

NorthWesternTM Energy

2006
-Montana-
Electric Distribution/Transmission
Annual Reliability Report



March 2007
Final Report

1.0 Executive Summary

The main goal of this report is to provide information and insight into NorthWestern Energy's (NWE) 2006 Electric Distribution and Transmission System indices for the Montana region. These indices include SAIDI (System Average Interruption Duration Index – in minutes), CAIDI (Customer Average Interruption Duration Index – in minutes), SAIFI (System Average Interruption Frequency Index – in frequency) and Outage Counts.

System indices will be given for the entire Montana operating region and also broken down into the major operating divisions of the state – Billings, Bozeman, Butte, Great Falls, Havre, Helena, Lewistown and Missoula. As with the previous years annual reports, the Institute of Electrical and Electronics Engineers (IEEE) Power Engineering Society Standard 1366-2003 will again be followed. This standard is directly related to the use of a statistically based definition for classification of Major Event Days (MED) – also commonly referred to as the 2.5 Beta Method. Major Event Days are days in which the system SAIDI exceeds a statistically derived threshold value provided by IEEE and represent days in which the electric system experienced stresses beyond normal operating conditions (such as a severe weather storm).

NorthWestern Energy has an active relationship with IEEE to ensure a consistent and accurate portrayal of our utility's ability report and benchmark reliability indices. MED's are identified through a monthly process for each region and can be included and excluded per the data required. This report will provide all information (including and excluding MED's) for all indices to better demonstrate and analyze normal versus emergency conditions.

2.0 General

There were two major event days in 2006. The first was caused by a July storm that caused 110 reported outages in Billings. This summer storm brought strong winds that took many tree limbs down creating outages. The second major event day impacted both the Great Falls and Missoula divisions when a winter (December) storm again took tree limbs and trees down causing numerous system equipment failures and outages on the system. The total system SAIDI for these two events was 20.69 minutes.

For a comparison, there were three major event days in 2002, zero 2003-2004, and four 2005. Therefore, the two experienced in 2006 is approximately the average experienced since 2002.

3.0 Montana – System Reliability

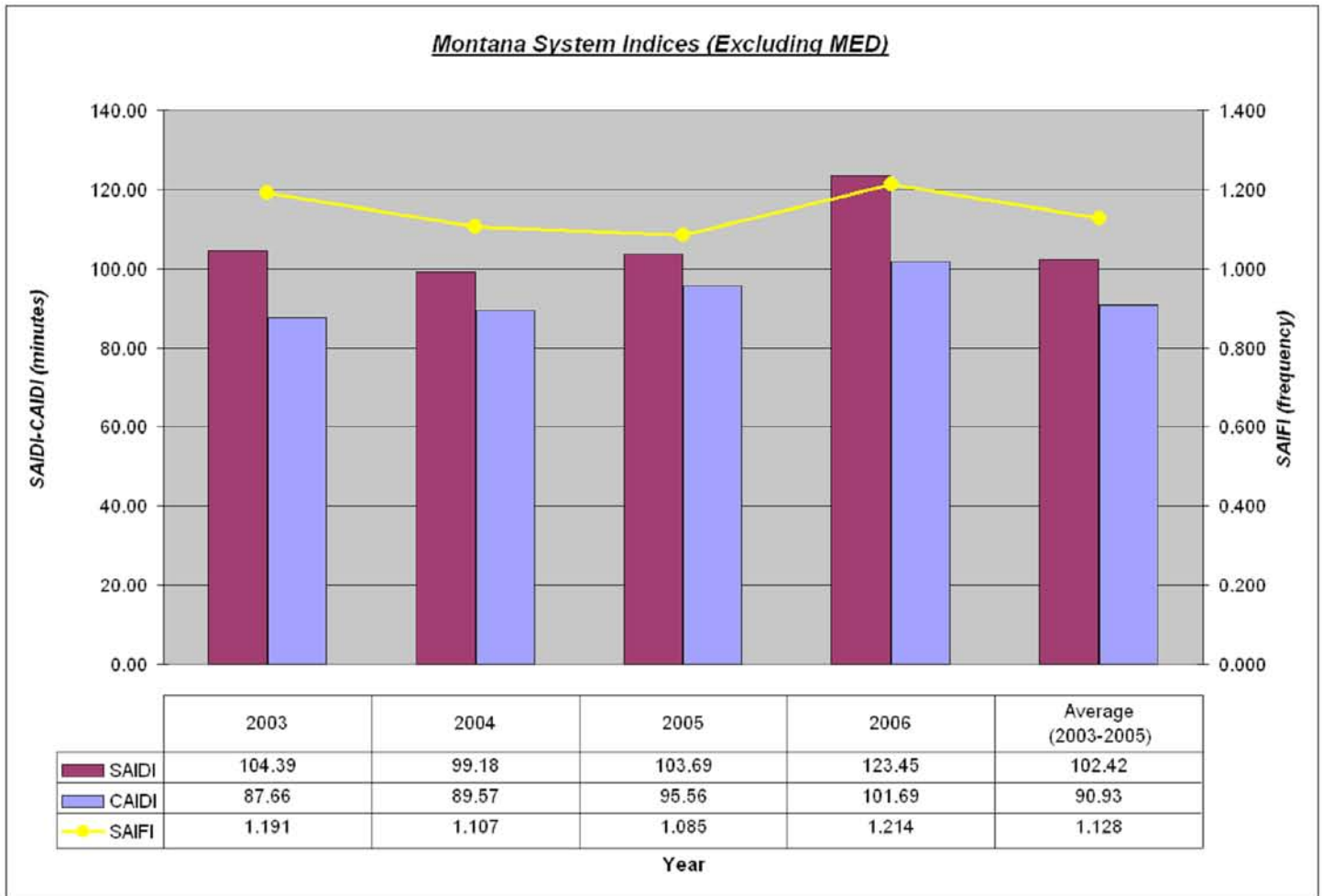


Figure 3.0a – Montana – System Indices (Excluding MED)

The information in figures 3.0a and 3.0b depict NorthWestern Energy's Montana system indices and outage counts for the years 2003-2006. System indices shown for 2003-2005 (excluding MED) are IEEE certified and the 2006 data was taken from year-end audited data (Excluding MED). Please note that SAIDI and CAIDI are given in minutes and SAIFI in the frequency of occurrence.

As can be seen by figure 3.0a, SAIDI, CAIDI, and SAIFI indices increased from the year 2005. The 2006 indices were also higher than the three-year (2003-2005) average. The contributing factors to this increase will be discussed in further detail in this report as each of the operating divisions of the Montana region are examined. Data and figures, which included identified MED information, are given in this section to demonstrate the significant increase in indices information if not removed.

Outages By Cause (excluding MED) are also shown in figure 3.0b of this section.

