**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 distributed energy, possible adoption of demand response programs, interest in electrification programs, 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 attain representation with a minimum sample size of 30 for each LPC. Since reaching 30 completes per LPC is difficult, local power company samples are summed to the seven TVA geographically dispersed District levels. The total sample is designed for achieving 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 for many LPCs. 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.

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| **TABLE 1**  **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Albertville Municipal Utilities Board | 7,902 | Alabama | 21 | 21.36% |
| Arab Electric Cooperative | 12,458 | Alabama | 36 | 16.31% |
| Athens Electric Department, City of | 34,227 | Alabama | 42 | 15.11% |
| Bessemer Electric Service | 9,476 | Alabama | 20 | 21.89% |
| Cherokee Electric Cooperative | 17,330 | Alabama | 21 | 21.37% |
| Courtland Electric Department | 652 | Alabama | 0 | 0.00% |
| Cullman Electric Cooperative | 35,273 | Alabama | 43 | 14.94% |
| Cullman Power Board | 6,511 | Alabama | 6 | 39.99% |
| Decatur Utilities | 22,517 | Alabama | 34 | 16.79% |
| Florence Utilities | 40,482 | Alabama | 86 | 10.56% |
| Fort Payne Improvement Authority | 6,464 | Alabama | 11 | 29.53% |
| Franklin Electric Cooperative | 6,530 | Alabama | 3 | 56.57% |
| Guntersville Electric Board | 4,681 | Alabama | 13 | 27.15% |
| Hartselle Utilities | 4,300 | Alabama | 5 | 43.81% |
| Huntsville Utilities | 160,556 | Alabama | 270 | 5.96% |
| Joe Wheeler Electric Membership Corporation | 34,756 | Alabama | 64 | 12.24% |
| Marshall-DeKalb Electric Cooperative | 14,808 | Alabama | 34 | 16.79% |
| Muscle Shoals Electric Board | 6,311 | Alabama | 14 | 26.16% |
| North Alabama Electric Cooperative | 13,041 | Alabama | 20 | 21.90% |
| Russellville Electric Board | 3,927 | Alabama | 2 | 69.29% |
| Sand Mountain Electric Cooperative | 25,158 | Alabama | 31 | 17.59% |
| Scottsboro Electric Power Board | 6,706 | Alabama | 23 | 20.40% |
| Sheffield Utilities | 15,337 | Alabama | 26 | 19.20% |
| Tarrant Electric Department | 2,156 | Alabama | 6 | 39.96% |
| Tuscumbia Electricity Department | 3,940 | Alabama | 5 | 43.80% |
| **Alabama District Totals** | **495,499** |  | **836** | **3.39%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Benton Electric System | 1,847 | Kentucky | 4 | 48.96% |
| Bowling Green Municipal Utilities | 24,775 | Kentucky | 32 | 17.31% |
| Franklin Electric Plant Board | 3,773 | Kentucky | 7 | 37.01% |
| Fulton Electric System | 1,244 | Kentucky | 0 | 0.00% |
| Glasgow Electric Plant Board | 5,466 | Kentucky | 8 | 34.63% |
| Hickman Electric Plant Board | 870 | Kentucky | 3 | 56.52% |
| Hopkinsville Electric System | 10,300 | Kentucky | 24 | 19.98% |
| Mayfield Electric and Water Systems | 4,434 | Kentucky | 8 | 34.62% |
| Murray Electric System | 6,398 | Kentucky | 20 | 21.88% |
| Pennyrile Rural Electric Cooperative Corporation | 42,525 | Kentucky | 61 | 12.54% |
| Russellville Electric Plant Board | 3,214 | Kentucky | 4 | 48.98% |
| Tri-County Electric Membership Corporation | 41,875 | Kentucky | 41 | 15.30% |
| Warren Rural Electric Cooperative Corporation | 52,588 | Kentucky | 87 | 10.50% |
| West Kentucky Rural Electric Cooperative Corporation | 30,436 | Kentucky | 21 | 21.38% |
| **Kentucky District Totals** | **229,745** |  | **320** | **5.47%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Caney Fork Electric Cooperative | 27,029 | Middle TN | 29 | 18.19% |
