

SERC and BPU Partnership

New Jersey's Reliability Criteria for the Electric and Natural Gas Sectors

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January 26, 2003 -
February 2, 2003

Newark, New Jersey

1

Reliability Concerns

- Power disruption in the United States results in \$150 billion of lost productivity each year
- Electricity is “the oxygen of modern industrial society”
- Efforts are underway to attain a national minimum reliability level of “six nines”, or 99.9999%
 - At the national level, average interruptions per customer decreased from 5.3 in 2000 and 2001 to 4.7 in 2002

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2

Reliability Standards

- 27 of 50 states have established reliability and power quality standards for electric utilities
- With a growing reliance on digital technology, the need for security, quality, reliability and availability of a secure electricity supply for digital systems is becoming a new priority

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3

Reliability Standards (cont'd)

- Standards often incorporate the following:
 - American Gas Association
 - American National Standards Institute
 - Edison Electric Institute
 - Institute of Electrical and Electronics Engineers
 - National Electrical Code
 - National Electrical Safety Code

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4

Reliability Criteria

- New Jersey Statutes
 - Provide legislative direction
 - Establish broad policy
- New Jersey Administrative Code
 - Provides generic rules and regulations
- Board Orders
 - Provide specific direction

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5

Electric Distribution Service Reliability and Quality Standards

- Establish uniform methodology to measure reliability and ensure quality of electric distribution service
- Establish requirements for data maintenance, records retention and service interruption information
- Establish standards to measure service reliability

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6

Customer Average Interruption Duration Index (CAIDI)

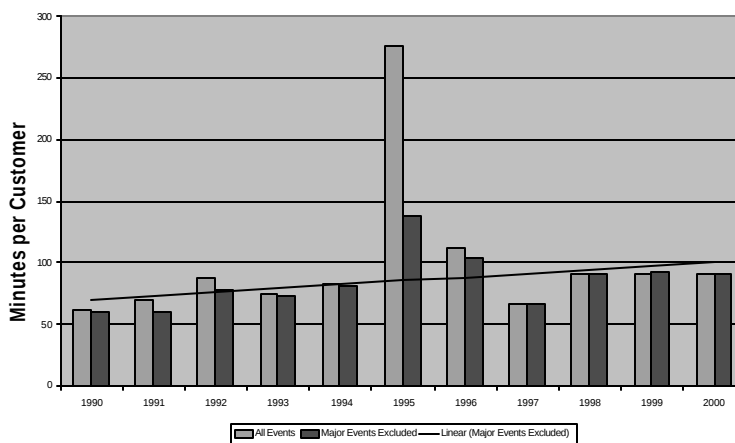
- $CAIDI = (\text{Total customer-minutes interrupted}) \div (\text{Total number of customer interruptions})$
- This is the average time taken for supply to be restored to a customer affected by an interruption. Our goal is to lower this index

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February 2, 2003

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7

Customer Average Interruption Duration Index



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8

System Average Interruption Frequency Index (SAIFI)

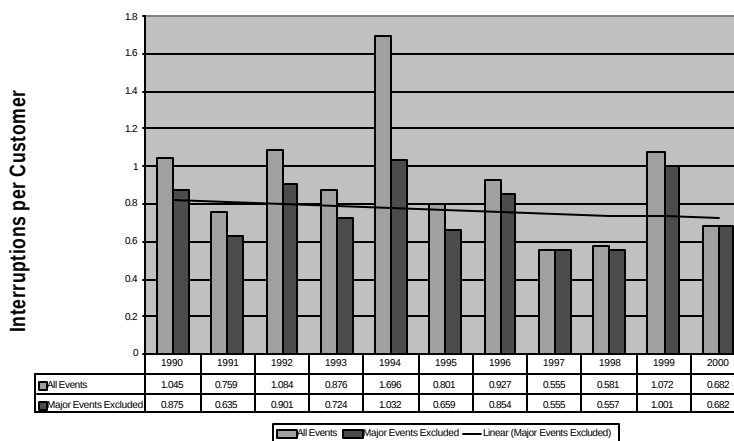
- SAIFI = (Total number of customer interruptions) ÷ (Total customers)
- This is the average number of interruptions for all customers, whether affected by an interruption or not. Our goal is to lower this index

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9

System Average Interruption Frequency Index



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February 2, 2003

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10

System Average Interruption Duration Index (SAIDI)

