.0	18.1	0.0
<b>Total</b>	<b>3,097.3</b>	<b>--</b>	<b>2,149.5</b>	<b>947.8</b>
<b>Average percent reduction</b>		<b>33.2</b>		
<b>Shelby</b>				
EGU	8,177.03	55.7	3,622.4	4,554.6
Non-EGU Point	2,972.31	7.4	2,752.3	2220.0
Nonpoint	811.06	2.0	794.8	16.2
Nonroad	14,583.33	21.0	11,520.9	3,062.5
Onroad	23,134.61	35.8	14,852.5	8,282.2
Fires	15.21	0.0	15.2	0.0
<b>Total</b>	<b>49,693.55</b>	<b>--</b>	<b>33,558.1</b>	<b>16,135.5</b>
<b>Average percent reduction</b>		<b>26.8</b>		
<b>Tipton</b>				

**Table 4: Projected 2008-2015 VOC Emission Reductions By County and Source Type for the Memphis MSA Based on CSPAR Modeling and the 2008 NEI**

State/County/Emission Source Type	2008 VOC Emissions <sup>1</sup>	2008-2015 Percent VOC Emission Reduction <sup>2</sup>	Projected 2015 VOC Emissions <sup>3</sup>	Projected 2008-2015 VOC Emission Reduction <sup>4</sup>
	(TPY)	(%)	(TPY)	(TPY)
<b>Arkansas</b>				
<b>Crittenden</b>				
EGU	0.19	-25.7	0.2	0.0
Non-EGU Point	483.26	7.0	449.4	33.9
Nonpoint	1,529.05	4.3	1,463.2	65.8
Nonroad	1,113.28	23.9	846.8	266.5
Onroad	1,288.66	35.3	834.1	454.5
Fires	585.20	0.0	586.2	0.0
<b>Total</b>	<b>4,999.64</b>	<b>--</b>	<b>4,179.9</b>	<b>820.7</b>
<b>Average percent reduction</b>		<b>16.4</b>		
<b>Mississippi</b>				
<b>Desoto</b>				
EGU	8.25	23.6	6.3	2.0
Non-EGU Point	576.88	6.6	539.0	37.9
Nonpoint	2,225.21	3.4	2,149.0	76.2
Nonroad	744.95	24.3	564.2	180.7
Onroad	1,648.08	40.0	989.0	659.1
Fires	328.49	0.0	328.5	0.0
<b>Total</b>	<b>5,531.86</b>	<b>--</b>	<b>4,576.0</b>	<b>955.9</b>
<b>Average percent reduction</b>		<b>17.3</b>		
<b>Marshall</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	57.66	6.6	53.9	3.8
Nonpoint	604.99	3.4	584.3	20.7
Nonroad	137.54	24.3	104.1	33.4
Onroad	722.93	40.0	433.8	289.1
Fires	618.72	0.0	618.7	0.0
<b>Total</b>	<b>2,141.84</b>	<b>--</b>	<b>1,794.8</b>	<b>347.0</b>
<b>Average percent reduction</b>		<b>16.2</b>		
<b>Tate</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	118.24	6.6	110.5	7.8
Nonpoint	580.99	3.4	561.1	19.9
Nonroad	397.75	24.3	301.2	96.5

Onroad	361.96	40.0	217.2	144.8
Fires	364.23	0.0	364.2	0.0
<b>Total</b>	<b>1,823.17</b>	<b>--</b>	<b>1,554.2</b>	<b>269.0</b>
<b>Average percent reduction</b>		<b>14.8</b>		
<b>Tunica</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	36.23	6.6	33.8	2.4
Nonpoint	563.70	3.4	544.4	19.3
Nonroad	479.76	24.3	363.4	116.4
Onroad	331.39	40.0	198.9	132.5
Fires	354.11	0.0	354.1	0.0
<b>Total</b>	<b>1,765.19</b>	<b>--</b>	<b>1,494.6</b>	<b>270.6</b>
<b>Average percent reduction</b>		<b>15.3</b>		
<b>Tennessee</b>				
<b>Fayette</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	142.29	13.0	123.8	18.5
Nonpoint	582.47	5.4	551.2	31.3
Nonroad	280.13	27.8	202.2	77.9
Onroad	541.93	34.2	356.6	185.3
Fires	228.65	0.0	228.7	0.0
<b>Total</b>	<b>1,775.47</b>	<b>--</b>	<b>1,462.5</b>	<b>313.0</b>
<b>Average percent reduction</b>		<b>17.6</b>		
<b>Shelby</b>				
EGU	168.40	2.5	164.3	4.1
Non-EGU Point	4,042.89	13.0	3,516.4	526.54
Nonpoint	8,554.39	5.4	8,095.2	459.2
Nonroad	5,354.76	27.8	3,865.0	1,489.8
Onroad	8,015.40	34.2	5,274.6	2,740.8
Fires	129.32	0.0	129.3	0.0
<b>Total</b>	<b>26,265.16</b>	<b>--</b>	<b>21,044.8</b>	<b>5,220.4</b>
<b>Average percent reduction</b>		<b>19.9</b>		
<b>Tipton</b>				
EGU	0.0	--	0.0	0.0
Non-EGU Point	117.23	13.0	102.0	15.3
Nonpoint	1,311.76	5.4	1,241.3	70.4
Nonroad	581.97	27.8	420.1	161.9
Onroad	415.51	34.2	273.4	142.1
Fires	73.09	0.0	73.1	0.0
<b>Total</b>	<b>2,499.56</b>	<b>--</b>	<b>2,109.9</b>	<b>389.7</b>
<b>Average percent reduction</b>		<b>15.6</b>		

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1. 2008 emissions are from the 2008 NEI, v2 found at <http://www.epa.gov/ttn/chief/net/2008inventory.html>.
2. Based on the emission reductions for 2005-2014 from the CSAPR modeling. 2005-2014 percent reductions were divided by 9 and multiplied by 7.
3. Calculated by multiplying the percent emission reductions in column 3 by the 2008 emissions in column 2 and then subtracting that amount from the 2008 emissions in column 2.
4. The difference between 2008 emissions and the projected 2015 emissions.

**Table 5: 2008-2011 NO<sub>x</sub> Emissions and Emission Rates For TVA's Allen Power Plant<sup>1</sup>**

<b>Year</b>	<b>NO<sub>x</sub> Emissions (tons)</b>	<b>Heat Input (mmBTU)</b>	<b>NO<sub>x</sub> Emission Rate (lbs NO<sub>x</sub>/mmBTU)</b>
<b>2008</b>	8,056.714	51,568,207.13	0.31
<b>2009</b>	2,602.961	49,896,227.07	0.10
<b>2010</b>	2,449.442	47,693,766.31	0.10
<b>2011</b>	2,530.897	46,766,886.27	0.11

1. Source: EPA Air Markets Program database.

**Table 6: Projected 2014 and 2015 Ozone Design Values (DV) for Monitors in the Memphis MSA Based on EPA's CSAPR Modeling and EPA's Extrapolation of CSAPR Modeling Results to 2015<sup>1</sup>**

State	County	Monitor Location	2003-2007 DV (ppb)	CSAPR Projected 2014 DV (ppb)	2008-2010 DV (ppb)	2015 Extrapolated DV (ppb)
TN	Shelby	Frayser	80.0	68.3	76	69.8
	Shelby	Orgill	80.7	68.6	73	66.9
MS	DeSoto	Hernando	82.7	70.7	73	67.1
AR	Crittenden	Marion	87.3	74.4	74	67.9

1. Source: *Spreadsheet projecting the hypothetical 8-hour ozone nonattainment areas for the 75 ppb NAAQS to 2015 to estimate the number of marginal nonattainment areas that are expected to attain the NAAQS by their attainment date of 2015, (EPA-HQ-OAR-2010-0885-0064)*

Appendix 4

**TVA's Environmental Policy**



# 2010 Review of TVA's 2008 Environmental Policy

US EPA ARCHIVE DOCUMENT



TVA's Environmental Policy establishes a framework to guide decision-making and future strategic development and is reviewed every other year by the TVA Board of Directors. The results of the 2010 biennial review indicate that TVA's 2008 Environmental Policy remains consistent with the stated Board strategy and policy and does not require a revision at this time.