| Clarksville Department of Electricity (CDE) Lightband | 60,290 | Middle TN | 66 | 12.06% |
| Columbia Power & Water Systems | 22,496 | Middle TN | 24 | 19.99% |
| Cookeville Electric Department | 14,029 | Middle TN | 17 | 23.75% |
| Cumberland Electric Membership Corporation | 84,034 | Middle TN | 85 | 10.62% |
| Dickson Electric Department | 27,745 | Middle TN | 42 | 15.11% |
| Duck River Electric Membership Corporation | 62,606 | Middle TN | 89 | 10.38% |
| Fayetteville Public Utilities | 15,688 | Middle TN | 13 | 27.17% |
| Gallatin Department of Electricity | 15,197 | Middle TN | 15 | 25.29% |
| Lawrenceburg Utility Systems | 17,011 | Middle TN | 17 | 23.76% |
| Lewisburg Electric System | 4,535 | Middle TN | 5 | 43.81% |
| McMinnville Electric System | 6,360 | Middle TN | 6 | 39.99% |
| Meriwether Lewis Electric Cooperative | 28,390 | Middle TN | 38 | 15.89% |
| Middle Tennessee Electric Membership Corporation | 185,383 | Middle TN | 192 | 7.07% |
| Mt. Pleasant Power System | 3,181 | Middle TN | 7 | 37.01% |
| Murfreesboro Electric Department | 52,119 | Middle TN | 44 | 14.77% |
| Nashville Electric Service | 345,517 | Middle TN | 352 | 5.22% |
| PES Energize (Pulaski Electric System) | 11,812 | Middle TN | 17 | 23.75% |
| Shelbyville Power System | 8,493 | Middle TN | 11 | 29.53% |
| Smithville Electric System | 2,053 | Middle TN | 0 | 0.00% |
| Sparta Electric & Public Works | 2,180 | Middle TN | 3 | 56.55% |
| Springfield Department of Electricity | 6,290 | Middle TN | 7 | 37.02% |
| Tullahoma Board of Public Utilities | 8,746 | Middle TN | 11 | 29.53% |
| Upper Cumberland Electric Membership Corporation | 41,587 | Middle TN | 46 | 14.44% |
| Winchester Utility System | 4,671 | Middle TN | 9 | 32.64% |
| **Middle Tennessee District Totals** | **1,057,442** |  | **1,145** | **2.89%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| 4-County Electric Power Association | 38,457 | Mississippi | 72 | 11.54% |
| Aberdeen Electric Department, City of | 2,782 | Mississippi | 4 | 48.97% |
| Alcorn County Electric Power Association | 14,716 | Mississippi | 28 | 18.50% |
| Amory Water & Electric | 3,086 | Mississippi | 9 | 32.62% |
| Central Electric Power Association | 29,673 | Mississippi | 31 | 17.59% |
| Columbus Light and Water Department | 9,369 | Mississippi | 22 | 20.87% |
| East Mississippi Electric Power Association | 32,284 | Mississippi | 11 | 29.54% |
| Holly Springs Utilities Department | 8,686 | Mississippi | 5 | 43.82% |
| Louisville Utilities | 2,535 | Mississippi | 2 | 69.28% |
| Macon Electric Department, City of | 930 | Mississippi | 0 | 0.00% |
| Monroe County Electric Power Association | 10,796 | Mississippi | 12 | 28.28% |
| Natchez Trace Electric Power Association | 12,434 | Mississippi | 15 | 25.29% |
| New Albany Light, Gas & Water, City of | 7,875 | Mississippi | 11 | 29.53% |
| North East Mississippi Electric Power Association | 23,589 | Mississippi | 24 | 19.99% |
| Northcentral Mississippi Electric Power Association | 24,908 | Mississippi | 36 | 16.32% |
| Okolona Electric Department, City of | 4,167 | Mississippi | 4 | 48.98% |
| Oxford Electric Department, City of | 7,407 | Mississippi | 2 | 69.29% |
| Philadelphia Utilities | 2,806 | Mississippi | 4 | 48.97% |
| Pontotoc Electric Power Association | 15,227 | Mississippi | 19 | 22.47% |
| Prentiss County Electric Power Association | 10,808 | Mississippi | 13 | 27.17% |
| Starkville Utilities | 11,376 | Mississippi | 24 | 19.98% |