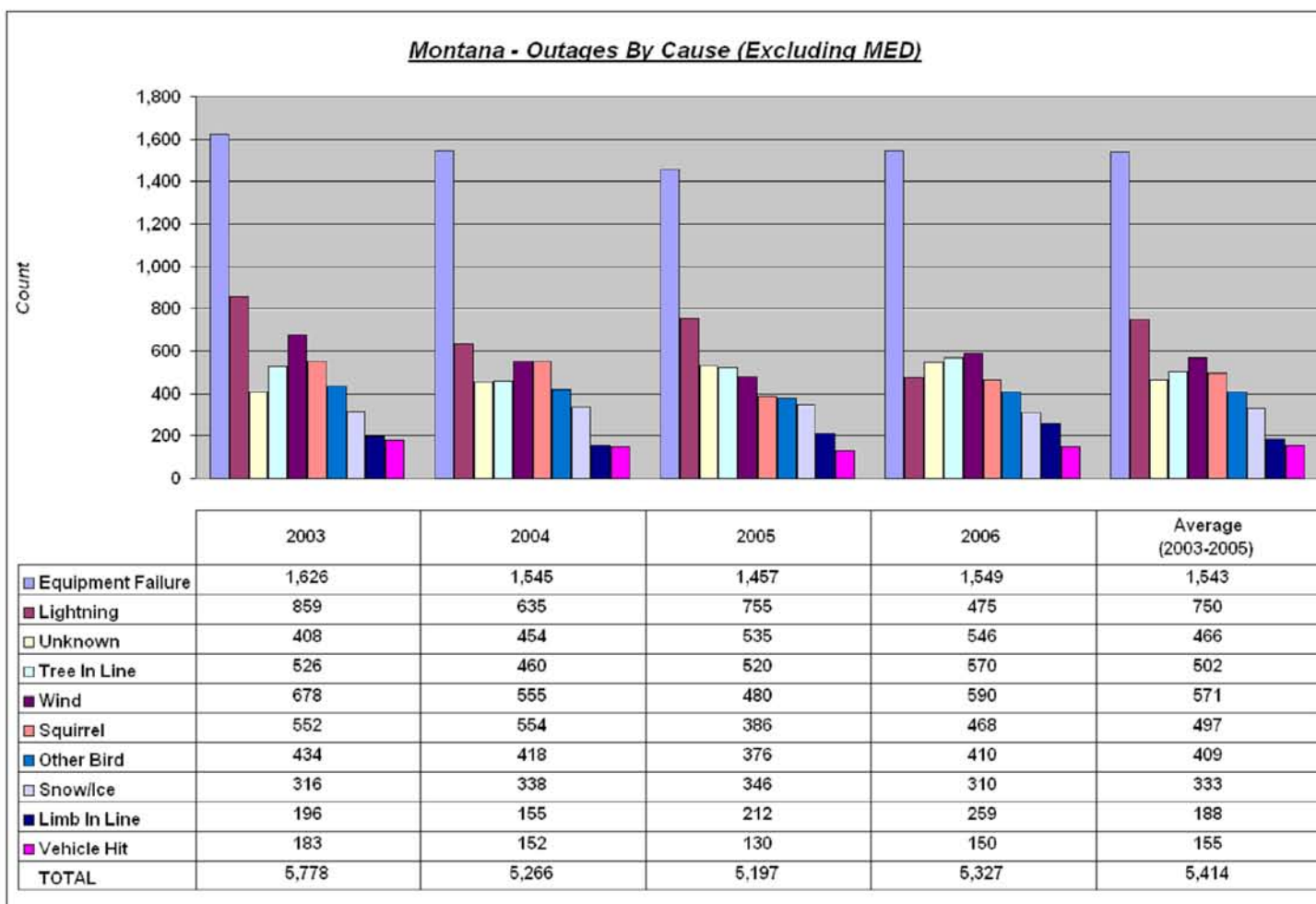


Figure 3.0b – Montana – Outages By Cause (Excluding MED)

As can be seen in the figure above, outages increased by 130 from the 2005 operating year, but 2006 was still below the previous three year average (2003-2005). The outage causes represented in this table are the top ten major contributors for outages on the NorthWestern Energy Electric Distribution and Transmission system.

Equipment failure, wind, and squirrel related outages saw the most significant increase from 2005 to 2006 due to various reasons. Wind related outages experienced an increase most likely due to the accumulation of tree growth throughout the state and the delayed reaction to the newly implemented tree-trimming program. Outages due to tree related issues should see a decrease as the five-year cycle trimming process is completed and takes effect.

Equipment failure is the most common outage cause due to its broad and all-inclusive category nature. Pole and crossarm failures, underground cables, transformers, insulators, lightning arrestors, and other line devices are all included here.

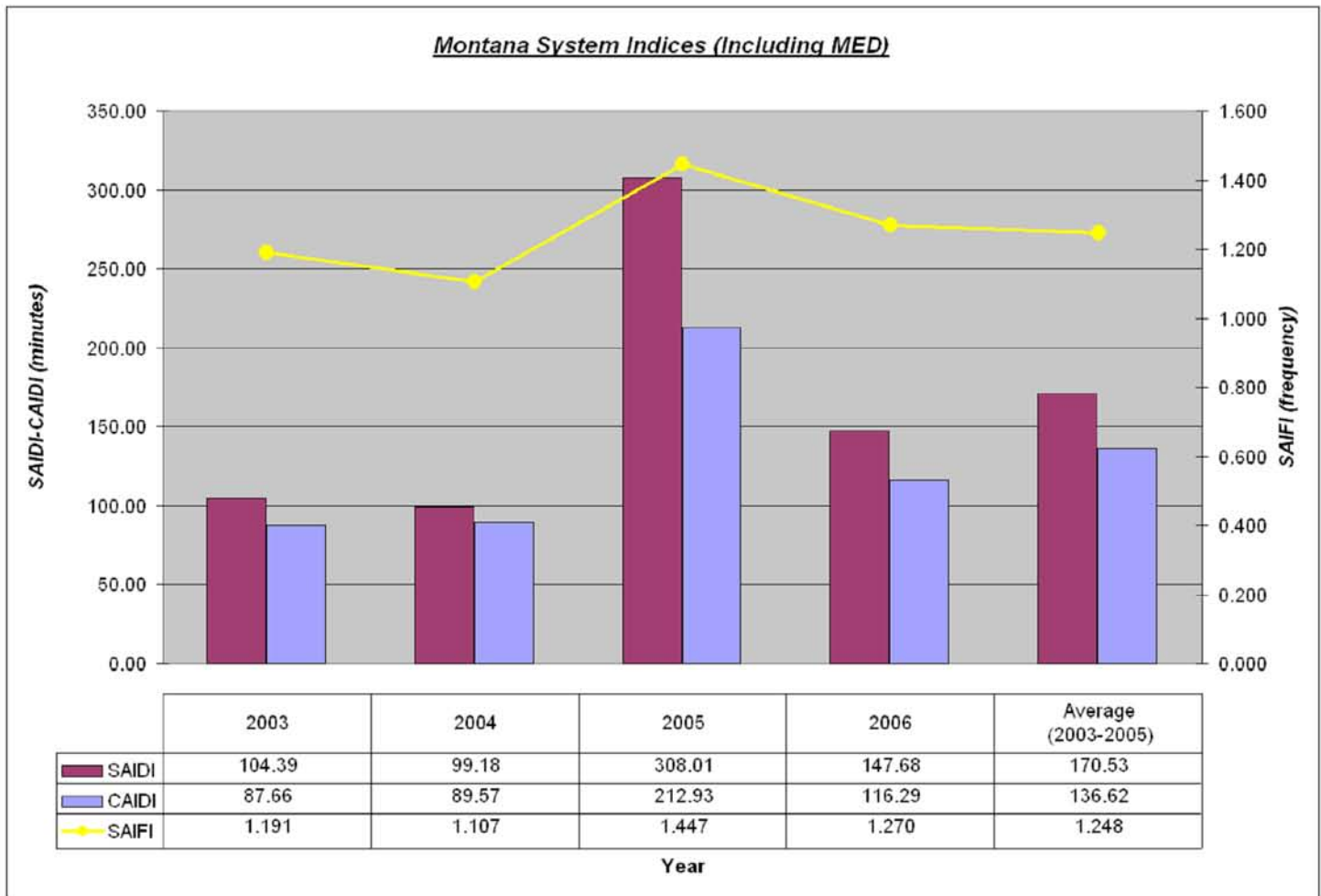


Figure 3.0c – Montana – System Indices (Including MED)

As can be seen above in figure 3.0c, with the inclusion of the four Major Event Days in 2005 and the two MED's in 2006, the three year average increased and the 2006 yearly indices increased substantially. All 2006 indices are less than the three-year average due to the significant impact 2005 had on the average.

SAIDI and CAIDI increased by 33 and 21 minutes, respectively, and SAIFI saw a 0.066 increase in frequency with the addition of the MED's data.

Figure 3.0d depicts Montana system outages by cause after including major event days. The four outage causes that increased the most, with the addition of MED's were limb in line, wind, tree in line, and equipment failure.