The review identified areas where TVA has made progress in meeting its Environmental Policy objectives and areas where it faces challenges that need to be managed. These areas of progress and challenge are described in this report and presented along with the policy principles to which they relate. They are identified throughout this document with this reference:



2010 comments based on Environmental Policy review

The original text from the 2008 Environmental Policy has not been modified and is included in its entirety in this review document.

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## The TVA Board

**CHAIRMAN DENNIS BOTTORFF** of Nashville, Tenn., serves as chairman and partner of Council Ventures, a venture capital firm. He was chairman of AmSouth Bancorporation in Nashville until his retirement in 2001 and previously was chief executive officer of First American Bank.

**MARILYN A. BROWN** of Atlanta, Ga., is a professor of energy policy at the Georgia Institute of Technology School of Public Policy and a distinguished visiting scientist at Oak Ridge National Laboratory. The author of more than 200 publications, she was a co-recipient of the 2007 Nobel Peace Prize for her work with the Intergovernmental Panel on Climate Change.

**MIKE DUNCAN** of Inez, Ky., is chairman, chief executive officer and director of Community Holding Co. and chairman, chief executive officer and director of Inez Deposit Bank. He is a director of the regional Center for Rural Development.

**THOMAS GILLILAND** of Blairsville, Ga., recently retired as executive vice president, general counsel and secretary of United Community Banks Inc. He is a former chief of staff to Georgia Lt. Gov. Pierre Howard and served as chairman of the Stone Mountain Authority under Georgia Govs. Roy Barnes and Sonny Perdue.

**BISHOP WILLIAM GRAVES** of Memphis, Tenn., is presiding bishop of the Christian Methodist Episcopal Church. He was previously pastor of the Phillips Temple CME Church of Los Angeles. He is the immediate past president of the board of the National Congress of Black Churches and a former member of the board of Memphis Light, Gas & Water Division.

**BARBARA S. HASKEW** of Chattanooga, Tenn., served Middle Tennessee State University as distinguished professor of economics for eight years. She also provided leadership for more than 20 years as chair of the department of economics and finance, dean of the college of business administration, and vice president and provost of the university. She previously managed TVA's Rate Staff for eight years.

**NEIL MCBRIDE** of Oak Ridge, Tenn., is a public-interest advocate and national leader in the field of public interest law. He is general counsel with the Legal Aid Society of Middle Tennessee and the Cumberland, a nonprofit law firm that gives free legal help in civil cases to people in need. He is also an adjunct professor at the University of Tennessee College of Law.

**WILLIAM B. SANSOM** of Knoxville, Tenn., has been chairman and chief executive officer of the H.T. Hackney Co. since 1983. Hackney is a diversified company involved in wholesale grocery and furniture manufacturing. He previously served on the TVA Board from 2006 to 2009 and was chairman from 2006 to 2008.

**HOWARD THRAILKILL** of Huntsville, Ala., retired as president and chief operating officer of Adtran, Inc., in Huntsville, which supplies equipment for telecommunications service providers and corporate end-users. Previously, he was president and chief executive officer of the firm Floating Point Systems.



## Message from the CEO

### Stewardship of the Tennessee Valley

*May 2008* – We are very much aware of the impact that the Tennessee Valley Authority's operations have on the environment, and we are working in partnership with others to further the region's environmental quality. In fulfilling its historic mission, TVA has contributed to the region's economic progress by meeting an ever-increasing demand for electricity while significantly reducing its impact on the environment. Yet, we recognize that greater challenges lie ahead to meet higher environmental standards and ensure the finite water and land resources under our stewardship are available for future generations.

The annual demand for electricity in the TVA service region is forecast to grow more than the national average. To offset the impact of meeting this demand, we are increasing our efforts in energy efficiency to reduce demand growth, investing in lower-carbon generating sources for meeting any additional growth, and lowering emissions from our current generating plants. This approach will help us improve performance and be proactive in our environmental stewardship responsibilities, while meeting the demand for more power at an affordable cost. However, future decisions to take further actions in these areas could put an upward pressure on power rates.

This policy sets out environmental objectives that help us make decisions about our business and identifies areas that allow TVA to produce cleaner, still-affordable electricity and provide environmental leadership in partnership with our stakeholders. We have established this policy because I, and all the people at TVA, appreciate the opportunity to provide cleaner power to you and your family now and in the generations to come.

Tom Kilgore  
President and Chief Executive Officer



## 2010 Review of TVA's Environmental Policy

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*August 2010* – TVA has completed the first biennial review of the 2008 Environmental Policy. The review was conducted by assessing the alignment of the policy with TVA's mission and strategy, evaluating major changes in the internal and external environment, and documenting progress toward policy objectives. The review also included TVA's financial reports, public information statements, major operational and capital investment planning assumptions, regulatory outlook, and initiatives to update TVA's Strategic Plan. It recognized that work under way on a new TVA Integrated Resource Plan and a Natural Resource Plan will provide the appropriate level of environmental assessment to support the policy when those efforts are completed. Progress is being made on all of the policy's environmental objectives, critical success factors and performance measures. The Environmental Policy review is reflected in annotated notes that address highlights and hard spots specific to each strategic objective, as well as general comments.

The results of this review indicate that TVA's 2008 Environmental Policy remains consistent with the stated board strategy and policy and does not require a revision at this time.

**Anda A. Ray**  
Environmental Executive and Senior Vice President  
Environment and Technology

*August 2010* – The biennial assessment of the 2008 Environmental Policy has been reviewed by TVA's Board of Directors as required in the policy. The 2008 policy continues to reflect TVA's current environmental intentions and serve as a guide for strategic and operational decision-making.

**Kimberly S. Greene**  
Group President  
Strategy and External Relations



## Executive Summary

TVA is engaged in responding to the Kingston Fossil Plant dike failure that occurred in December 2008, when over five million cubic yards of ash were released into the Emory River and Watts Bar Reservoir and onto adjacent lands. By the end of May 2010, TVA had removed all time-critical ash from the river. That is, it had taken all the necessary steps to protect public health and the environment, restore flow to the river and minimize further movement of the ash. The ongoing recovery and restoration efforts underscore TVA's commitment to environmental stewardship.

Following the ash spill, TVA announced plans to end the wet storage of ash and gypsum at all of its fossil plants in the next eight to 10 years. Its goal is to create the safest and most thoroughly inspected impoundments in the industry. Even though the ash spill was not due to any deficiencies in the Environmental Policy, TVA has initiated and is implementing a broad set of actions in the areas of organization structure; governance and accountability; risk management; and policies and procedures to address the shortcomings that contributed to the event.

Progress has been made toward increasing the amount of power TVA generates from non- or low-emitting sources while reducing peak demand and increasing energy efficiency. Issues related to more stringent regulations for carbon emissions are being addressed along with new clean air controls. TVA's continued investments have successfully reduced emissions of sulfur dioxide and nitrogen oxides at the fossil plants. However, complying with new and more-stringent regulations may present additional challenges in the future. Regulatory changes could also affect TVA's recycling of coal ash by-products.

As part of its resource stewardship responsibilities, TVA has implemented several water quality improvement projects. It faces operational challenges related to thermal compliance (the regulation of water temperatures in cooling water discharged from power plants) and the escalating number of new water-related regulatory initiatives.

To improve the management of public lands and strengthen stakeholder relationships, TVA has standardized and centralized many programs. It is working to improve land conditions and perform land assessments in order to minimize environmental liabilities. However, a comprehensive mineral rights policy has not been developed. This policy action is under review.

