

## **B. Collections of Information Employing Statistical Methods**

1. To collect this information, TVA employs telephone, online, and mail surveys of residential households and businesses residing in the service area of one of the 154 local power companies (LPCs) that purchase power from TVA. This survey is conducted as an independent measure of indirect program impact, effectiveness of communication efforts, evolving household demographics, program administration, changes in the saturation of non-electric fuels, potential interest in energy efficiency, drivers of energy efficiency, and changes in saturation of electrical equipment. This information is not available from other public sources and must be gathered by TVA. The results of this survey aid groups such as TVA's Enterprise Planning as well as Products and Services managers in assessing the effectiveness of TVA's energy efficiency and demand response programs, planning improvements to existing programs, and designing new programs. local power company' staffs also use these results to determine ways to better meet the needs of their residential and commercial customers.

The respondent universe is comprised of households and businesses residing in the TVA service area. From this universe, sample sizes are calculated based on each LPCs total customer base and the proportion of overall TVA service area (Valley) customer base represented. TVA has developed a three tiered approach to ensure that each LPCs survey sample size is sufficient for minimal analysis and based on customers served. More information on this approach can be found in **Section B.2**.

Samples sizes are calculated to ensure representation with a minimum sample size of 30 for each LPC. Local power company samples are summed to the seven TVA geographically dispersed District levels. The total sample is designed to attain a margin of error less than 2 percent at the 95 percent confidence level for the overall TVA service area. With sufficient sample sizes, statistical analysis can be completed down to the individual LPC service area. Results are summarized down to the LPC level; however, in most cases, TVA recommends using District or TVA level results when making substantive decisions from the data. **Table 1** contains the overall framework using this sampling method.

**2016 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY**

District	PD #	Distributor	2016 Residential Customers	2016 Sample	2016 Margin of Error
Alabama	6	Albertville Municipal Utilities Board	7,634	6	40%
Alabama	12	Athens Utilities (AL)	34,227	82	11%
Alabama	23	Bessemer Electric Service	9,476	10	31%
Alabama	54	Courtland Electric Department	652	-	N/A
Alabama	56	Cullman Power Board	6,511	14	26%
Alabama	61	Decatur Utilities	22,569	38	16%
Alabama	72	Florence Utilities	40,008	74	11%
Alabama	76	Fort Payne Improvement Authority	6,215	6	40%
Alabama	82	Guntersville Electric Board	4,662	14	26%
Alabama	88	Hartselle Utilities	4,289	11	30%
Alabama	99	Huntsville Utilities	155,268	322	6%
Alabama	155	Muscle Shoals Electric Board	6,042	12	28%
Alabama	192	Russellville Electric Board (AL)	3,899	8	35%
Alabama	195	Scottsboro Electric Power Board	6,730	14	26%
Alabama	201	Sheffield Utilities	15,351	14	26%
Alabama	220	Tarrant Electric Department	2,112	5	44%
Alabama	229	Tuscumbia Electricity Department	3,880	7	37%
Alabama	274	Arab Electric Cooperative	12,365	24	20%
Alabama	282	Cherokee Electric Cooperative	17,325	32	17%
Alabama	285	Cullman Electric Cooperative	34,695	45	15%
Alabama	301	Franklin Electric Cooperative	6,570	1	98%
Alabama	312	Joe Wheeler Electric Membership Corporation	34,471	57	13%
Alabama	317	Marshall-DeKalb Electric Cooperative	14,552	18	23%
Alabama	330	North Alabama Electric Cooperative	13,337	22	21%
Alabama	351	Sand Mountain Electric Cooperative	24,993	30	18%
		<b>Alabama District Totals</b>	<b>487,833</b>	<b>866</b>	<b>4.1%</b>

<b>District</b>	<b>PD #</b>	<b>Distributor</b>	<b>2016 Residential Customers</b>	<b>2016 Sample</b>	<b>2016 Margin of Error</b>
Kentucky	19	Benton Electric System	1,865	5	44%
Kentucky	29	Bowling Green Municipal Utilities	24,269	47	14%
Kentucky	77	Franklin Electric Plant Board	3,773	8	35%
Kentucky	78	Fulton Electric System	1,340	4	49%
Kentucky	80	Glasgow Electric Plant Board	5,341	17	24%
Kentucky	91	Hickman Electric System	894	1	98%
Kentucky	95	Hopkinsville Electric System	10,300	17	24%
Kentucky	133	Mayfield Electric & Water Systems	4,543	15	25%
Kentucky	153	Murray Electric System	6,336	21	21%
Kentucky	194	Russellville Electric Plant Board (KY)	3,216	4	49%
Kentucky	306	Hickman-Fulton Counties Rural Electric Cooperative Corporation	2,866	2	69%
Kentucky	337	Pennyryle Rural Electric Corporation	41,956	63	12%
Kentucky	374	Tri-County Electric Membership Corporation	41,023	59	13%
Kentucky	383	Warren Rural Electric Cooperative Corporation	51,383	110	9%
Kentucky	385	West Kentucky Rural Electric Corporation	30,260	64	12%
		<b>Kentucky District Totals</b>	<b>229,365</b>	<b>437</b>	<b>5.6%</b>