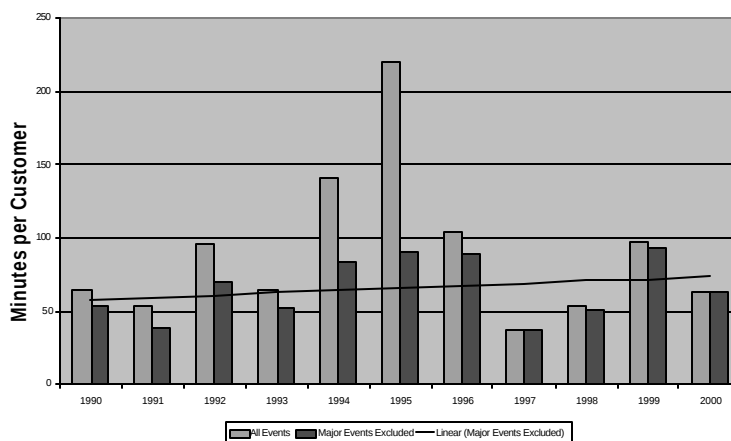
- SAIDI = (Total customer-minutes interrupted) ÷ (Total customers)
- This is the average time OFF supply for all customers, whether affected by an interruption or not. Our goal is to lower this index.

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February 2, 2003

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11

System Average Interruption Duration Index



January 26, 2003 -
February 2, 2003

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12

Momentary Average Interruption Frequency Index (MAIFI)

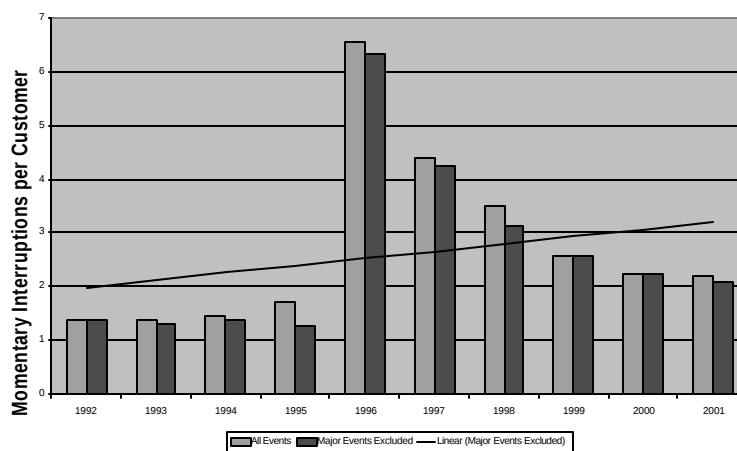
- $MAIFI = (\text{Total number of customer momentary interruptions}) \div (\text{Total customers})$
- This is the number of momentary interruptions per customer of less than 5 minutes duration. Our goal is to lower this index.

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13

Momentary Average Interruption Frequency Index

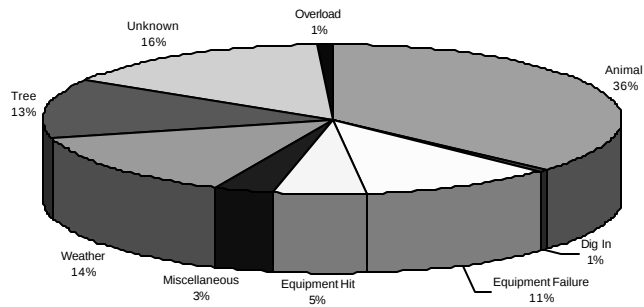


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14

Major Causes of Interruptions



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Outside Inspection Programs

- Tree Trimming/Vegetation
- Transformer Load Checks
- Network Protectors (Relays)
- Automatic Transfer Switches
- Poles and Overhead Lines
- Underground Cables
- Reclosers/Interrupters

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February 2, 2003

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16

Inside Inspection Programs

- Circuit Breakers/Relays
- Infrared Thermography
- Battery Maintenance

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17

Other Reliability Programs

- Outage Management System
- Poor Performing Circuits
- Power Quality

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18

Outage Management System

- Each utility must establish a system consisting of:
 - Geographic information system
 - Automated voice response unit
 - Software-driven outage
 - Energy management system
 - Supervisory control and data acquisition system (SCADA)

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19

Outage Management System (cont'd)

- Operating Criteria
 - Digitally map entire distribution system
 - Group customers without service and identify most probable cause
 - Associate customers with specific facilities
 - Generate street maps showing outage locations
 - Improve response and restoration times

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20

Poor Performing Circuits

- Each utility shall identify its worst performing circuits each year and take appropriate actions to improve reliability
- Criteria is 2% of all circuits or five circuits, whichever is greater, in each operating area.

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21

Power Quality

- Maintain voltage within + 4% or – 4% of applicable voltage level
- Balance phases on circuits
- Identify customer causes
 - Deteriorated service connections
 - Overloaded services or transformers
 - Unbalanced phases to three-phase equipment
 - Incompatible equipment requirements with supplied voltage level

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22

Additional Information

- www.bpu.state.nj.us, or
- carl.dzierzawiec@bpu.state.nj.us

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February 2, 2003

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23