TVA is developing its Integrated Resource Plan, a comprehensive study of alternatives for meeting the electrical energy needs of the Tennessee Valley over the next 20 years while achieving environmental sustainability. It is formulating its Natural Resource Plan, which will evaluate the implementation of TVA's reservoir land planning; natural resource and water resource management; and recreation processes and strategies.

In June 2010, TVA submitted its Strategic Sustainability Performance Plan to the U.S. Office of Management and Budget, as directed by Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance.

TVA continues to implement the Environmental Policy, emphasizing the three issues that are important from the perspective of its customers and stakeholders: maintaining affordable rates; expanding collaboration, outreach and education; and furthering the quality of life in the Tennessee Valley.



## 2010 comments based on Environmental Policy Review

On August 20, 2010, TVA's Board of Directors restated TVA's vision:

To become one of the nation's leading providers of low-cost and cleaner energy by 2020.

The focus on "Enhance, Protect and Reduce" aligns TVA's Environmental Policy with this newly stated vision.



### EXHIBIT 1.2

TVA will lead in reducing the environmental impact of its operations and in protecting and enhancing the Valley's natural resources.

# Environmental Policy

## BACKGROUND

As stated in the 2007 TVA Strategic Plan, "TVA will be proactive in addressing environmental concerns, including those related to global climate change." This Environmental Policy provides board-level guiding principles to successfully lead TVA to reduce its environmental impact while continuing to provide reliable and competitively priced power to the Valley. There is a growing recognition of the environmental and economic need for an increased emphasis on actions that support sustainable initiatives to most effectively meet the three dimensions of the TVA mission. In the Strategic Plan, about half of the identified strategic objectives and critical success factors relate directly to TVA's environmental-related activities and policy-making. Following the release of the Strategic Plan, the board asked for the development of an integrated environmental policy to outline objectives and critical success factors across the multiple areas of TVA's activities. The policy also addresses TVA's response to the uncertain future of legislation on greenhouse gases (GHGs), including carbon, and the scarcity of available mitigating technologies in a carbon-constrained future.

## ENVIRONMENTAL POLICY

TVA's overarching Environmental Policy objective is to provide cleaner, reliable and still-affordable energy, support sustainable economic growth in the Tennessee Valley, and engage in proactive environmental stewardship in a balanced and ecologically sound manner.

### EXHIBIT 1

Overall Environmental Policy Alignment With TVA's Mission



In this context, the Environmental Policy directly aligns with the threefold TVA mission of Energy, Economic Development and Environment, and, as shown in the center of Exhibit 1, accents and integrates environmental leadership into all aspects of the TVA mission.

The Environmental Policy itself is not intended to serve as TVA's response to future environmental regulations, nor is it intended to outline a specific regulatory forecast for planning purposes. Rather, the policy establishes an overarching framework to guide decision-making and future strategic development. The board of directors will review the Environmental Policy every two years. More frequent reviews may be needed to respond to significant market and regulatory changes and ensure alignment with TVA's strategic priorities.

### Cleaner, reliable and still-affordable energy

TVA has an enduring responsibility to deliver reliable and affordable power to the residents and businesses in the Tennessee Valley. We have made investments to comply with environmental regulations in an efficient and affordable manner. We recognize the challenge ahead to achieve continuous improvements to make our generation portfolio cleaner while still meeting our commitment to a reliable and affordable energy supply.

### Sustainable economic development

Growth is an important component of maintaining the economic vitality of the Tennessee Valley, and TVA is committed to continued leadership in economic

development. We recognize unplanned growth can place great demands on all of our resources and lead to outcomes that can erode the quality of life within the Tennessee Valley. We believe the solution lies in achieving sustainable community and economic growth while considering environmental impacts.

#### Proactive environmental stewardship

Looking forward, we see the magnitude of the environmental challenges growing larger and requiring increasing innovation and leadership to find practical, effective and affordable answers to our stewardship challenges. To meet the environmental challenges of the 21st century and beyond, we must be proactive in our commitment to provide both affordable energy and environmental stewardship. We must work together to reduce the “footprint” we all impose upon the environment.

#### GUIDING PRINCIPLES

TVA will continue to integrate responsible environmental practices into its business operations by establishing goals, measuring progress and reporting performance through a comprehensive environmental management system. Employees are trained on their environmental responsibilities and factor environmental considerations into business decisions. TVA remains committed to complying with environmental laws and regulations, with a goal of continuous improvement.

#### Climate Change Mitigation

TVA plans to actively reduce its carbon emissions through cleaner energy options and energy efficiency initiatives.

#### Air Quality Improvement

TVA improves regional air quality by installing emission control equipment on existing generation and planning for cleaner future energy options.

#### Water Resource Protection and Improvement

TVA manages an integrated river system for multiple uses while striving to provide clean and sufficient water for the Valley’s needs.

#### Waste Minimization

TVA surveys all aspects of its operational and business functions to implement ways to reduce waste and increase recycling.

#### Sustainable Land Use

TVA manages public lands for multiple benefits, striving to keep them in good environmental health while balancing the need for sustainable development.

#### Natural Resource Management

TVA protects natural resources while providing recreational opportunities across the Valley.

#### POLICY DEVELOPMENT

The development of the Environmental Policy followed four phases. The first phase identified the key environmental focus areas and established an overarching framework for the policy. The evaluations performed in the second phase analyzed market forces and established a range of possible regulatory outcomes, highlighting the potential impacts of both on TVA. The third phase defined a series of environmental objectives and identified the critical success factors necessary to meet those objectives. The fourth phase asked for public comments and incorporated those comments into the final document, subject to approval of the policy by the TVA Board of Directors.

#### STAKEHOLDER INVOLVEMENT

TVA’s evaluation of stakeholders’ suggestions and feedback revealed four emerging themes they believe TVA should emphasize:

#### Leadership

TVA must take a leadership position in areas of its core competency such as nuclear power and hydroelectric power.

#### Partnerships

TVA should expand partnership opportunities with stakeholders, such as local, federal and state institutions, in specific focus areas.

#### Coordination

TVA should leverage its credibility and position as a federal agency to foster coordination among multiple parties to achieve common goals.

#### Commitment

TVA should clearly articulate its environmental commitment, preferred strategies for least-cost solutions and associated performance metrics.

**CHAPTER 2**

**Environmental Objectives and Critical Success Factors**

The Environmental Policy is organized into six environmental areas that encompass the variety of issues faced by TVA. These areas are climate change mitigation, air quality improvement, water resource protection and improvement, waste minimization, sustainable land use and natural resource management.



**CLIMATE CHANGE MITIGATION**

**Environmental Objective**

TVA will stop the growth in volume of emissions and reduce the rate of carbon emissions by 2020 by supporting a full slate of reliable, affordable, lower-carbon-dioxide (CO<sub>2</sub>) energy-supply opportunities and energy efficiency.

**Critical Success Factors**

- Reduce load growth by at least one-fourth over five years, through energy efficiency and demand-side management initiatives.
- Meet the remaining load growth through lower-carbon-emitting energy sources such as affordable renewables, nuclear and combined heat and power.
- Improve the efficiency of the transmission network, including the use of technologies such as Smart Grid, which helps achieve environmental benefits through improved communication and remote control, making the system more responsive in real time.
- Strive to reduce the rate of carbon and other GHG emissions from the existing generation fleet.
- Use affordable regional resources to comply with renewable and clean-energy standards and mandates, limiting the use of purchased compliance credits.
- Invest in a technology portfolio that supports low- or zero-carbon emitting generation options and electricity grid infrastructure to support a lower-carbon economy.
- Promote public education and outreach to encourage energy efficiency, clean end-user energy generation, premium green-energy offerings, and regional climate change mitigation opportunities.