<b>District</b>	<b>PD #</b>	<b>Distributor</b>	<b>2016 Residential Customers</b>	<b>2016 Sample</b>	<b>2016 Margin of Error</b>
Middle TN	40	Clarksville Department of Electricity	57,631	126	9%
Middle TN	49	Columbia Power & Water Systems	21,699	57	13%
Middle TN	53	Cookeville Electric Department	14,115	36	16%
Middle TN	62	Dickson Electric System	27,704	54	13%
Middle TN	70	Fayetteville Public Utilities	15,505	20	22%
Middle TN	79	Gallatin Department of Electricity	14,325	31	18%
Middle TN	111	Lawrenceburg Utility Systems	16,853	28	19%
Middle TN	117	Lewisburg Electric System	4,522	6	40%
Middle TN	135	McMinnville Electric System	6,200	12	28%
Middle TN	146	Mount Pleasant Power System	3,152	7	37%
Middle TN	149	Murfreesboro Electric Department	48,798	113	9%
Middle TN	158	Nashville Electric Service	332,425	610	4%
Middle TN	182	Pulaski Electric System	11,661	17	24%
Middle TN	206	Shelbyville Power System	8,350	10	31%
Middle TN	208	Smithville Electric System	2,063	1	98%
Middle TN	211	Sparta Electric Department	2,172	4	49%
Middle TN	212	Springfield Electric	6,883	3	57%
Middle TN	224	Tullahoma Utilities Board	8,611	14	26%
Middle TN	241	Winchester Utilities	4,585	9	33%
Middle TN	278	Caney Fork Electric Cooperative, Inc.	26,857	50	14%
Middle TN	288	Cumberland Electric Membership Corporation	81,115	146	8%
Middle TN	291	Duck River Electric Membership Corporation	61,221	108	9%
Middle TN	318	Meriwether Lewis Electric Corporation	28,390	38	16%
Middle TN	321	Middle Tennessee Electric Membership Corporation	174,468	350	5%
Middle TN	363	Tennessee Valley Electric Cooperative	15,875	22	21%
Middle TN	380	Upper Cumberland Electric Membership Corporation	41,058	81	11%
		<b>Middle TN District Totals</b>	<b>1,036,238</b>	<b>1,953</b>	<b>2.7%</b>

<b>District</b>	<b>PD #</b>	<b>Distributor</b>	<b>2016 Residential Customers</b>	<b>2016 Sample</b>	<b>2016 Margin of Error</b>
Mississippi	3	Aberdeen Electric Department, City of	2,782	5	44%
Mississippi	9	Amory Utilities, City of	3,086	3	57%
Mississippi	52	Columbus Light and Water Department	9,361	18	23%
Mississippi	93	Holly Springs Utility Department	8,686	8	35%
Mississippi	126	Louisville Utilities	2,481	1	98%
Mississippi	129	Macon Electric Department, City of	930	-	N/A
Mississippi	161	New Albany Light, Gas & Water, City of	7,888	11	30%
Mississippi	170	Okolona Electric Department, City of	4,167	3	57%
Mississippi	172	Oxford Electric Department, City of	6,365	18	23%
Mississippi	178	Philadelphia Utilities	2,853	4	49%
Mississippi	214	Starkville Electric Department	10,223	30	18%
Mississippi	226	Tupelo Water & Light Department, City of	10,540	33	17%
Mississippi	232	Water Valley Electric Department, City of	1,551	3	57%
Mississippi	238	West Point Electric System, City of	3,162	4	49%
Mississippi	270	Alcorn County Electric Power Association	14,654	17	24%
Mississippi	279	Central Electric Power Association	29,424	36	16%
Mississippi	293	East Mississippi Electric Power Association	32,052	8	35%
Mississippi	300	4-County Electric Power Association	37,673	21	21%
Mississippi	324	Monroe County Electric Power Association	8,805	13	27%
Mississippi	327	Natchez Trace Electric Power Association	12,405	10	31%
Mississippi	331	Northcentral Mississippi Electric Power Association	24,171	53	14%
Mississippi	333	North East Mississippi Electric Power	20,276	28	19%

i		Association			
Mississippi	345	Pontotoc Electric Power Association	14,923	20	22%
Mississippi	348	Prentiss County Electric Power Association	10,805	14	26%
Mississippi	360	Tallahatchie Valley Electric Power	21,406	16	25%
Mississippi	366	Tippah Electric Power Association	10,320	14	26%
Mississippi	369	Tishomingo County Electric Power Association	10,933	17	24%
Mississippi	372	Tombigbee Electric Power Association	34,856	66	21%
		<b>Mississippi District Totals</b>	<b>356,778</b>	<b>474</b>	<b>5.7%</b>