| Tallahatchie Valley Electric Power Association | 21,387 | Mississippi | 36 | 16.32% |
| Tippah Electric Power Association | 10,406 | Mississippi | 20 | 21.89% |
| Tishomingo County Electric Power Association | 10,891 | Mississippi | 11 | 29.53% |
| Tombigbee Electric Power Association | 35,338 | Mississippi | 64 | 12.24% |
| Tupelo Water & Light Department, City of | 10,591 | Mississippi | 38 | 15.87% |
| Water Valley Electric Department, City of | 1,555 | Mississippi | 0 | 0.00% |
| West Point Electric System, City of | 3,178 | Mississippi | 6 | 39.98% |
| **Mississippi District Totals** | **367,257** |  | **523** | **4.28%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Alcoa Electric Department, City of | 25,243 | Northeast | 34 | 16.80% |
| Appalachian Electric Cooperative | 39,633 | Northeast | 62 | 12.44% |
| Bristol Tennessee Essential Services | 28,797 | Northeast | 50 | 13.85% |
| BVU Authority | 13,605 | Northeast | 17 | 23.75% |
| Clinton Utilities Board | 25,311 | Northeast | 24 | 20.00% |
| Elizabethton Electric Department, City of | 22,952 | Northeast | 37 | 16.10% |
| Erwin Utilities | 7,592 | Northeast | 9 | 32.65% |
| Greeneville Light and Power System | 30,970 | Northeast | 37 | 16.10% |
| Harriman Utility Board | 9,256 | Northeast | 15 | 25.28% |
| Holston Electric Cooperative | 24,901 | Northeast | 22 | 20.88% |
| Jellico Electric and Water Systems | 3,702 | Northeast | 5 | 43.80% |
| Johnson City Power Board | 66,762 | Northeast | 82 | 10.82% |
| Knoxville Utilities Board | 179,100 | Northeast | 200 | 6.93% |
| LaFollette Utilities | 19,022 | Northeast | 17 | 23.76% |
| Lenoir City Utilities Board | 52,145 | Northeast | 50 | 13.85% |
| Maryville Electric Department, City of | 18,114 | Northeast | 24 | 19.99% |
| Morristown Utilities Commission | 11,862 | Northeast | 8 | 34.64% |
| Mountain Electric Cooperative, Inc. | 27,455 | Northeast | 27 | 18.85% |
| Newport Utilities | 18,575 | Northeast | 15 | 25.29% |
| Oak Ridge Electric Department | 13,096 | Northeast | 27 | 18.84% |
| Plateau Electric Cooperative | 13,891 | Northeast | 16 | 24.49% |
| Powell Valley Electric Cooperative | 25,978 | Northeast | 31 | 17.59% |
| Sevier County Electric System | 35,546 | Northeast | 44 | 14.77% |
| **Northeast District Totals** | **713,508** |  | **853** | **3.35%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Athens Utilities Board | 10,948 | Southeast | 19 | 22.46% |
| Blue Ridge Mountain Electric Membership Corporation | 39,964 | Southeast | 43 | 14.94% |
| Chickamauga Electric System | 848 | Southeast | 3 | 56.51% |
| Cleveland Utilities | 26,600 | Southeast | 37 | 16.10% |
| Dayton Electric Department, City of | 8,617 | Southeast | 6 | 40.00% |
| **EPB (Chattanooga)** | 153,982 | Southeast | 150 | 8.00% |
| Etowah Utilities | 4,387 | Southeast | 7 | 37.02% |
| Fort Loudoun Electric Cooperative | 27,552 | Southeast | 29 | 18.19% |
| Loudon Utilities | 10,055 | Southeast | 17 | 23.75% |
| Murphy Electric Power Board | 3,431 | Southeast | 3 | 56.56% |
| North Georgia Electric Membership Corporation | 84,406 | Southeast | 107 | 9.47% |
| Rockwood Electric Utility | 11,550 | Southeast | 9 | 32.66% |
| Sequachee Valley Electric Cooperative | 29,653 | Southeast | 28 | 18.51% |
| Sweetwater Utilities Board | 7,096 | Southeast | 4 | 48.99% |
| Tri-State Electric Membership Corporation | 15,378 | Southeast | 22 | 20.88% |
| Volunteer Energy Cooperative | 95,534 | Southeast | 118 | 9.02% |
| **Southeast District Totals** | **530,001** |  | **602** | **3.99%** |