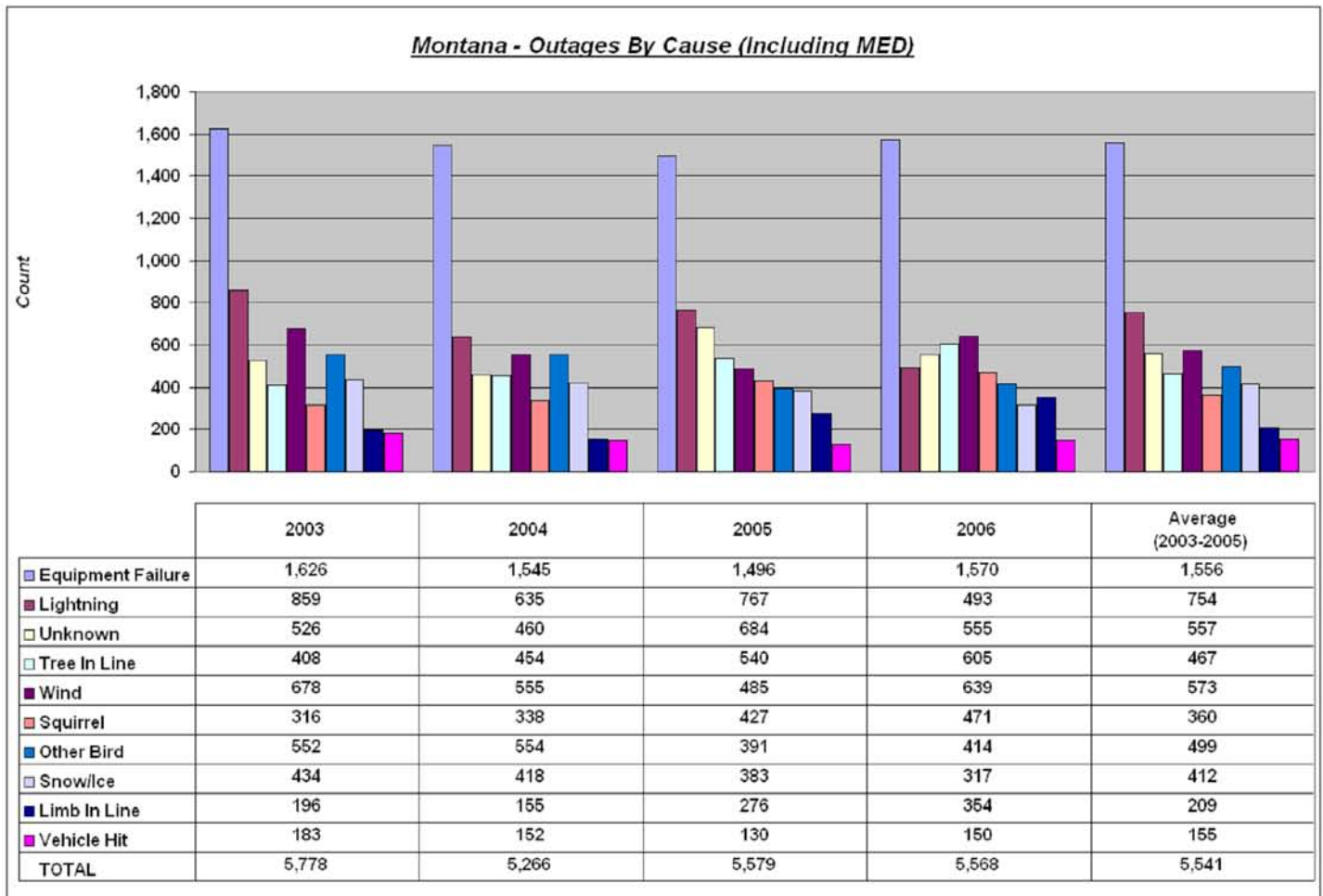


Figure 3.0d – Montana – Outages By Cause (Including MED)

4.0 Billings – System Reliability

4.1 Discussion – There were two outages in Billings on the “Top 20 SAIDI” excluding MED’s list. One was a forest fire in August which took several customers out for nearly 25 hours. The other outage was a system equipment failure in October.

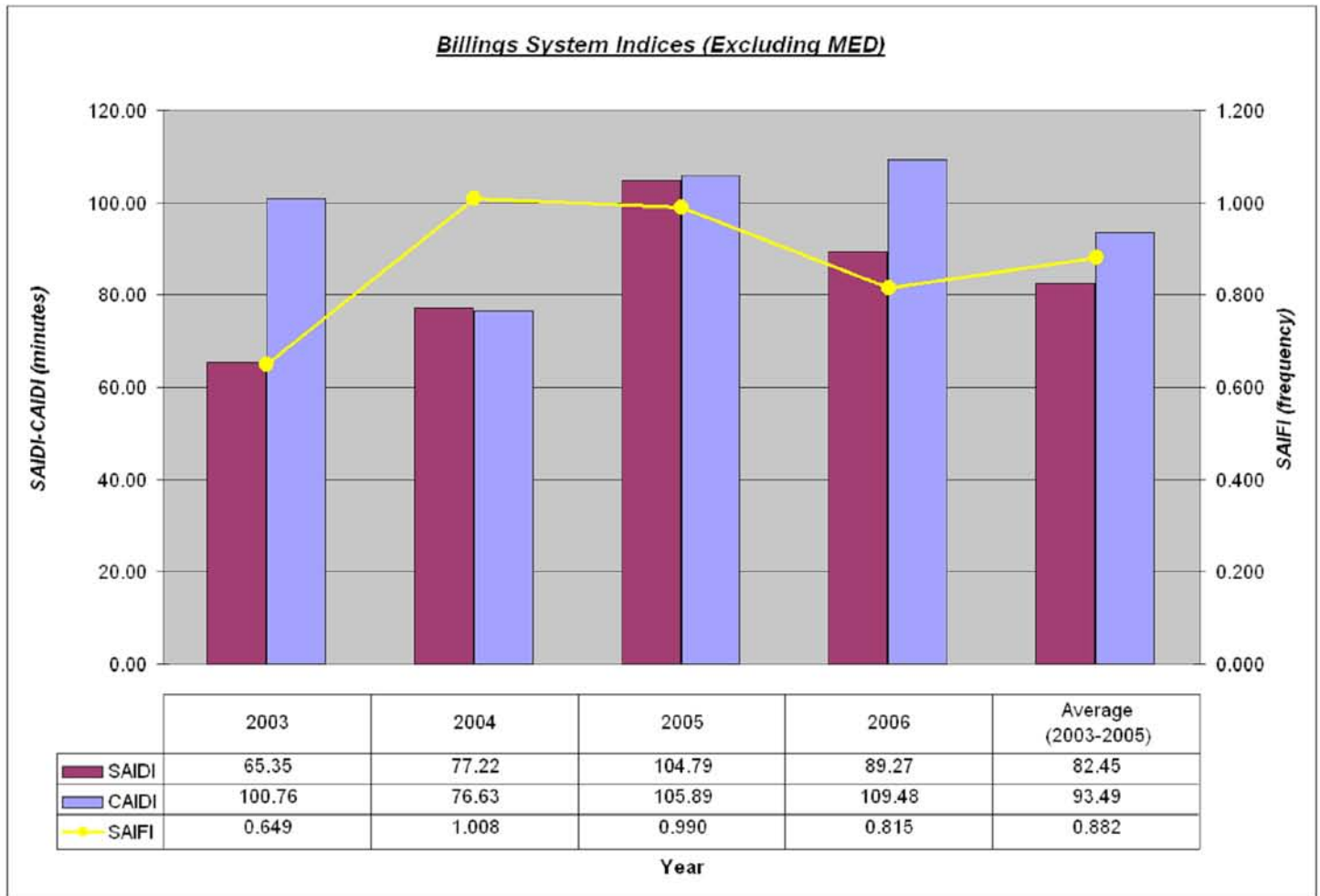


Figure 4.0a – Billings – System Indices (Excluding MED)