**AIR QUALITY IMPROVEMENT**

**Environmental Objective**

TVA will continue efforts to reduce sulfur-dioxide, nitrogen-oxide, mercury and particulate emissions and engage regional and national stakeholders to develop better ways to understand, monitor and improve regional air quality, including all regulated air emissions.

**Critical Success Factors**

- Reduce emissions across the system by continuing to install emission reduction equipment and new technology to control over 80 percent of fossil generation in the next 10 years.
- Allow for earlier retirement of coal-fired plants if energy efficiency, renewables and clean-energy gains exceed targets.
- Elevate air quality improvement as a critical component in evaluating future capacity-planning decisions.
- Promote open exchange and collaboration with others to improve the industry's air quality control technology and modeling.





**WATER RESOURCE PROTECTION AND IMPROVEMENT**

**Environmental Objective**

TVA will improve reservoir and stream-water quality, reduce the impact of its operations, and leverage alliances with local and regional stakeholders to promote water conservation.

**Critical Success Factors**

- Mitigate TVA's impact on aquatic systems while balancing thermal cooling needs with consumptive use.
- Demonstrate a sustainable reduction of consumptive use of water at TVA's metered facilities.
- Integrate the impacts of water quality and quantity into the long-range planning and decision-making process.
- Maintain river system infrastructure for safe operation while operating in compliance with the operating policy from TVA's Reservoir Operations Study (ROS).
- Promote the integration of energy efficiency and water conservation into community planning and building construction.
- Collaborate in community outreach and partnerships through voluntary demonstrations of the efficient use of water resources and protection of water quality.



**WASTE MINIMIZATION**

**Environmental Objective**

TVA will drive increased sustainability in existing compliance programs and waste management practices by focusing on waste avoidance, minimizing waste generation, and increasing recycling to reduce environmental impacts.

**Critical Success Factors**

- Reduce the waste footprint of all TVA facilities by pursuing operational and business practices to decrease waste generation and improve recycling.
- Increase the percentage of recycled coal-combustion waste.
- Minimize low-level nuclear waste and contribute to efforts by industry groups and agencies to formulate innovative and sustainable solutions for the management of spent nuclear fuel waste.
- Further reduce the risk of polychlorinated biphenyl (PCB) releases to the environment over time by eliminating use of PCBs in large electrical equipment.



**SUSTAINABLE LAND USE**

**Environmental Objective**

TVA will strive to maintain the lands under its management in good environmental health, balancing their multiple uses, and will improve its land transaction processes to support sustainable development.

**Critical Success Factors**

- Actively manage TVA lands to meet the desired conditions for their purpose as defined in the Reservoir Land Management Plans.
- Develop a policy for managing TVA's mineral rights that considers the potential environmental impacts.
- Improve reservoir shoreline conditions through collaborative partnership initiatives and balance the multiple uses of the reservoirs in accordance with TVA's Land Policy and Shoreline Management Policy.
- Manage TVA lands, mineral rights, and shoreline access to better achieve environmental commitments while meeting the needs for recreation, residential access and economic development.



**NATURAL RESOURCE MANAGEMENT**

**Environmental Objective**

TVA will be a leader in natural resource management through the implementation of sustainable practices in dispersed recreation while balancing the protection of cultural, heritage and ecological resources.

**Critical Success Factors**

- Allow for properly managed, eco-friendly dispersed recreation while balancing the protection of biological, cultural and heritage resources.
- Promote ecological diversity and wildlife habitats on TVA lands through partnerships and voluntary initiatives.
- Increase the level of environmental quality and management consistency among TVA-managed and -leased recreation facilities.



## CLIMATE CHANGE MITIGATION

Greenhouse gases are produced by many natural and industrial processes. In order of abundance, the top four gases are water vapor, CO<sub>2</sub>, methane and nitrous oxides. GHGs are important to maintaining the temperature on the earth. Over the past decade, the impact of man-made GHG emissions has been the focus of much scientific, business and policy debate in the United States and abroad. Man-made CO<sub>2</sub> originates primarily from fossil-fuel combustion for transportation, electricity generation and industrial processes, accounting for more than 80 percent of the nation's total GHG emissions. Forty percent of the nation's CO<sub>2</sub> emissions can be directly attributed to electricity generation.

TVA is a large emitter in the power sector due to the size of its fossil generation portfolio. However, about 30 percent of TVA's current generation comes from non-carbon-emitting sources — nuclear, hydropower, and renewables — and that figure is forecast to be over 50 percent by 2020.

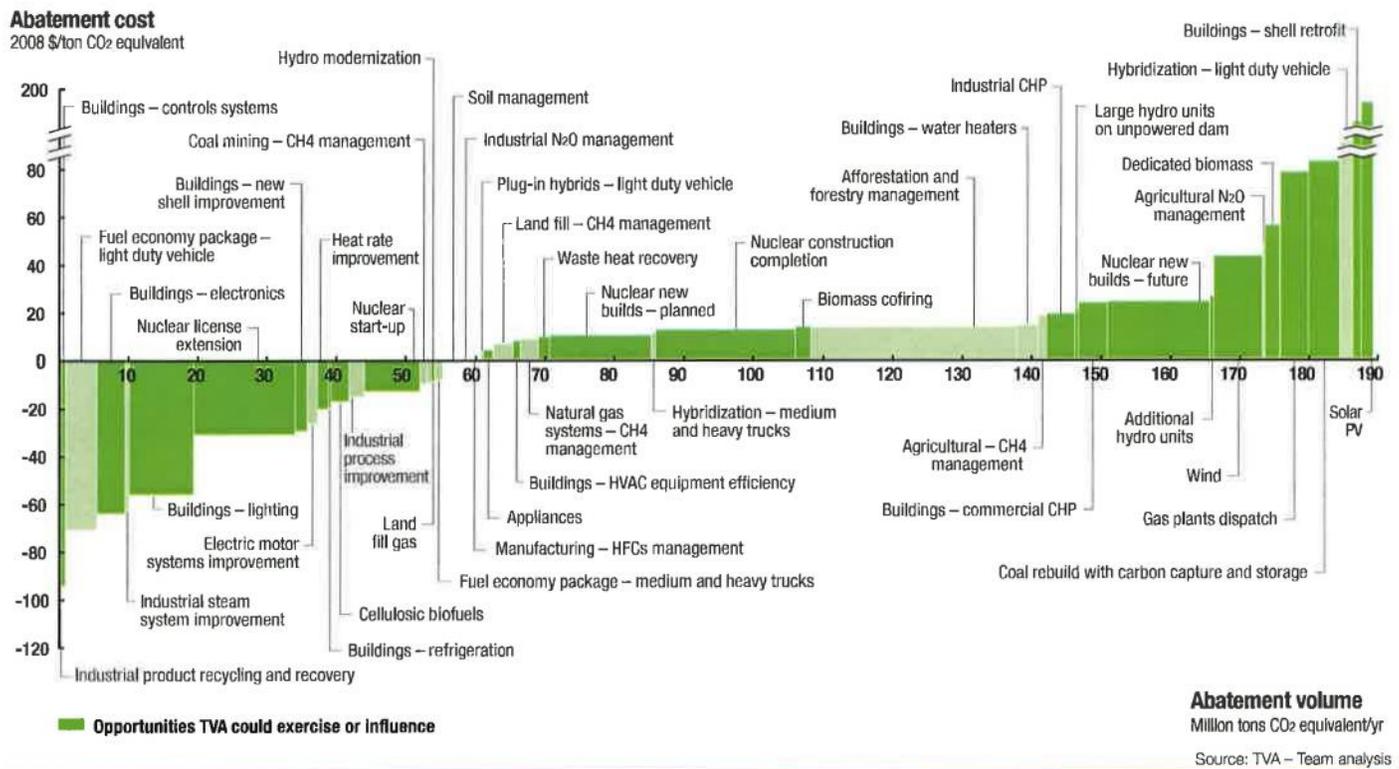
TVA's generating portfolio emissions "intensity" (tons-of-CO<sub>2</sub>-per-megawatt-hour) is near the national average and considerably better than that of most utilities in the Southeast.

