



# Reliability Information Sheet

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The City of Boulder understands that electrical system reliability is of the utmost importance for many residents and all of the local business and industrial community. As part of the municipalization exploration work plan, the city is studying what measures would need to be taken to be able to ensure maximum and above-adequate reliability.

Unfortunately, measuring reliability is difficult to do without actually creating a municipal electric utility and establishing a starting point track record of reliability data. Fortunately, there are numerous standards in place that require both public and private power providers to achieve certain levels of reliability or face significant consequences.

In addition, many municipally run electric utilities have proven over many years that they are at least as reliable, if not even more reliable, than a privately operated utility, and there is hard data to support this record.

## **Reasons a municipal utility may be more reliable than a public utility include:**

- Close proximity of maintenance crews to outage locations leads to shorter outages
- Enhanced knowledge of the local electrical system by maintenance crews can allow for increased maintenance and better durability
- Greater ability to underground the electrical system, which reduces outages due to weather and accidents.
- Greater ability to assess the system and create redundancies

## **How Reliability is Measured - Reliability Indices**

- **SAIDI = System Average Interruption Duration Index** – indicates average minutes of interruption per customer each year.
  - The lower the SAIDI number, the better the reliability.
  - Index used by most private and public electric utilities

**Xcel Energy uses SAIDI-ODI (Ordinary Distribution Interruptions)** as a reliability index, which represents those events that utility staff can respond to without crisis mode operation. It ensures the utility is tracking the real changes in the reliability indices, and not chasing unusual events like hurricanes, tornadoes, and floods.

## **Other Reliability Indices:**

- **SAIFI** – System Average Interruption Frequency Index – measures how often an average customer experiences a sustained interruption



- **CAIDI** – Customer Average Interruption Duration Index – measures the average time required to restore service once an outage occurs
- **ECT** – Electric Continuity Threshold – measures the total number of customers experiencing more than five sustained electrical service interruptions each year that aren't caused by major events or public accidents.
- **ERT** – Electrical Restoration Threshold – measures the number of customers experiencing a sustained electric service interruption over 24 hours in duration in a calendar year.

## Historical Reliability

For comparison purposes, historical reliability data was collected from several utilities that include investor-owned and public power companies in and outside of Colorado.

The American Public Power Association (APPA), an organization of 2,000 municipal and other publicly owned electric utilities, compiles reliability data for its members from data submitted to the Energy Information Administration (EIA).

### Data was gathered from:

- Xcel Energy's nine service regions in Colorado:
  - Boulder (includes county and mountain communities, not just the City of Boulder)
  - Denver
  - Front Range
  - Greeley
  - High Plains
  - Mountain
  - Northern Region
  - San Luis Valley
  - Western Region
- Colorado Municipal Utilities
  - Colorado Springs
  - Fort Collins
  - Longmont
- Non-Colorado Utilities
  - Bryan Texas Utility – Municipally run and located between Dallas and Houston
  - Portland General Electric – Private utility based in Portland, OR
  - Otter Tail Power - Private utility serving parts of North and South Dakota and Minnesota



- Pacific Power and Light – Private utility serving northern California and southern Oregon

**When comparing reliability between regions, there are a number of factors that can contribute to differences:**

- Size of the operating region in square miles
- Geographic location – rural vs. urban, mountains vs. plains, etc.
- Population density and size of customer base
- Climate trends and weather patterns
- Transmission and distribution system design
- Transmission and distribution system age
- Maintenance crew factors
  - Number of crews and
  - Access to equipment
  - Maintenance crew proximity to outage source

Reliability data is reported by Xcel for the “Boulder Region” rather than for the city itself, so customers in the foothills and others outside of Boulder are included. About 40 percent of the Xcel’s customers in the Boulder region are within the city’s boundaries.

**Findings:**

- Boulder Region SAIDI was 88.8 minutes for 2008 and 98.6 minutes for 2009
- For Colorado utilities and regions, annual SADI values range from 10 to 124 minutes.
- APPA mean and the Institute of Electrical and Electronics Engineers (IEEE) median benchmark annual SAIDI values range from 69 to 119 minutes.

**2009 SAIDI data for the 12 Xcel regions and other Colorado utilities sampled, ranked from the highest (most reliable) to lowest (least reliable)**

1. Fort Collins (muni) – 11.0
2. Longmont (muni) – 23.8
3. High Plains (Xcel region) – 42.8
4. San Luis Valley (Xcel region) – 47.6
5. Colorado Springs (muni) – 47.7
6. Greely (Xcel region) – 48.2
7. Northern (Xcel region) – 62.8
8. Denver (Xcel region) – 71.3
9. Western (Xcel region) -



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10. Mountain (Xcel region) – 79.1
  11. Boulder (Xcel region) – 98.6
  12. Front Range (Xcel region) – 124.1

The high system reliability achieved by the City of Fort Collins can be attributed to the fact that a majority (99%) of its transmission and distribution system is currently underground. It is currently unknown what percentage of the Boulder Region’s system is underground as Xcel has declined to provide that information.

Although undergrounding can increase system reliability, associated high costs to complete the work can make this difficult to achieve. In addition, underground system interruptions may take longer to repair due to the difficulty of accessing the wires.

**North American Electric Reliability Corporation (NERC) Requirements – NERC sets the standards that all public and private electrical utilities must achieve.**

**NERC’s mission** is to ensure the reliability of the North American bulk power system.

It is the electric reliability organization (ERO) certified by the Federal Energy Regulatory Commission (FERC) to establish and enforce reliability standards for the bulk power system.

**What NERC does:**

- Develops and enforces reliability standards in the U.S.
- Assesses system adequacy annually via a 10-year forecast
- Monitors the bulk power system for outages and other issues
- Educates, trains and certifies industry personnel

NERC has the legal authority to enforce compliance with its reliability standards, which it does through a rigorous program of monitoring, audits and investigations, and the imposition of penalties and other enforcement actions for non-compliance.

Learn more at [www.NERC.com](http://www.NERC.com).