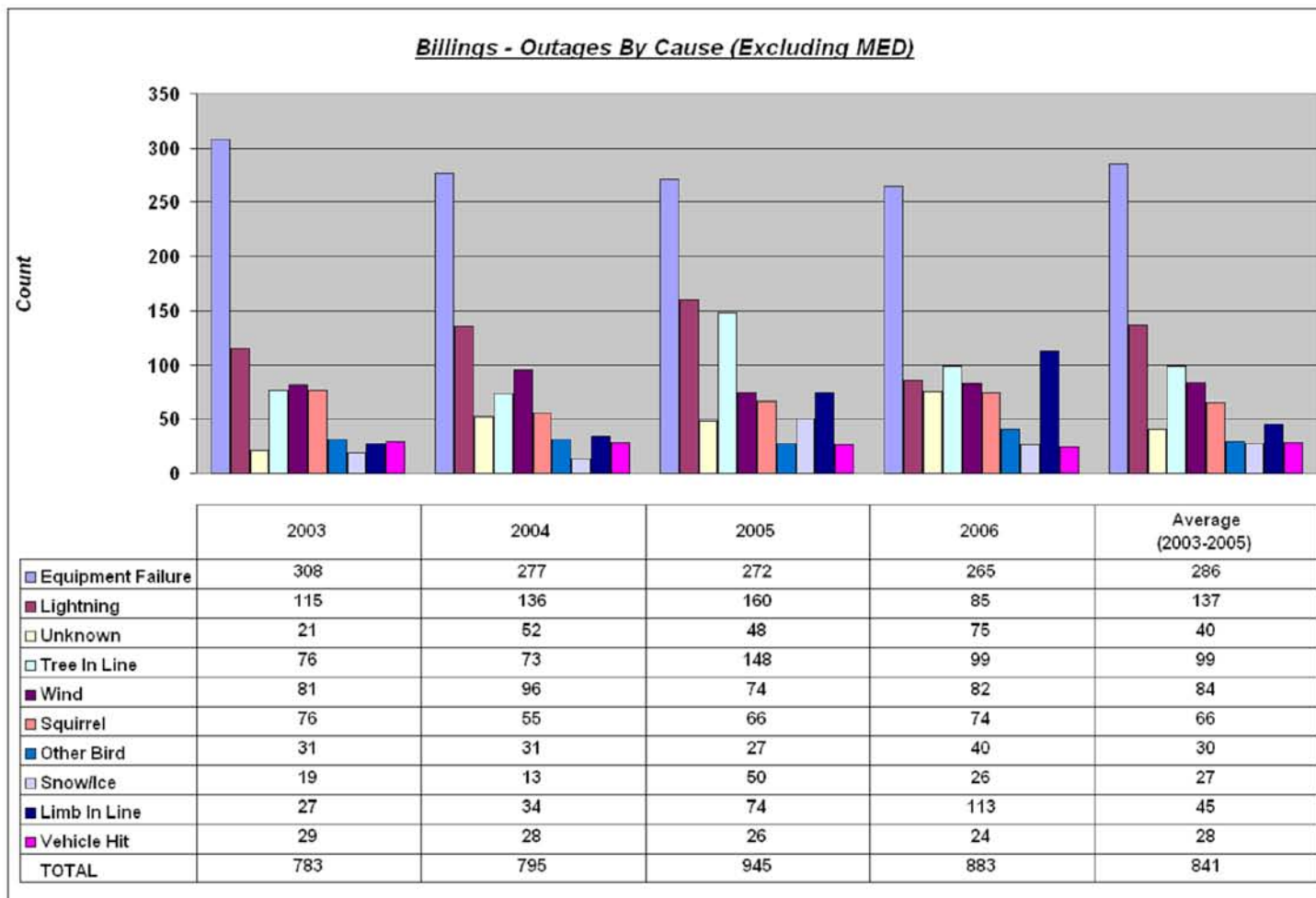


Figure 4.0b – Billings – Outages By Cause (Excluding MED)

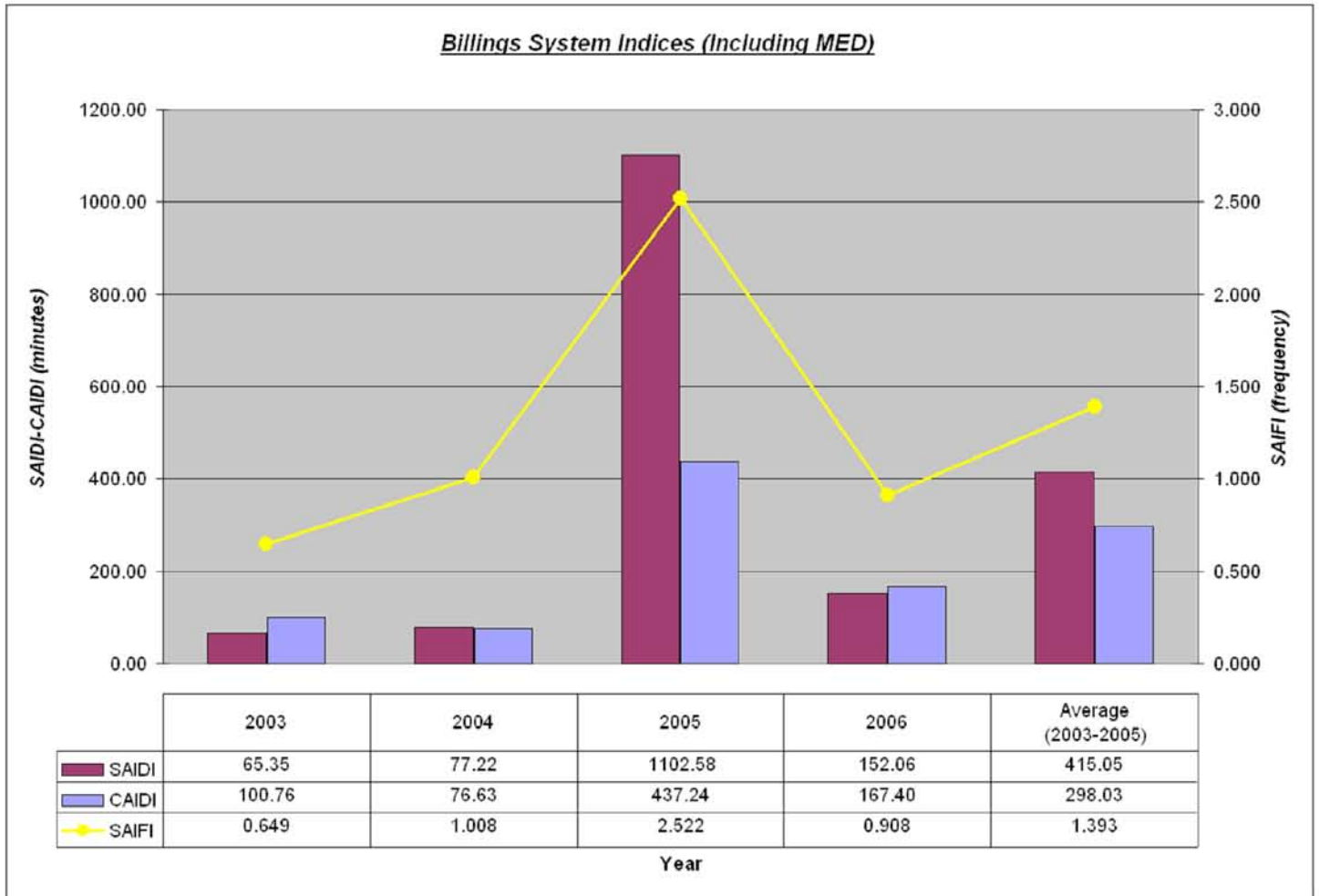


Figure 4.0c – Billings – System Indices (Including MED)

