

# ***Benchmarking Features, Comparisons & Deliverables***

## ***Customized SGS Distribution Reliability Benchmarking Study***

The customized, company-specific SGS Distribution Reliability Benchmarking Studies provide in-depth benchmarking of distribution reliability performance. In addition to system-level benchmarks, there are host of other, more detailed comparisons providing *actionable* information. Analysis is also performed down to the feeder level, providing guidance to identify under-performing feeders which maximize system-level reliability improvement.

Because the SGS Study uses *raw outage data* and applies a single, consistent method of screening major storms and events, the comparisons have a higher level of integrity than any other benchmarking comparison available.

**Examples** of SGS Study output are contained in Figures 1 through 8, which follows at the end of this document.

### ***1. Reporting Granularity and Analysis Aggregations***

Five or more years of raw, feeder-level outage data and a corresponding feeder definition table are the basic study requirements. From this data, analysis is performed at four levels within each participating system:

- (1) Individual feeder
- (2) Substation (feeder performance rolled-up to substation)
- (3) Voltage Class
- (4) System

**Examples:** Figure 1: Circuit Listing, Figure 2: Voltage Class Tabular Summaries

### ***2. Feeder Circuit, Substation, Voltage Class and System Performance Summaries***

*There are many ways to compare systems: Public domain reporting (State Regulatory Commission reports), IEEE, EEI and other consultants... Do these sources provide the necessary granularity, precision and accuracy for reliability management decision support? The SGS Distribution Reliability Benchmarking Study offers:*

- IEEE STD 1366 Metrics: SAIFI, SAIDI, CAIDI, MAIFI, ASAI, etc.
- Composite Metrics: Distribution Availability Composite Score, weighted values for Time Between Failures, Outages, Duration, Customers Affected, Customer Time, etc.

**Reported Using:** System and Voltage Class: Bar Charts (most recent 2 years and 5 year average), Trend Charts (up to 12 years), Tables, Electronic Output Data Files (most recent 5 years and 5 year average) and Adobe PDF documents. Feeder Circuit Level: Tables and Electronic Output Data Files (5+ years)

**Examples:** Figure 3: Voltage Class Bar Chart, Figure 4: Voltage Class Trend Chart

### ***3. Comparisons of Outage Causes***

*Analysis of the root cause of outages helps direct maintenance and capital spending. The SGS Study does system and voltage class comparison of ~10 Generalized SGS Study Categories:*

**Reported Using:** System and Voltage Class: Proportion of SAIFI, SAIDI, Outages and Duration: Bar Charts (5 year average), Electronic Output Data Files and Adobe PDF documents. Feeder Circuit Level: Tables and Electronic Output Data Files.

**Example:** Figure 6: Graphical Comparison of Outage Causes by Voltage Class

### ***4. Circuit Selection Methods: Under-Performing Circuit Measures***

*Have you examined efficacy of your internal reliability project selection methods and considered alternatives? There are dozens of ways to find under-performing feeders... the SGS Study*

evaluates 20+ feeder-level metrics, specific to your system, to identify and select under-performing feeders that offer to maximize system-level reliability performance improvements. The circuit selection method uses multiple years of data and seeks to simultaneously optimize system level SAIFI, SAIDI, MAIFI and number of outages.

**Reported Using:** System, Voltage Class: Bar Charts, X-Y Scatter Plots and Tables.  
Feeder Circuit Level: Tables and Electronic Output Data Files.

**Examples:** Figure 7: Bar Chart Comparison of Methods, Figure 8: Table Comparison of Methods.

## 5. Deliverables

The Study's primary deliverables are a customized report of approximately 300 pages ("Report"), electronic output of benchmarking, system, voltage class and circuit-level summaries, "Data Filters" and a results presentation conference. Deliverables contain the following key elements:

**Discussion and Methods:** 50-100 pages, written in lay terminology, containing analysis, interpretation, data dictionary for electronic output, definitions and formulas.

**Composite Scores:** Graphical and tabular performance summaries by voltage class. Included are: Composite Scores and components (MTBF, outage frequency and duration, momentary vs. sustained outages, etc.). Data summaries (e.g., mean, median) are given in original units and percentiles.

**IEEE Standard 1366 Metrics:** Tabular and graphical form, by system and voltage class. Current and past years plus a five year average.

**Analysis of Outage Causes:** Circuit outages are classified into general categories (e.g., Lines, Equipment, Supply, Weather, etc). Within-company percentile "grades" and sum of outages, duration, customers and customers affected are computed for each circuit within each category. System and voltage class statistics of outage causes are calculated for comparisons with peers, geographic regions, quartiles for outage frequency, duration and customer measures are calculated.

**Company-Specific Features:** Proprietary section of the Report include hard-copy and electronic output for:

- Individual *circuit-level* Composite Scores and Components.
- "GAP" analysis comparing reliability performance with circuit criticality. This identifies improvement opportunities.
- IEEE metrics (5+ year and annual averages for system, voltage class and each circuit).
- Regression and residual analysis of outages vs. circuit length.

**Trend Charting and Analysis:** Many types of trend charts and analyses are included; the charts feature system trends and comparisons against industry norms. Trend charts are produced by voltage class for:

- Composite Scores
- IEEE standard metrics

A **Study Presentation** is provided at your facility at a time of your choice for customized distribution Study participants.

**Data Filters:** SGS runs a series of Data Filters for quality assurance of outage data. There are 25+ integrity checks and other summary statistics, which aid in improving data integrity.