

SCHEDULE 3. PART A. DISTRIBUTION SYSTEM INFORMATION

SCHEDULE 3. Part B: SAIDI and SAIFI in accordance with IEEE 1366-2003 standard or IEEE 1366-2012 standard

Normal ranges for SAIDI should be low double digits (i.e. 50 minutes) up to a couple thousand minutes, in a utility that may have had significant damage during the year. Normal ranges for SAIFI should be low decimal numbers (i.e. 0.3 events) up to low double digits (perhaps 10-12).

Major event SAIDI recorded in a given year can easily be small minutes (i.e. 10 or so, as well as 0) or to several hundred or a thousand. Major event SAIFI recorded in a given year can be low decimals, or 0, up to low single digits.

SCHEDULE 3: PART A. DISTRIBUTION SYSTEM INFORMATION

For purposes of this schedule, a distribution circuit is any circuit with a voltage of 34kV or below that emanate from a substation and that serves end use customers. Report this schedule if you own distribution lines.

Issue: "... that emanate from a substation ..."

Discussion: Are there distribution circuits that do not emanate from a substation? Perhaps directly from a generator?

Also, '34 kV' is not appropriate because 34.5 kV is a common distribution voltage.

Alternate wording: **For purposes of this schedule, a distribution circuit is any circuit with a voltage of 35kV or below that serves primarily end use customers.**

1. **Distribution automation** is a set of technologies providing sensing, communications, and control that enables an electric utility to remotely monitor and coordinate its distribution assets, and operate these assets in an optimal manner with or without manual intervention. Examples of distribution automation include automated feeder switches, automated capacitors and voltage regulators, and equipment monitoring.
2. **Automated feeder switching** is realized through automatic isolation and reconfiguration of faulted segments of distribution feeders via sensors, controls switches, and communications systems. These devices can operate autonomously in response to local events or in response to signals from a central control system.
3. **Automated Voltage & VAR Control** requires coordinated operation of reactive power resources such as capacitor banks, voltage regulators, and transformer load-tap changers, with sensors, controls, and communications systems. These devices could operate autonomously in response to local events or in response to signals from a central control system to actively manage voltage levels within feeders.
4. **Diagnosis and notification of equipment condition** is defined as on-line monitoring and analysis of equipment, its performance, and operating environment in order to monitor

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the status of equipment and remotely communicate that status to operators, allowing operators to make decisions regarding operations or maintenance. Examples of equipment monitoring are remote fault indicators and transformer monitors that check pressure, temperature, oil or fluid level, and or chemical constituents.

5. **Load served by distribution circuits with automation (MWh)** is the amount of energy delivered to customers traveling from the transmission system to the end-use customer through a distribution circuit (or distribution transformer or substation) that uses any form of automation during the reporting year.

Issue: Most companies do not aggregate energy by circuit. There is no standard way to estimate this value. Some companies may be able to set up special calculations to do this. Some may not. The reporting burden is excessive.

Recommendation: Delete this question

6. **Number of customers served by distribution circuits with automation** is the number of customers that are delivered energy that travels from the transmission system to the end-use customer through a distribution circuit (or distribution transformer or substation) that uses any form of automation.

Issue: In spite of the definition provided for automation, there are not necessarily consistent and easily accessed methods for calculating the number of customers that may somehow be affected by automation. Further, automation should include non-communicating technologies such as line reclosers or other similar devices that attempt to restore the flow of electricity to the customer.

Recommendation: Delete this question

7. On line 1 enter the **Total Number of Distribution Circuits**.
8. On line 2 enter the **Total Number of Distribution Circuits applying any type of distribution automation**.

Issue: Same comment as above. In spite of the definition provided for automation, there are not necessarily consistent and easily accessed methods for calculation the number of distribution circuits that may somehow be affected by automation. Further, automation should include non-communicating technologies such as line reclosers or other similar devices that attempt to restore the flow of electricity to the customer.

Recommendation: Delete this question

9. On line 2a select "Y" or "N" for the question, **Do you employ automated feeder switches?**
10. On line 2b select "Y" or "N" for the question, **Do you employ automated voltage and VAR control?**
11. On line 2c select "Y" or "N" for the question, **Do you perform diagnosis and notification of equipment cognition with on-line monitoring?**

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12. On line 3 enter **Load served by Distribution Circuits applying automation technology (MWhs)**.

Issue: Most companies do not aggregate energy by circuit. There is no standard way to estimate this value. Some companies may be able to set up special calculations to do this. Some may not. The reporting burden is excessive.

Recommendation: Delete this question

13. On line 4 enter the total number of customers served by Distribution Circuits applying automation technology.

Issue: Same comment as above. In spite of the definition provided for automation, there are not necessarily consistent and easily accessed methods for calculation the number of customers that may somehow be affected by automation. Further, automation should include non-communicating technologies such as line reclosers or other similar devices that attempt to restore the flow of electricity to the customer.