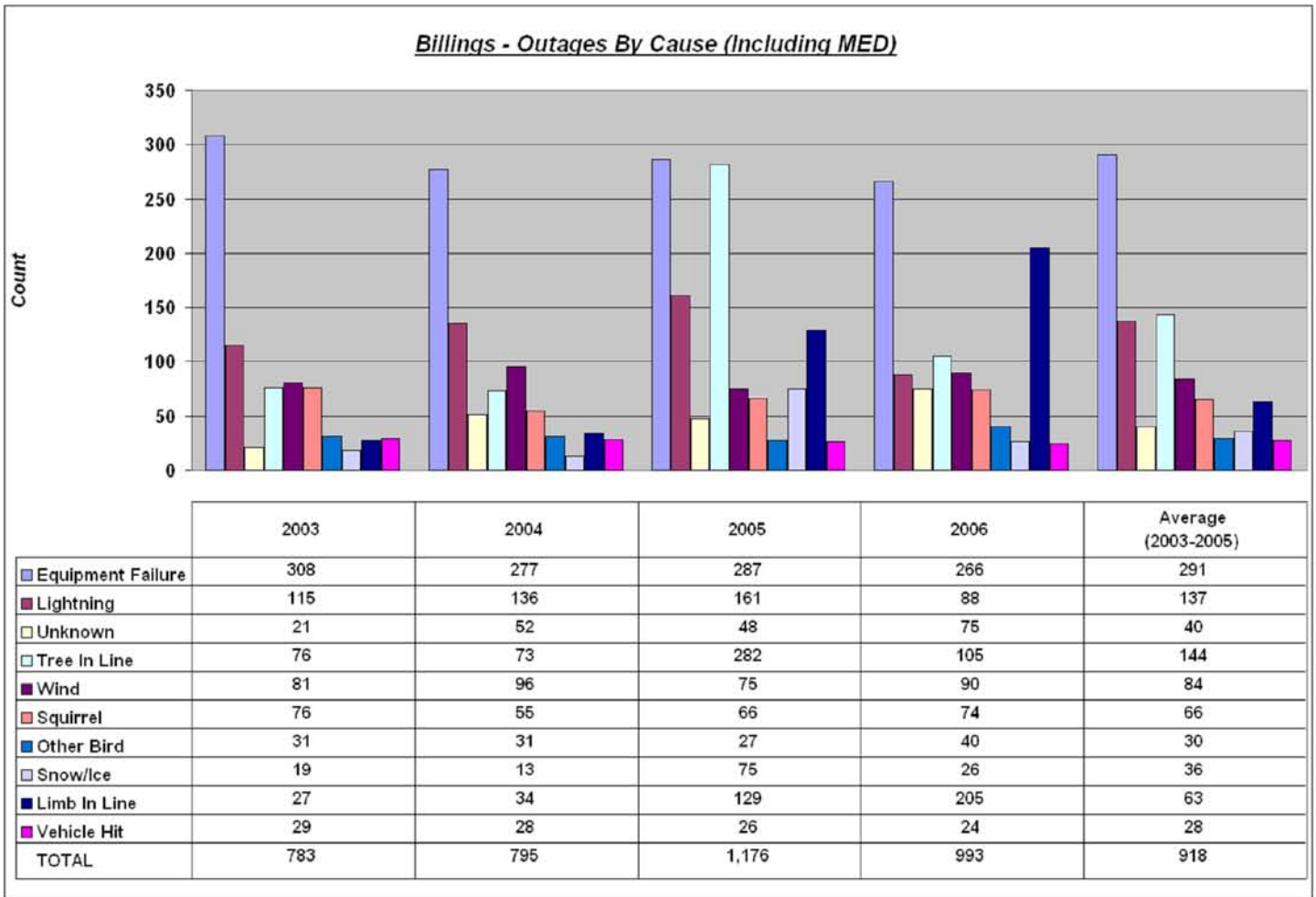


Figure 4.0d – Billings – Outages By Cause (Including MED)

5.0 Bozeman – System Reliability

5.1 Discussion – There were two outages in Bozeman on the “Top 20 SAIDI” excluding MED’s list. One was a vehicle that hit a junction pole in November. The other was a system equipment failure in April.

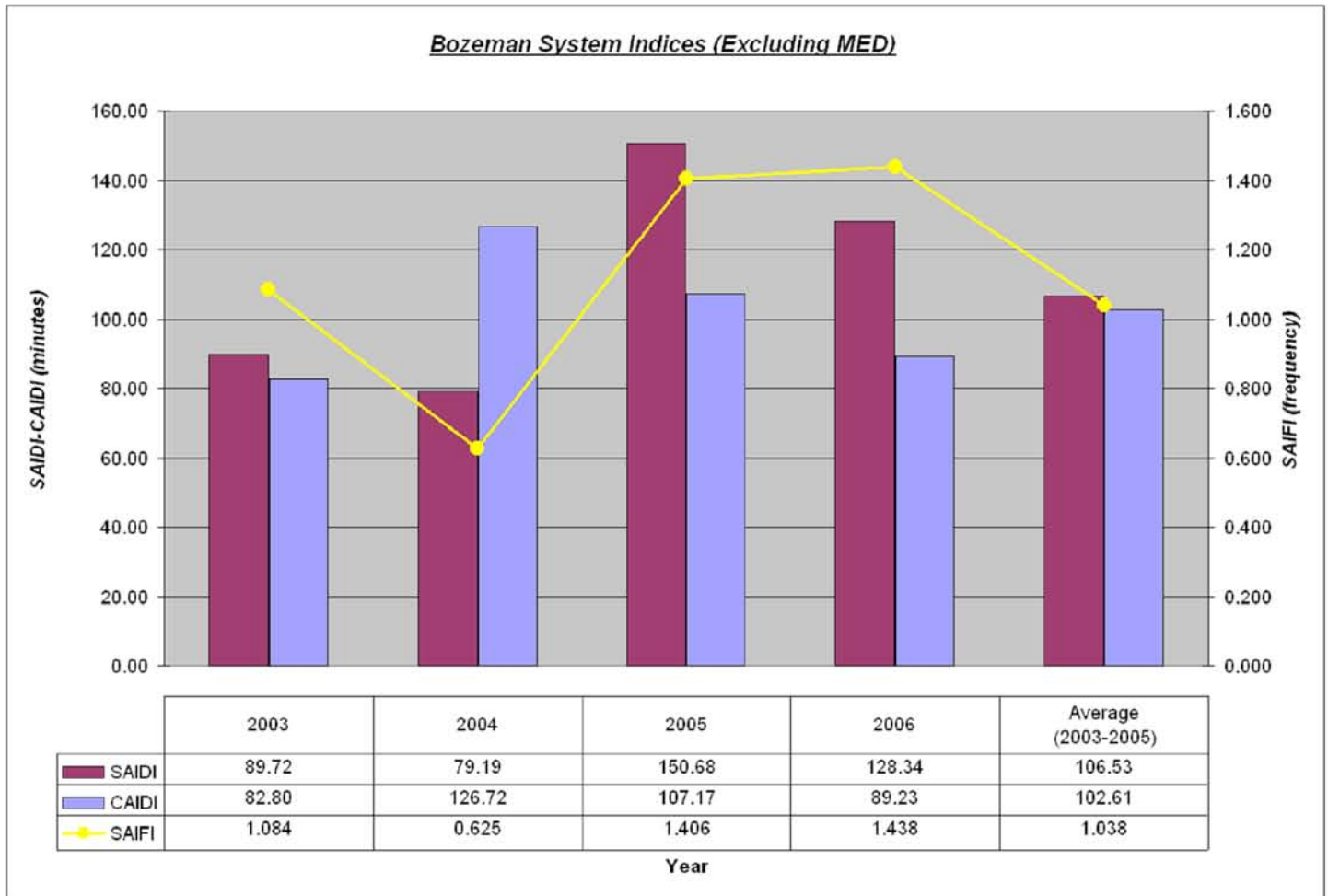


Figure 5.0a – Bozeman – System Indices (Excluding MED)