Legislation has been introduced in the United States Congress requiring reductions of GHG emissions, specifically focusing on CO<sub>2</sub>. If enacted, such legislation could result in significant additional costs for TVA. To prepare to respond to this issue, TVA has undertaken a study of the opportunities to reduce GHG emissions in the Valley. In order to understand the cost-effectiveness of TVA's available actions relative to others within the Valley economy, TVA has created a comprehensive catalog of specific opportunities to reduce GHGs and estimated the corresponding volumes and relative costs associated with each. Those opportunities for carbon abatement that are within TVA's control or influence are shown with dark-green bars. Preliminary output from this analysis is depicted in Exhibit 2 on the next page.



**EXHIBIT 2**

**Tennessee Valley's Carbon Abatement Opportunities and TVA Opportunities (TVA shown as dark-green bars)**



The abatement curve visualized in Exhibit 2 illustrates the range of actions the Valley can take to reduce carbon emissions, including non-CO<sub>2</sub> gases. Each bar denotes a single type of opportunity to reduce carbon emissions or increase carbon absorption. The width of the bar represents the total net annual emissions reduction that would result from pursuing the opportunity. The height of the bar highlights the cost of pursuing each option relative to the costs that would be incurred if the current practices were maintained. Sequencing the options from least cost to highest cost helps provide a sense of the relative priority of the abatement measures and can be used to identify the least-cost approach to achieving any targeted level of emissions reduction.

The shape of the curve warrants explanation. The societal costs associated with each measure can be positive or negative in the aggregate. The benefits received are spread over time to one or more beneficiaries who may be different from those making the initial investments. A “negative cost” implies that pursuing the related option will result in a net savings over the life cycle of the oppor-

tunity relative to what would be incurred in the business-as-usual case. These savings are frequently the result of reduced energy costs associated with improved energy efficiency. The positive cost options require an incremental expense to abate emissions above and beyond the business-as-usual case.



Five key insights have emerged from this analysis that are of critical relevance to TVA's Environmental Policy:

- A significant amount of energy-efficiency potential exists within the Valley and requires a corresponding level of investment to realize that potential.
- Nuclear power options available to TVA can provide significant abatement potential at a modest incremental cost.
- Compared to other regions, the Valley has a limited supply of renewable energy to support carbon and clean-energy objectives.
- Coal generation remains an important resource to meet TVA's mission to deliver low-cost power.
- Modern transmission and distribution grid technologies can help support the transition to a lower-carbon energy supply by improved real-time information and controls.

Given the potential for legislation that will require TVA to find ways to reduce GHG emissions – particularly carbon emissions – we must position TVA to address the challenge of operating in a carbon-constrained world. Specifically, TVA will continue to reduce the carbon intensity of its generating system and take advantage of lower-CO<sub>2</sub>-emitting energy sources consistent with maintaining a reliable and affordable energy supply. Technology innovations will be needed to address the intermittency of many renewable generation sources. TVA will target reducing load growth by at least one-fourth in five years through energy efficiency and demand response while meeting the remaining load growth through lower-carbon-emitting options.



## 2010 comments based on Environmental Policy review

### Highlights

- In 2009, approximately 45 percent of TVA's generation came from non- or low-emitting generating sources (hydro, nuclear and green power), up from 37 percent in 2007.
- Watts Bar Nuclear Plant Unit 2 is on schedule for completion by fall 2012 to provide 1,150 megawatts (MW) of air emission-free generation.
- Nearly 600 MW of capacity has been added due to modernization of hydro facilities.
- TVA's efficiency and peak demand reduction initiatives exceeded 2009 goals. Summer peak power demand was reduced by 208 MW, surpassing the goal of 189 MW.
- TVA has signed contracts adding up to 1,380 MW of new renewable or clean energy resources to its generating system.
- TVA continues work on its Integrated Resource Plan, which began in 2009, to identify resources to meet the Tennessee Valley's energy needs for the next 20 years, in accordance with the principles and objectives set forth in TVA's 2008 Environmental Policy.
- TVA's Strategic Sustainability Performance Plan set goals to reduce Scope 1, 2, and 3 GHG emissions and develop and maintain a comprehensive agency GHG inventory. Reduction will be achieved through building energy efficiency, renewable energy credits, increased use of more-fuel-efficient vehicles, waste disposal reduction, transmission and distribution loss reduction, and decreased employee travel.
- To support carbon reduction through the emerging use of electricity for fuel, TVA has made its first Smart Model Area Recharge Terminal, or SMART Station, available in 2010.

### Hard Spots

- New clean air controls on fossil fuel units have reduced efficiency in some cases, thus increasing the CO<sub>2</sub> emissions rate (CO<sub>2</sub> tons/MWh output) for those units.
- More stringent regulations to carbon emissions may demand reductions beyond current funding plans and could impact TVA's ability to meet requirements and Executive Order goals.
- Carbon capture control equipment will not be commercially viable for another five to 10 years. Commercial deployment of carbon capture control equipment is possible within 10 to 15 years.
- Availability of regional, low-cost, large-scale renewable resources is limited. There are also challenges associated with integration and storage of local renewable energy.
- As a government agency, TVA does not qualify to receive most of the federal tax incentives, credits or grants offered for investment in clean and renewable energy resources.



## AIR QUALITY IMPROVEMENT

TVA is a regional leader in the installation and operation of air emission control equipment through an aggressive investment of more than \$4.8 billion. This investment has reduced TVA's sulfur-dioxide emissions by about 83 percent since 1977, and lowered nitrogen-oxide emissions during the summer ozone season by 81 percent since 1995. As an additional benefit of these controls, mercury emissions also have been reduced. TVA's efforts have contributed to continued air quality improvement across the region. These improvements are important to the quality of life and economic sustainability in the Valley. The fundamentals of TVA's program focus on complying with air pollution control requirements, considering air-quality impacts on urban and environmentally sensitive areas, and supporting stakeholder interests. TVA's Clean Air Program is based on a strategy of self-compliance that involves the installation of controls on fossil plants to achieve tangible air quality and health benefits for Valley citizens with a limited use of the allowance markets.

Despite these successes, work remains. EPA's Clean Air Interstate Rule, more-restrictive National Ambient Air Quality Standards, and future mercury and regional haze requirements will ensure that regional air quality continues to improve. In the ongoing effort to contribute to that improvement, TVA will continue to reduce its sulfur-dioxide, nitrogen-oxide, mercury and particulate emissions. We will pursue this objective by continuing to invest in assets that will measurably reduce emissions from fossil-fired plants and thereby improve air quality. This investment will reduce emissions across the system through the installation of emission reduction equipment and new technology to control over 80 percent of fossil generation in the next 10 years. It's possible that, if energy efficiency efforts yield higher load reductions than forecast, we will have an opportunity to retire higher-emitting fossil plants earlier. In addition, TVA will continue to engage regional and national stakeholders to develop better ways to understand, monitor and improve regional air quality.