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| **2018 RESIDENTIAL SATURATION MARGIN OF ERROR SUMMARY** | | | | |
| **Local Power Company** | **2018 Residents** | **District** | **2018 Sample** | **2018 Margin of Error** |
| Benton County Electric System | 8,494 | West TN | 14 | 26.17% |
| Bolivar Energy Authority | 8,767 | West TN | 2 | 69.29% |
| Brownsville Utility Department | 4,241 | West TN | 4 | 48.98% |
| Carroll County Electric Department | 12,211 | West TN | 19 | 22.47% |
| Chickasaw Electric Cooperative | 16,110 | West TN | 13 | 27.17% |
| Covington Electric System | 3,724 | West TN | 11 | 29.51% |
| Dyersburg Electric System | 9,407 | West TN | 5 | 43.82% |
| Forked Deer Electric Cooperative, Inc. | 8,305 | West TN | 4 | 48.99% |
| Gibson Electric Membership Corporation | 31,713 | West TN | 33 | 17.05% |
| Humboldt Utilities | 3,488 | West TN | 2 | 69.29% |
| Jackson Energy Authority | 29,187 | West TN | 44 | 14.76% |
| Lexington Electric System | 17,897 | West TN | 16 | 24.49% |
| Memphis Light, Gas and Water Division | 360,916 | West TN | 362 | 5.15% |
| Milan Department of Public Utilities | 6,769 | West TN | 13 | 27.16% |
| Newbern Electric Water and Gas | 1,429 | West TN | 0 | 0.00% |
| Paris Board of Public Utilities | 15,472 | West TN | 20 | 21.90% |
| Pickwick Electric Cooperative | 16,424 | West TN | 26 | 19.20% |
| Ripley Power & Light | 5,337 | West TN | 11 | 29.52% |
| Southwest Tennessee Electric Membership Corporation | 42,127 | West TN | 58 | 12.86% |
| Tennessee Valley Electric Cooperative | 15,935 | West TN | 10 | 30.98% |
| Trenton Light & Water Department | 1,945 | West TN | 3 | 56.55% |
| Union City Electric System | 5,241 | West TN | 17 | 23.73% |
| Weakley County Municipal Electric System | 15,765 | West TN | 34 | 16.79% |
| **West Tennessee District Totals** | **640,904** |  | **721** | **3.65%** |
|  |  |  |  |  |
| **Valley Totals** | **4,034,356** |  | **5000** | **1.39%** |

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 a pooled proportion formula and have a goal of attaining 30 responses for each local power company. Individual LPC samples are summed to the seven TVA geographically dispersed District levels. The total sample is designed for achieving 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®* 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. Also, 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®* 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.

Local Power Company Weight = Local Power Company Proportion of Residential Customers

Local Power Company Proportion of Sample

For simplicity, weights are rounded to the nearest hundredth for analysis. Residential results are also weighted by data from the American Community Survey (ACS). Five-year trend results are used from data on all counties which comprise TVA’s market area. Weights are based on homeownership, age of the residence, units in structure, and age of householders.

Commercial and industrial studies are weighted to D&B counts by TVA District, building type, and square footage.

**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 before launching the fieldwork for the survey. These interviews, as well as the training, are monitored by TVA staff members. Also, as interviews begin, calls are monitored closely in a further effort to ensure the 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, KANTAR was the contractor. KANTAR 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. The KANTAR staff who work on TVA related surveys are listed below.

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