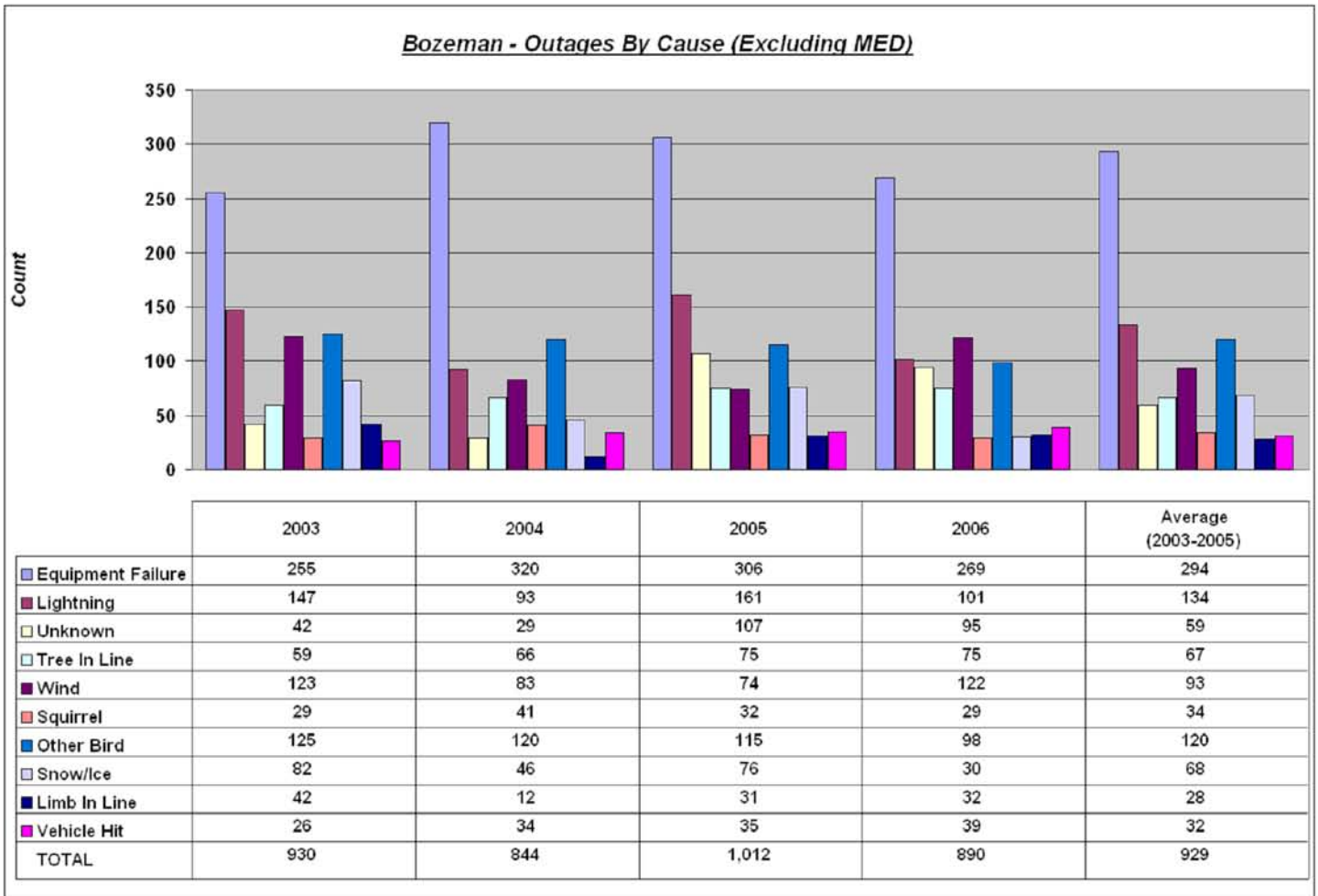


Figure 5.0b – Bozeman – Outages By Cause (Excluding MED)

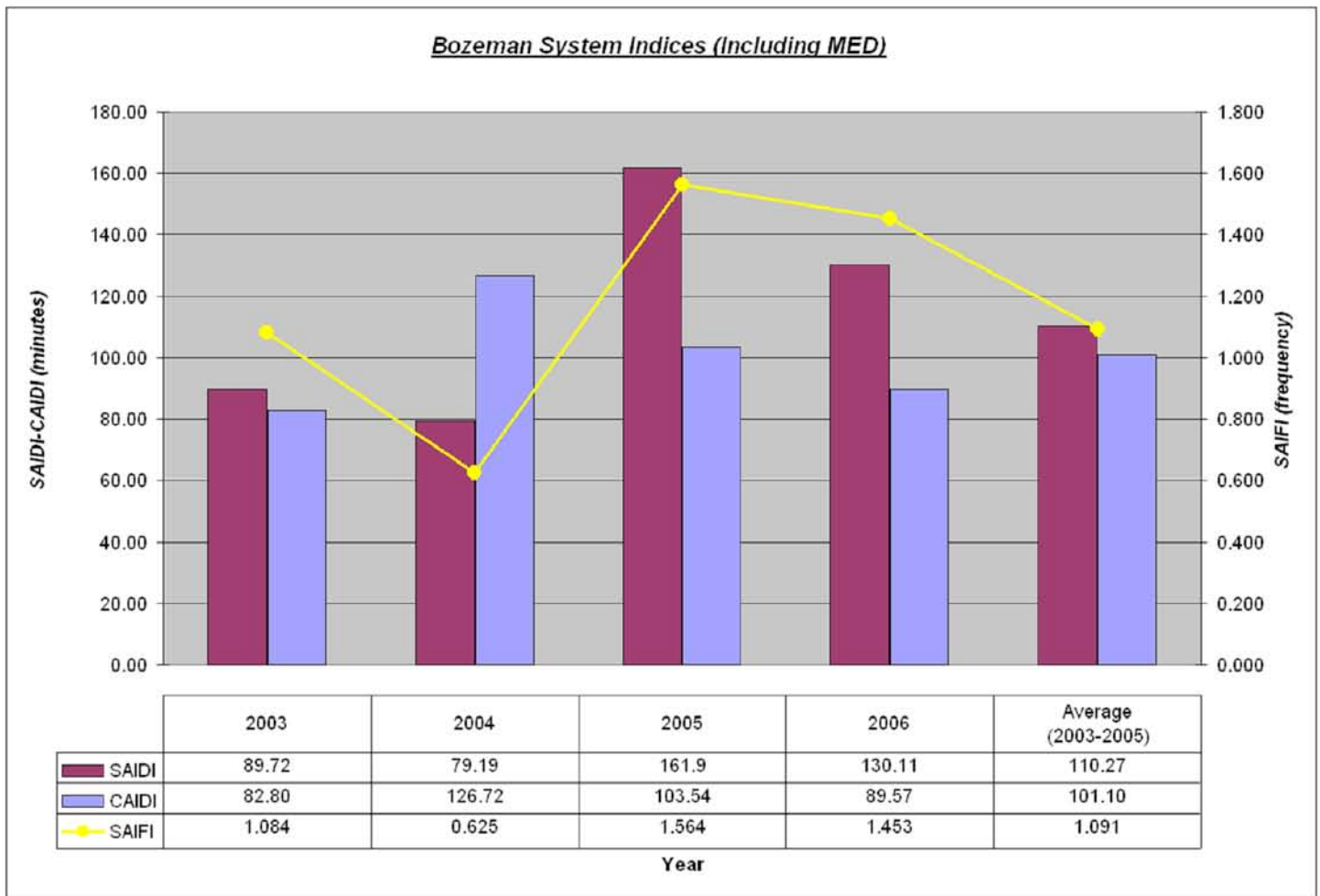


Figure 5.0c – Bozeman – System Indices (Including MED)