## 2010 comments based on Environmental Policy review

### Highlights

- **TVA has invested \$5.5 billion to reduce air emissions at its fossil plants as part of its ongoing clean air program.**
- **TVA continues efforts to further reduce its fossil emissions. In 2008, a sulfur-dioxide scrubber began operating at Bull Run Fossil Plant, and the construction of scrubbers at Kingston Fossil Plant was completed.**
- **TVA's annual sulfur-dioxide emissions were down by 91 percent in 2009 from the peak 1977 level.**
- **In 2009, TVA operated nitrogen-oxide controls on fossil units year-round for the first time, and annual emissions were at their lowest level since all 59 fossil units were placed in service.**
- **Air quality has improved over the last decade. Ozone particulates are diminishing and visibility is increasing.**

### Hard Spots

- **Complying with new and evolving clean air regulations presents challenges. Integrated generation and transmission utility operations will require complex implementation, increasing the risk that noncompliance due to regulatory requirements will conflict with prudent and reliable operations.**
- **Several new, more stringent National Ambient Air Quality Standards (NAAQS) are proposed or forthcoming. As these standards are finalized, it is likely that large portions of the Valley will be out of attainment with new standards, despite air quality improvements.**



## WATER RESOURCE PROTECTION AND IMPROVEMENT

TVA operates the Tennessee River System to provide a wide range of public benefits: year-round navigation, flood-damage reduction, affordable electricity, improved water quality, water supply, land use and recreation.

In 2004, the TVA Board approved a new operating policy based on the results of the agency's Reservoir Operations Study. The policy maintains TVA's ability to meet its fundamental responsibilities for flood control, commercial navigation and power production while protecting water quality and accommodating the increased demands created by recreational and residential growth. It shifts the focus of TVA's reservoir operations from achieving specific summer pool elevations on the reservoirs to managing the flow of water throughout the river system in an integrated way to support multiple demands.

TVA pursues its progressive management of water quality and water quantity impacts through the permitting of activities on and around TVA reservoirs; the collection, maintenance, and distribution of water quality information; targeted water quality improvement initiatives; and strategies to manage increased water demand.

The increasing demand for water due to residential, commercial and industrial growth requires a focus on resource conservation in the Tennessee Valley region. In addition, chronic rainfall deficits can result in low water flows, which could lead to future constraints on power operations. Rapid growth coupled with the challenge of availability further amplifies the importance of balancing resource management activities for multiple, and often competing, uses across the Valley.

Facing these challenges, TVA will lead by example. TVA will demonstrate an efficient use of water in its operations and will collaborate and coordinate with internal and external stakeholders to protect and improve water quality and sufficiency, while maintaining an in-depth knowledge of changing conditions in the river system. TVA's goal is to mitigate its impact on aquatic systems while balancing thermal cooling needs with consumptive use. At the same time, TVA will continue to improve river system operations to balance diverse demands.



## 2010 comments based on Environmental Policy review

### Highlights

- TVA is recognized as a pioneer in water resource stewardship through the implementation of water quality improvement programs such as Targeted Watershed Initiatives, the Clean Marina Initiative, Vital Signs Monitoring, Reservoir Releases Improvement, and other water resource-related campaigns. These programs enable TVA to work with stakeholders to identify and quantify water resource issues, build collaborative partnerships, develop improvement plans, leverage funding and implement improvement projects.
- TVA is substituting nontraditional water sources for fresh water, including storm water runoff, treated sewage effluents and agricultural runoff, and continues to seek other opportunities for similar water reuse projects at power facilities.
- TVA's Strategic Sustainability Performance Plan includes water use efficiency improvement goals, water reuse strategies and sustainable storm-water management practices. The plan also sets goals to reduce potable and nonpotable water use.
- There are now 85 marinas participating in TVA's Clean Marina Initiative, which helps marina owners and operators protect water quality by addressing such activities as marina siting, sewage management, oil and gas control, and erosion prevention.

### Hard Spots

- Water quality is affected by many different variables beyond TVA's control (e.g., land use, development, weather); therefore, it can be difficult to create positive change in streams and watersheds.
- Water quality in the Tennessee Valley has improved for some reservoirs, but standards continue to evolve. Changing standards cause more segments of rivers in the Valley to be listed as impaired for their intended use.
- The growing number of new water-related regulatory initiatives and more-stringent water quality standards will challenge TVA's ability to manage Valley water resources cost-effectively and maintain the reliability of TVA's generating plants.
- Thermal compliance continues to be a challenge because of high temperatures and low flows. TVA is taking various measures to address the issue such as increasing its use of cooling towers and adjusting power plant operations.



## WASTE MINIMIZATION

TVA manages an array of different wastes, including municipal solid waste, wastewater, hazardous waste, low- and high-level nuclear waste, other regulated wastes (e.g., asbestos and PCBs), scrap metal, office waste, and coal-combustion waste, which includes fly ash, bottom ash and gypsum. One of TVA's strengths is its waste management system and the day-to-day implementation of this system at the various facilities by trained environmental personnel. Employees help integrate waste-management expertise at every level of TVA to minimize the impact on Valley resources.

TVA has a strong focus on the use of coal-combustion waste, which comprises its single largest waste stream. Approximately 43 percent of this waste is recycled into by-products. Similarly, TVA recycles the majority of its electronic waste and scrap metal. While focusing on compliance with waste requirements, TVA uses a team approach to seek out and implement further waste-minimization opportunities. In addition, the agency is collaborating with others to identify sustainable solutions for better management of nuclear waste.

TVA will reduce its waste footprint in regulated materials and increase the percentage of recycled coal-combustion waste. In this effort, TVA will augment its existing compliance programs and waste management practices by focusing on waste reduction at the source (in part through improved procurement practices), avoiding waste generation, and increasing recycling efforts (especially of municipal waste).



## 2010 comments based on Environmental Policy review

### Highlights

- TVA plans to eliminate all wet ash and gypsum storage in the system and convert its 11 operating coal-fired power plants to dry storage in eight to 10 years.
- TVA has reduced the volume of toxic chemicals purchased in corporate office buildings by over 90 percent since 1995.
- TVA's Office Recycling Program has a 35 percent recycling rate for office waste at its Knoxville and Chattanooga locations. In 2010, two facilities were added to the program, bringing the total to 15 participating facilities.
- From 1998 through 2009, TVA reduced its PCB large equipment inventory by 70 percent, with the reduction initiative ongoing.
- TVA's Strategic Sustainability Performance Plan set goals to reduce waste and prevent pollution. Reduction will be achieved through increased diversion of nonhazardous solid waste (corporate and facility recycling programs), increased wood waste recycling, and reduction of chemical waste and printing paper use.

### Hard Spots

- TVA needs to further reduce its PCB large equipment, which will require more detailed inventories and coordinated outage planning.
- Six TVA fossil plants are involved in TVA's coal-combustion products recycling program (usually over 1.5 million tons recycled each year). However, the program has been stymied by ongoing debate and uncertainty associated with the potential EPA regulation to classify coal-combustion products as hazardous waste. Regulatory changes in classification could further impact recycling rates, already decreased due to the economic downturn.
- With nuclear generation increasing to meet low-carbon generation goals, nuclear waste (low-level radioactive waste and spent nuclear fuel) will increase.



## SUSTAINABLE LAND USE

TVA manages public lands for multiple benefits, including economic development, conservation and recreation. TVA is the steward of 293,000 acres of public land and 11,000 miles of shoreline in the Valley along the Tennessee River. In addition, TVA maintains 293,000 acres of flowage easement rights, 258,000 acres of transmission rights-of-way, 35,000 acres of facility properties and 159,000 acres of mineral rights.

When deciding the proper uses of TVA-managed lands and shoreline or acquiring properties for its operations, TVA, while ensuring compliance with appropriate laws and regulations, considers the effects of these activities on the environment.

Section 26a of the TVA Act gives TVA permitting jurisdiction over proposed construction in and along the Tennessee River and its tributaries. Under this jurisdiction, TVA has the responsibility to address obstructions that might affect navigation, flood control and public lands.

Increasing growth within the region necessitates a balance of resource conservation, sustainable economic development and eco-friendly recreation. To demonstrate and promote best practices in sustainable land use, TVA intends to lead by example. It will maintain the public lands under its management in good environmental health to support multiple uses in meeting diverse stakeholder expectations. It will also improve its acquisition, development and disposal of managed lands to support sustainable development in the Valley.