Recommendation: Delete this question

**SCHEDULE 3. PART B. DISTRIBUTION SYSTEM RELIABILITY
INFORMATION - IEEE**

If your entity calculates system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI) and determines Major Event Days in accordance with the IEEE 1366-2003 or IEEE 1366-2012 standard, answer ‘yes’ to questions 1 and 2 and complete Part B. If your entity calculates SAIDI and SAIFI via another method answer ‘yes’ to question 1 and no to question 2 then skip Part B and complete Part C. If your entity does not calculate SAIDI and SAIFI answer ‘no’ to question 1 and go to Schedule 4A. For lines 3 through 6 complete all that you calculate, for example if you only calculate SAIDI and SAIFI without Major Event Days included, complete the area under the subtitle “Excluding Major Events” and do not complete the area under the subtitle “Including Major Events”

1. The **system average interruption frequency index, or SAIFI**, indicates how often the average customer experiences a sustained interruption (of over 5 minutes) over a predefined period of time. In this schedule report annual SAIFI, or the SAIFI resulting from all interruptions in the reporting year. SAIFI is calculated as the sum over the year of total number of customers that experiences an interruption of more than 5 minutes, divided by the total number of customers.
2. $SAIFI = [\text{Sum of total number of customers interrupted over the year}] / [\text{Total number of customers served}]$

Issue: SAIFI calculation misquoted slightly as, “the sum over the year of total number of customers that experiences an interruption of more than 5 minutes, divided by the total number of customers” (underline added). This definition does not allow for more than one interruption for an individual customer.

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Recommendation wording: **SAIFI is calculated as the sum over the year of total number of customers interrupted for more than 5 minutes, divided by the total number of customers.**

3. The **system average interruption duration index, or SAIDI**, indicates the total duration of interruption for the average customer over a predefined period of time. In this schedule report annual SAIDI, or the SAIDI resulting from all interruptions in the reporting year. SAIDI is calculated as the sum over the year of all customers interrupted for more than 5 minutes times the number of minutes they experienced an interruption, divided by total number of customers.
4. SAIDI = [Sum of customer minutes interrupted over the year] / [Total number of customers served]
5. On lines 3 through 6 report the values that you calculate.
 - a. Report the Annual Distribution SAIDI Including Major Event Days on line 3,
 - b. Report the Annual Distribution SAIDI Excluding Major Event Days on line 3,
 - c. Report the Annual Distribution SAIDI Including Major Event Days excluding events where the reliability event was initiated from loss of supply (e.g. resulted from an event on the distribution system, not from the high-voltage system) on line 4.

Loss of supply

Discussion:

Question 4 asks for, “SAIDI Value: Major Event Days Included minus loss of supply”

The instructions say: “Report the Annual Distribution SAIDI Including Major Event Days excluding events where the reliability event was initiated from loss of supply (e.g. resulted from an event on the distribution system, not from the high-voltage system) on line 4.”

Question 6 asks for, “SAIFI Value: Major Event Days Included minus loss of supply”

The instructions say: “Report the Annual Distribution SAIFI Including Major Event Days excluding events where the reliability event was initiated from loss of supply on line 6.”

This section is predicated on compliance with IEEE 1366-2003 or IEEE 1366-2012. The section asks for SAIDI and SAIFI excluding loss of supply, which is not defined in either version of the 1366 standard. The only definition of loss of supply is that given in the instructions for Question 4; “...(e.g. resulted from an event on the distribution system, not from the high-voltage system) ...”

Recommended wording for instructions for Question 4:

“Report the Annual Distribution SAIDI Including Major Event Days excluding events where the reliability event was initiated from loss of supply (i.e. exclude interruptions caused by a failure in the transmission system, including the transmission portion of a substation, or the loss of a generation source) on line 4.”

Recommended wording for instructions for Question 6:

“Report the Annual Distribution SAIFI Including Major Event Days excluding events where the reliability event was initiated from loss of supply (i.e. exclude

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interruptions caused by a failure in the transmission system, including the transmission portion of a substation, or the loss of a generation source) on line 6.”

- d. Report the Annual Distribution SAIFI Including Major Event Days on line 5,
 - e. Report the Annual Distribution SAIFI Excluding t Major Event Days on line 5,
 - f. Report the Annual Distribution SAIFI Including Major Event Days excluding events where the reliability event was initiated from loss of supply on line 6.
6. On line 7, enter the **Total number of customers used to calculate SAIDI and SAIFI**, as reported on this schedule. A customer is defined as a metered electrical service point for which an active bill account is established at a specific location (e.g., premise). (*IEEE 1366-2003 pg 2*)
7. On line 8, **indicate the voltage at which you distinguish the distribution system from the supply system.**
8. On line 9, indicate whether your company has an outage management system that detects loss of load or customer outages, answer “yes”, even if you also receive outage information manually via other methods.

SCHEDULE 3. PART C. DISTRIBUTION SYSTEM RELIABILITY

INFORMATION - OTHER

SAIDI and SAIFI calculations via other methods, calculated by state

- 1. On lines 10 through 11 report the values that you calculate.
 - a. Report the Annual Distribution SAIDI Including major events on line 10,
 - b. Report the Annual Distribution SAIDI Excluding major events on line 10,
 - c. Report the Annual Distribution SAIFI Including major events on line 11,
 - d. Report the Annual Distribution SAIFI Excluding major events on line 11.
- 2. On line 12, enter the total number of customers used to calculate SAIDI and SAIFI, as reported on this schedule.
- 3. On lines 13, indicate whether your utility includes inactive accounts in its definition of customers used to determine SAIDI and SAIFI.
- 4. On line 14, indicate how your utility defines momentary outages. (Less than how many minutes) Outages can be classified as either momentary or sustained. Momentary outages are not included in determining SAIDI and SAIFI.
- 5. On line 15, report the voltage that you use to distinguish the distribution system from the supply system.

Issue: A question asks, “At what voltage do you distinguish the distribution system from the supply system?” With this wording, it is unclear whether the distinguishing voltage belongs to the distribution system or the supply system.

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Recommended wording: **“What is the highest voltage that you consider part of the distribution system, as opposed to the supply system?”**

6. On line 16, indicate whether your company has an outage management system that detects loss of load or customer outages, answer “yes”, even if you also receive outage information manually via other methods.