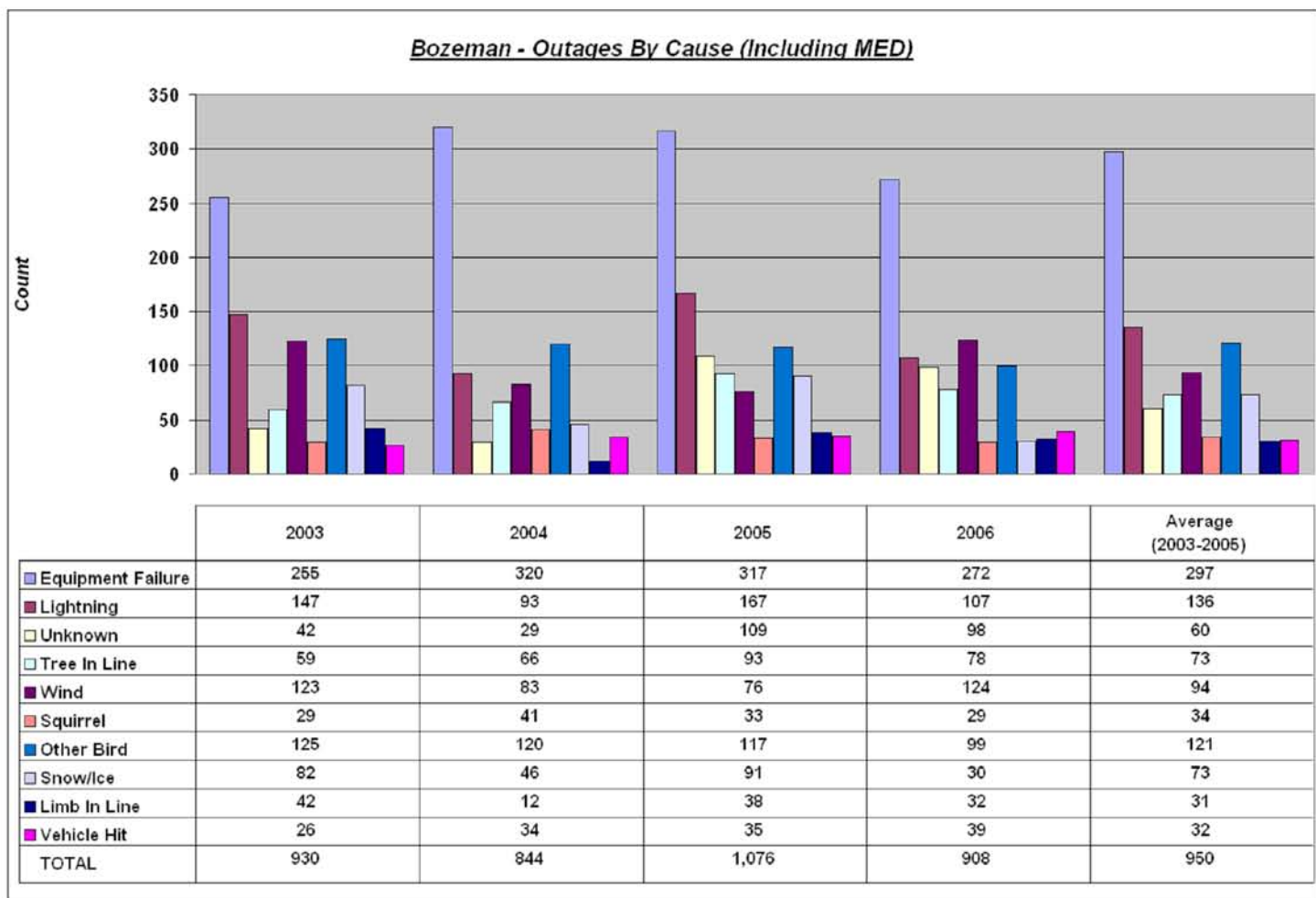


Figure 5.0d – Bozeman – Outages By Cause (Including MED)

6.0 Butte – System Reliability

6.1 Discussion – There was one outage in Butte on the “Top 20 SAIDI” excluding MED’s list that lasted approximately 6.5 hours and is attributed to a thunder-lightning storm in June.

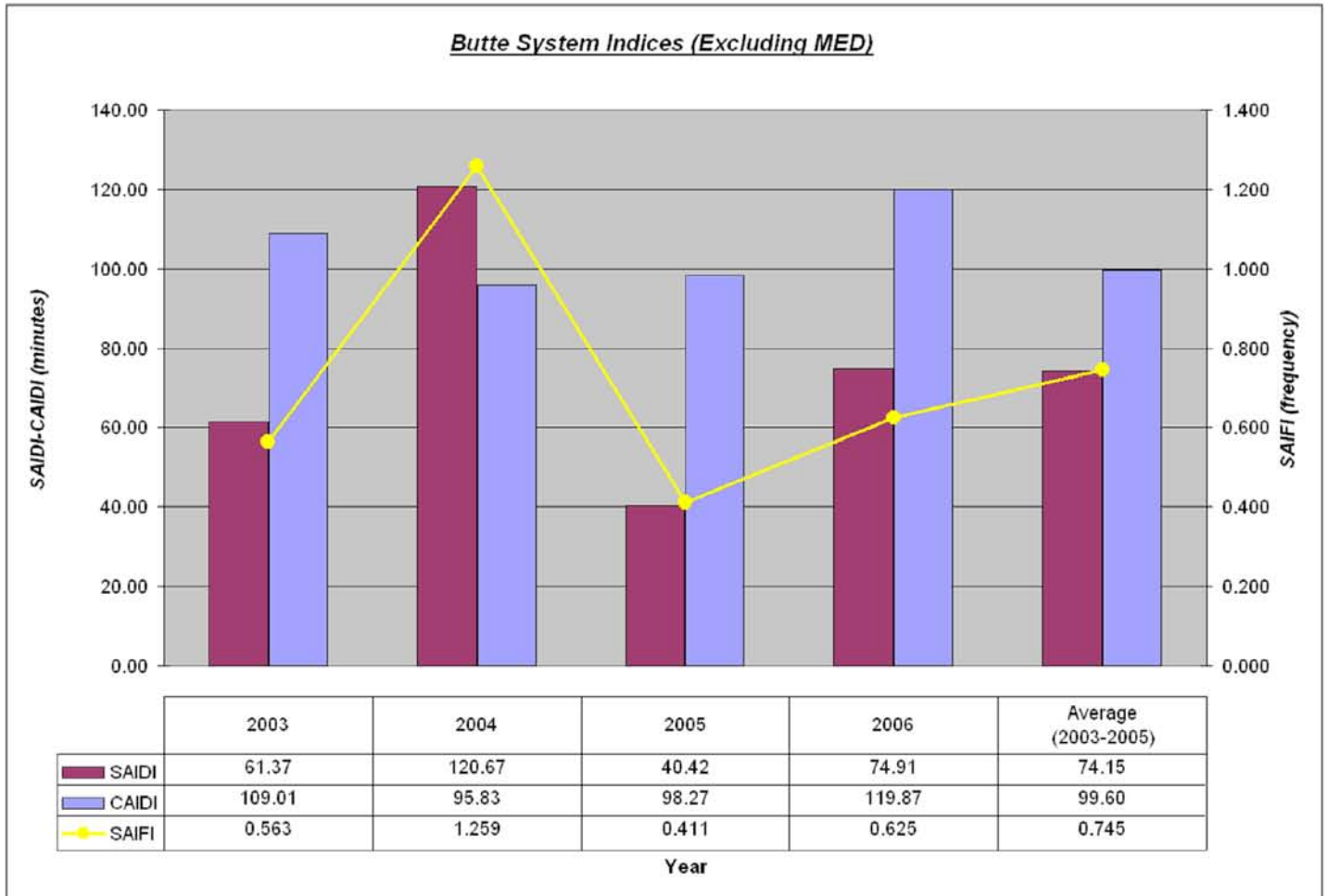


Figure 6.0a – Butte – System Indices (Excluding MED)