These efforts will align with TVA's Land Policy, approved by the TVA Board in November 2006, and its Shoreline Management Policy, approved by the board in June 1999. These policies direct TVA to manage and balance the multiple uses of lands under its jurisdiction and use its environmental decision-making process to minimize the environmental liabilities and impacts and ensure compliance. TVA will continue to actively manage its public lands to meet the desired conditions for their defined purpose, and it will also develop a policy for managing mineral rights that considers the potential environmental impacts.



## 2010 comments based on Environmental Policy review

### Highlights

- TVA's Natural Resource Plan, to be completed in spring 2011, is a first in the nation for utilities and other federal agencies. It will evaluate the implementation of TVA's reservoir lands planning, water and natural resource management, and recreation processes and strategies.
- At some 400 sites identified throughout the Valley, about 75 miles of shoreline have been treated to stabilize critically eroding soil or priority archaeological sites.
- TVA has ended the Maintain and Gain Program formerly part of its Shoreline Management Policy.
- In February 2010, TVA implemented new guidelines to achieve consistency in its management of new and existing commercial recreation agreements, particularly those governing campgrounds and marinas.
- TVA's Environmental Information Center was established to improve stakeholder relationships and provide consistent environmental information to the public.
- The 26a permitting process was centralized for efficiency and consistency. Section 26a of the TVA Act requires TVA approval for any construction that affects navigation, flood control or public lands along the shoreline of the Tennessee River system.

### Hard Spots

- Comprehensive land condition assessments are necessary to monitor reservoir land and establish resources required for proactive and responsible stewardship of TVA public lands. To date, approximately 6 percent of TVA reservoir lands have been assessed, with 25 percent meeting desired conditions. Completion of land condition assessments and improvement of land conditions are dependent on adequate resource availability.
- A comprehensive mineral rights policy has not been developed. This policy action is under review.
- Unauthorized use and impacts to TVA land and land rights (such as the building of unauthorized structures, land disturbance or modification, and clearing of vegetation) affect recreation, natural resource management and sustainable land use. TVA has developed a plan to prioritize and address violations and encroachments.



## NATURAL RESOURCE MANAGEMENT

TVA manages natural resources in the Valley while providing for many types of recreational opportunities. The agency has set aside more than 181,000 acres of public land for natural resource management, which includes the enhancement of wildlife habitat and dispersed informal recreation. TVA also oversees and manages an additional 31,000 acres for sensitive resources. The guidelines for use of these sensitive land resources include restrictions on activities that might endanger significant cultural or natural features.

TVA has more archaeological sites per acre under its management than any other federal agency; more than 10,000 archaeological sites have been identified on TVA-managed lands. Since 1976, TVA has maintained information on rare plants and animals, caves and other environmentally sensitive resources in the 80,000-square-mile TVA service area.

In its approach to natural resource management, TVA will demonstrate leadership through the ecologically sound management of natural resources and the protection of cultural and heritage resources. TVA is committed to increasing the proportion of TVA-managed resources that meet the desired environmental conditions of sustainable recreation, ecological diversity and cultural resource protection. More and more residents and visitors are enjoying the diverse, unique natural resources of the Valley by engaging in dispersed recreation activities such as hiking, birdwatching and fishing. An increase in outdoor activity has been shown to result not only in a healthier lifestyle but also a greater awareness of the importance of natural resource conservation. An increase in conservation practices by the public helps ensure the unique and beautiful Valley resources will be preserved for the continued enjoyment of generations to come.

To support this objective, TVA will pursue collaboration and partnerships to improve the delivery of its natural resource management activities, while also increasing the effectiveness of dispersed public recreation and reducing the impact of human uses on the environment. TVA will allow for properly managed, eco-friendly dispersed recreation on the lands it manages while balancing that goal with the protection of biological, cultural and heritage resources.



## 2010 comments based on Environmental Policy review

### Highlights

- In 2009, TVA partnered with government and nongovernmental organizations to improve habitat on TVA lands. Current partners include the Tennessee Wildlife Resources Agency, Quail Forever, Ducks Unlimited and the University of Tennessee.
- In 2009, TVA developed an on-the-ground land condition assessment methodology to determine whether individual parcels of land meet desired conditions. It also measures parameters of public use and sensitive resource protection and determines needs for appropriate stewardship.
- In 2010, TVA conducted inspections of 130 commercial campgrounds located on TVA property to determine compliance with environmental and regulatory requirements, contract provisions and permitting requirements. In 2011, TVA will continue working to ensure all commercial recreation facilities are brought fully into compliance.
- TVA is studying ways to address the future natural resource needs of the Tennessee Valley through its Natural Resource Plan, which will evaluate the implementation of TVA's reservoir land planning, natural resource management, water resource management, and recreation processes and strategies.

### Hard Spots

- Comprehensive land condition assessments need to be done to determine whether reservoir lands currently meet desired conditions and to establish the resources and funding required for proactive and responsible stewardship of TVA public lands.
- Areas of shoreline have been identified that have potential or actual erosion of important archaeological resources along the Tennessee River and its tributaries. Some of these areas have been protected, although resource limitations and other environmental considerations prevent protecting all of them.



### COMMITMENTS TO OUR CUSTOMERS

In collaboration with our 155 distributors, TVA is committed to providing low-cost, reliable power to more than 9 million residents and businesses and 56 directly served large industrial and federal facilities in the seven states of the Tennessee Valley. TVA's new Environmental Policy, in accordance with the 2007 TVA Strategic Plan, emphasizes three issues that are important from its customers' perspective: maintaining affordable rates; expanding collaboration, outreach and education; and furthering the Valley's quality of life.

#### Affordable rates

- TVA will strive to manage potential future rate increases for new generation and transmission construction by collaborating with distributors and customers to pursue lower-cost energy-efficiency and load-management options that may partially offset the need for capacity additions.
- For large commercial and industrial customers, TVA will continue to focus on rates as a principal measure of affordability and competitiveness when promoting cost-effective energy-efficiency and load-management programs.
- For residential and small commercial customers, TVA will emphasize the total bill impact by focusing on the combined effect of rate and consumption.

#### Collaboration, outreach and education

- TVA will increase its focus on education and outreach to inform Valley residents on key issues, including energy efficiency and renewables, water conservation and natural resource protection.
- TVA will collaborate with distributors and directly served customers to implement enabling technologies for clean-energy and energy-efficiency solutions.

#### Quality of life

- TVA will continue to promote an improved quality of life with an emphasis on the deployment of clean, low-carbon emissions technology in the Valley.
- TVA will consider the environmental footprint of industries recruited into the Valley.
- TVA will improve air quality and continue to promote the sustainable management of land, water and natural resources.
- TVA will provide for the expansion of ecologically friendly recreation activities within the Valley.

### STAKEHOLDER INVOLVEMENT

#### Leadership

- Development of new nuclear facilities and modernization of existing hydro facilities to improve efficiency demonstrate TVA's leadership.
- TVA's technology leadership is focused on three signature technologies: electric transportation, smart grid transmission and small modular nuclear reactors.

#### Partnerships

- TVA partners with nonprofit organizations, and local, state and federal agencies, to develop and implement Natural Resource Management and Sustainable Land Use projects.
- TVA collaborates with the Electric Power Research Institute (EPRI), the U.S. Department of Energy (DOE), the national energy research laboratories, and other regional, national and international energy consortiums to share expertise in key technology areas.

#### Coordination

- TVA chartered the Regional Resource Stewardship Council in 2000 to obtain feedback and coordinate the agency's decisions regarding management of Tennessee Valley natural resources and TVA-managed public lands, water bodies and ecosystems.
- TVA began two initiatives that involve coordination with and briefings to Stakeholder Review Groups.
  - Integrated Resource Plan: Also known as "TVA's Environmental and Energy Future," the plan identifies resources to meet the energy needs of the Tennessee Valley over the next 20 years.
  - Natural Resource Plan: Implements sustainable practices to protect natural and cultural resources while providing recreation opportunities across the region.