<b>District</b>	<b>PD #</b>	<b>Distributor</b>	<b>2016 Residential Customers</b>	<b>2016 Sample</b>	<b>2016 Margin of Error</b>
Southeast	17	Athens Utilities Board (TN)	10,867	22	21%
Southeast	37	EPB (Chattanooga)	151,622	285	6%
Southeast	39	Chickamauga Electric System	848	4	49%
Southeast	43	Cleveland Utilities	25,806	42	15%
Southeast	58	Dayton Electric Department, City of	8,454	17	24%
Southeast	67	Etowah Utilities Department	4,387	9	33%
Southeast	123	Loudon Utilities	9,760	43	15%
Southeast	152	Murphy Electric Power Board, Town of	3,391	9	33%
Southeast	189	Rockwood Electric Utility	11,465	15	25%
Southeast	217	Sweetwater Utilities Board	7,085	11	30%
Southeast	275	Blue Ridge Mountain Electric Membership Corporation	39,199	83	11%
Southeast	297	Fort Loudoun Electric Cooperative	27,345	47	14%
Southeast	336	North Georgia Electric Membership Corporation	83,796	155	8%
Southeast	354	Sequachee Valley Electric Corporation	29,428	50	14%
Southeast	377	Tri-State Electric Membership Corporation	15,119	32	17%
Southeast	381	Volunteer Energy Cooperative	94,333	198	7%
		<b>Southeast District Totals</b>	<b>522,905</b>	<b>1,022</b>	<b>3.7%</b>

<b>District</b>	<b>PD #</b>	<b>Distributor</b>	<b>2016 Residential Customers</b>	<b>2016 Sample</b>	<b>2016 Margin of Error</b>
West TN	20	Benton County Electric System	8,517	11	30%
West TN	27	Bolivar Electric Department	8,847	8	35%
West TN	33	Brownsville Utility Department, City of	4,264	-	N/A
West TN	34	Carroll County Electrical Department	12,141	25	20%
West TN	55	Covington Electric System	3,761	3	57%
West TN	64	Dyersburg Electric System	9,400	17	24%
West TN	96	Humboldt Utilities	3,529	3	57%
West TN	102	Jackson Energy Authority	28,730	60	13%
West TN	120	Lexington Electric System	17,816	29	18%
West TN	138	Memphis Light, Gas, and Water Division	360,916	528	4%
West TN	142	Milan Public Utilities	6,649	11	30%
West TN	164	Newbern Electric Water & Gas	1,429	2	69%
West TN	174	Paris Board of Public Utilities	15,324	30	18%
West TN	186	Ripley Power & Light Company	5,299	14	26%
West TN	223	Trenton Light & Water Department	1,970	2	69%
West TN	230	Union City Electric System	5,163	12	28%
West TN	235	Weakley County Municipal Electric System	15,841	36	16%
West TN	283	Chickasaw Electric Cooperative	15,728	36	16%
West TN	295	Forked Deer Electric Cooperative, Inc.	8,304	6	40%
West TN	303	Gibson Electric Membership Corporation	28,742	38	16%
West TN	339	Pickwick Electric Cooperative	16,410	39	16%
West TN	357	Southwest Tennessee Electric Membership Corporation	41,909	57	13%
		<b>West TN District Totals</b>	<b>620,689</b>	<b>967</b>	<b>3.9%</b>
		<b>Valley Totals</b>	<b>3,954,589</b>	<b>7,088</b>	<b>1.2%</b>



U.S. Postal Service (USPS) zip codes are used to define the sample frame

2. The survey population is comprised of all residential households or businesses residing in the TVA service area. From this population, sample sizes are calculated based on each local power company's total customer base and the proportion of overall TVA service area residential customers represented. Sample sizes are determined based on pooled proportion formula and are calculated to ensure representation of a minimum sample of 30 for each local power company. Individual LPC samples are summed to the seven TVA geographically dispersed District levels. The total sample is designed to attain a margin of error less than 2 percent at the 95 percent confidence level for the overall Valley. See **Table 1** above.