#### Commitment

- TVA, in collaboration with its 155 distributors, is committed to providing low-cost, reliable power to more than 9 million residents and businesses and 56 directly served large industrial and federal facilities in the seven states of the Tennessee Valley.
- Commitment to the environment is an integral part of TVA's Strategic Plan, which is aligned with its Environmental Policy.
- On June 2, 2010, TVA submitted its first Strategic Sustainability Performance Plan, as directed by Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), to the Office of Management and Budget. This plan sets goals in seven key areas related to sustainable practices (see Performance Indicators on page 17).

## 2010 comments based on Environmental Policy review (continued)

### Commitment (continued)

- An online Environmental Report Card was developed to track TVA's environmental performance as set forth in TVA's Environmental Policy. The report card is currently available to all TVA employees, and will be made available to the public via TVA's forthcoming Corporate Accountability Report.

### PERFORMANCE INDICATORS

TVA has an established set of metrics to monitor how well its performance fulfills the threefold TVA mission highlighted in the 2007 Strategic Plan, which outlines the policy level direction for TVA. Examples of these metrics are shown in Exhibit 3 on the next page. They include the metrics that are found in TVA's Strategic Plan, such as delivered cost of power, economic development index, and environmental performance, and additional ones associated with the Environmental Policy. This combined set of performance metrics establishes the successful translation of the TVA Environmental Policy into specific and measurable indicators that can be monitored for implementation of the policy. TVA will implement these metrics in an integrated approach to close the gap between the current level and desired improvement in environmental performance.



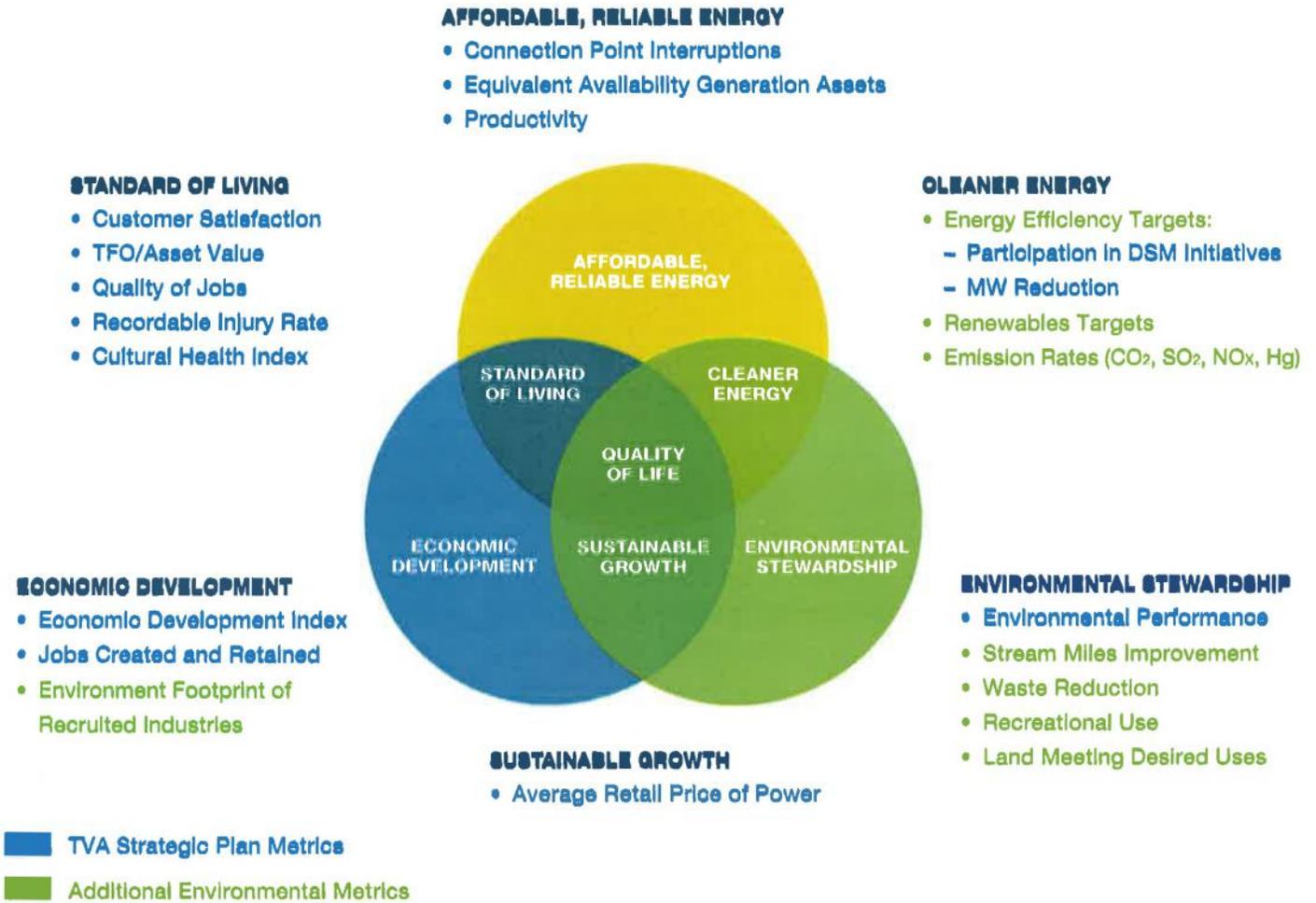
## 2010 comments based on Environmental Policy review

- TVA's Environmental Report Card consists of key environmental indicators that monitor the impact of its business on the environment.
- TVA's Office of the Inspector General has conducted a review of TVA's environmental performance results in order to provide an objective assessment to the board of directors and Congress and to highlight challenges facing TVA.
- TVA initiated and led the first Utility Environmental Benchmarking Forum on May 12-13, 2010. The forum facilitates a voluntary exchange of information on goals, ideas and experiences among utilities and environmentally focused industrial organizations to promote environmental improvement.
- In June 2010, TVA submitted its Strategic Sustainability Performance Plan to the U.S. Office of Management and Budget, as directed by Executive Order 13514, Federal Leadership in Environment, Energy, and Economic Performance. The Plan sets goals in seven key areas: 1) greenhouse gas reduction, 2) high performance facilities and water use efficiency, 3) waste reductions, 4) regional and local integrated planning, 5) sustainable acquisitions, 6) electronic stewardship and 7) agency innovation.
- The TVA Environmental Footprint is a quantitative representation of the performance of TVA's core environmental metrics, and is benchmarked against metrics from other top utility companies. TVA's performance is compared to benchmark data to establish an environmental footprint score and tier ranking within the utility industry.
- A Corporate Accountability Report is being developed that will encompass the sustainability principles of economic, environmental and social issues, combined with TVA's Annual Report.

**EXHIBIT 3**

Aligning TVA's Mission With Environmental Commitments and Performance Measures

The large circles represent the threefold TVA mission, while the intersections of the circles represent a higher quality of life realized through an integrated approach of pursuing cleaner energy, promoting sustainable growth and providing proactive stewardship.



Online Resources

View this policy electronically at [www.tva.com/environment/policy.htm](http://www.tva.com/environment/policy.htm)

View the 2007 TVA Strategic Plan at [www.tva.gov/stratplan](http://www.tva.gov/stratplan)

View the results of the Reservoir Operations Study at [www.tva.gov/environment/reports/roe\\_els](http://www.tva.gov/environment/reports/roe_els)

View TVA's Land Management Policy at [www.tva.gov/river/landandshore/land\\_policy.htm](http://www.tva.gov/river/landandshore/land_policy.htm)

View TVA's Shoreline Management Policy at [www.tva.gov/river/landandshore/landuse\\_shore.htm](http://www.tva.gov/river/landandshore/landuse_shore.htm)

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