When this method of sampling is used, local power companies within each stratum remain relatively stable due to similar growth patterns over time. While TVA would like to have this information annually with error margins of less than one percent, this is not practical from a cost standpoint or from a response burden. Attaining an overall margin of error of 1.3 percent to 1.8 percent provides sufficient differentiation that TVA can reasonably determine whether the *EnergyRight® Solutions* programs are having an indirect impact on Valley residents. While error margins at the local power company and District level vary, trends and differences can be seen for the larger power companies and the Districts. In addition, TVA offers local power companies the opportunity to request some data by local power company groups. These may be groups of power companies that wish to aggregate service areas for some reason. Reasons might include pooling advertising resources due to a viewing or listening area boundary and the need to determine appropriate messages for these boundaries. A frequency of two to three years provides data at sufficient intervals that trends and changes can be seen without overburdening residents with surveys. This is also possible since this is an indirect measure of the *EnergyRight® Solutions* programs' effectiveness.

Due to the quota sampling method described earlier, it is also necessary to weight responses by local power company. This weighting is designed to account for the over representation of the samples for smaller power companies. Weights are determined by dividing the proportion of the overall Valley residential customer base represented by a local power company's residential customers by the proportion of the overall Valley residential sample represented by a local power company's sample.

$$\text{Local Power Company Weight} = \frac{\text{Local Power Company Proportion of Residential Customers}}{\text{Local Power Company Proportion of Sample}}$$

For simplicity, weights are rounded to the nearest hundredth for analysis.

4. The survey instrument used may be modified slightly between iterations depending upon changes in language usage, appliance availability, and appliance usage patterns. However, most questions remain consistent over time to enhance reliability. Modifications to the survey are carefully considered by various TVA staff that will use the information and are tested by the contractor prior to launching the fieldwork for the survey. These interviews as well as the training are monitored by TVA staff members. In addition, as interviews begin, calls are monitored closely in a further effort to insure reliability of the data gathered.

5. When questions regarding statistical aspects of the survey methodology and analysis arise, TVA relies on our contractor staff. For the most recent study, TNS was the contractor. TNS is a full-service global strategy and research organization specializing in public policy and opinion surveys, banking and finance, telecommunications, media, energy, transportation, insurance and health care. Bios for the TNS staff who work on TVA related survey are below.

James D. Gill, Ph.D.  
Senior Vice President  
Energy & Emerging Sector Lead

A TNS employee since 1994, Jim has specialized in the design, implementation and management of customer satisfaction and loyalty research programs. Jim is the developer of the TNS Stakeholder Management solution for conducting Customer Satisfaction and Loyalty Research known as ISESSM (Integrated Satisfaction Enhancement System). ISESSM has been used successfully at more than 50 Fortune 1000 companies to build stronger and deeper relationships with their customers. In addition, Jim has served as a consultant to clients' senior management to help implement programs that take strategic advantage of study results to leverage strengths, reduce competitive weaknesses, and allocate corporate resources.

Prior to joining TNS, Jim held the position of Vice President, Customer Satisfaction Measurements at Walker Information for 7 years.

Jim received his Doctor of Philosophy in Business Administration, his M.A. in Marketing, and B.A in Business Administration from the University of Nebraska. Jim is a member of the American Marketing Association.

James D. Gill, Ph.D.  
Senior Vice President  
Energy & Emerging Sector Lead

TNS  
222 Merchandise Mart Plaza, Suite 275  
Chicago IL 60654

Phone: (480) 584-4963  
Fax: (480) 584-4560  
Cell: (480) 510-0899  
[Email: jim.gill@tnsglobal.com](mailto:jim.gill@tnsglobal.com)  
[Web: www.tns-us.com](http://www.tns-us.com)

Eric Rosenberg  
Sr. Project Director, Research Delivery Services

Eric is a Senior Manager on the TNS Research Delivery Services team. As such, he will act as the key point of contact on a day-to-day basis coordinating all aspects of each project's execution.

Eric joined TNS in May 2005 and has worked on a variety of projects including a 15 country consumer electronics tracking study, brand equity studies for a global apparel company and customer satisfaction trackers in the tech sector and utilities industry.

He is currently involved in concept testing in the tech sector and manages a customer satisfaction and brand health program for a large regional utility.

His previous experience includes 8 years at a financial marketing consulting firm and 5 years at a consulting firm focused on employee training and market research. He also worked for several years as an independent consultant. Eric received his BA in Finance and MBA in Marketing and Strategic Planning from the University of Illinois.

Eric is currently located within the TNS facility in Chicago, IL.

Eric Rosenberg  
TNS  
222 Merchandise Mart Plaza, Suite 275  
Chicago IL 60654  
Phone: 312 981 5747  
Eric.Rosenberg@tnsglobal.com