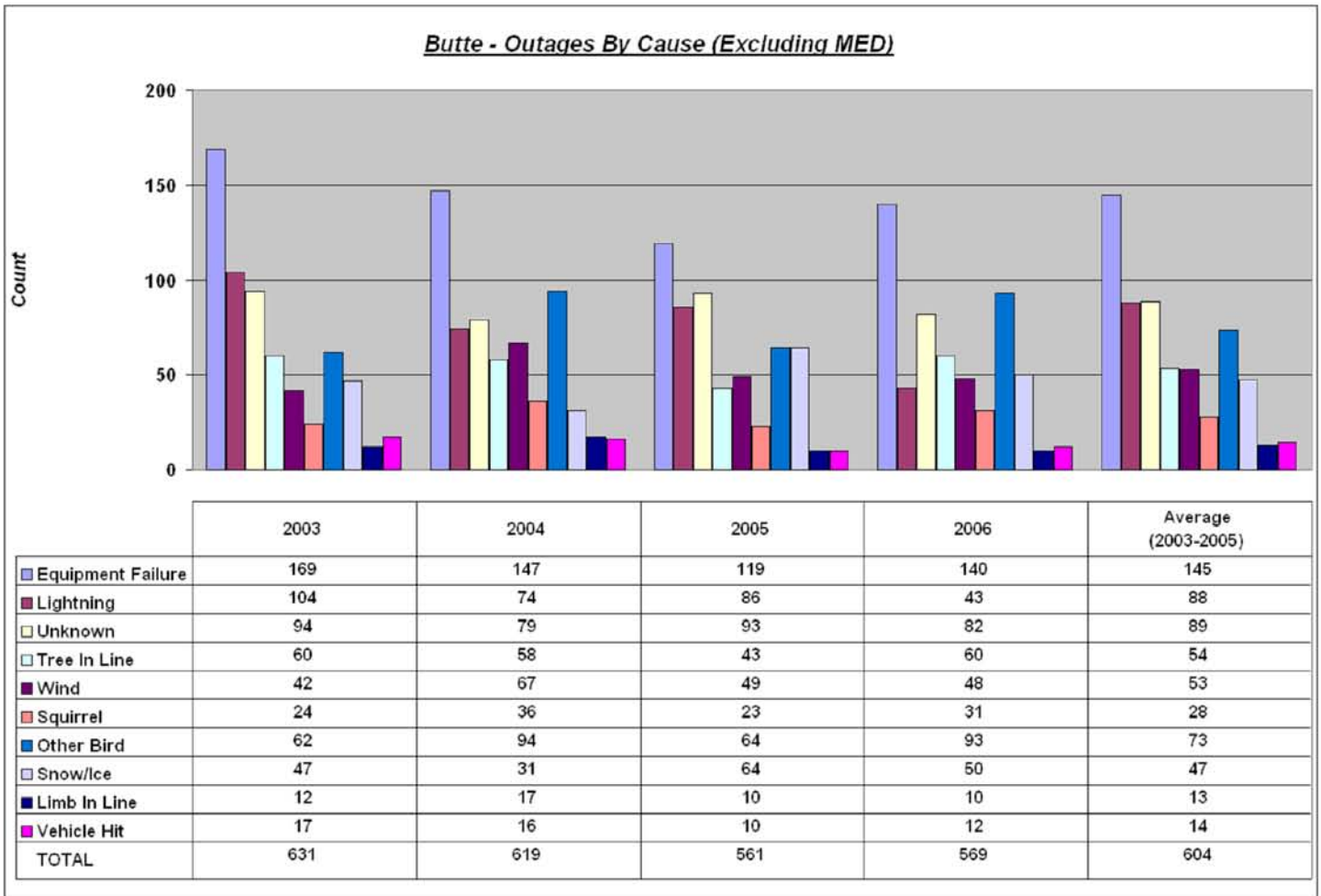


Figure 6.0b – Butte – Outages By Cause (Excluding MED)

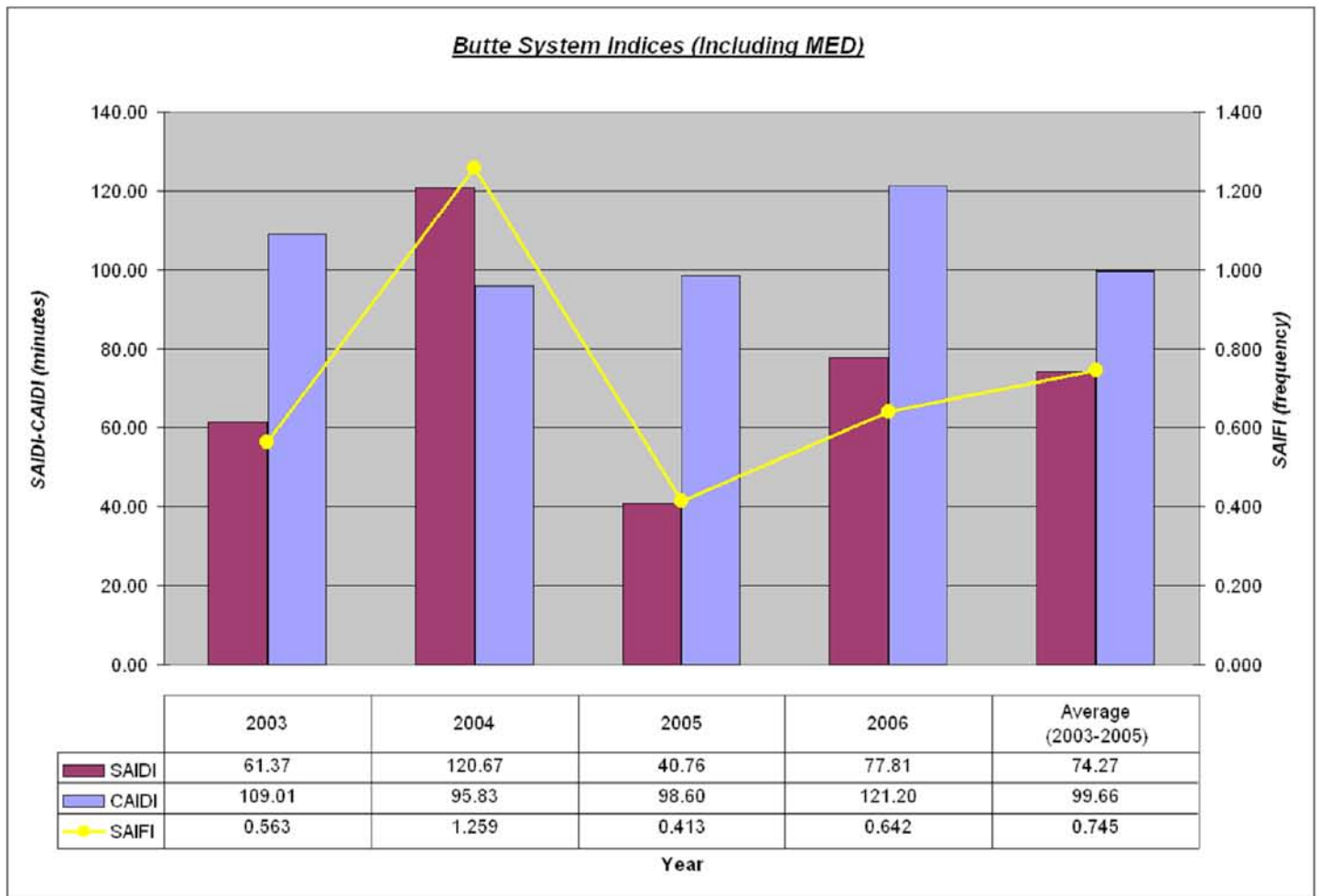


Figure 6.0c – Butte – System Indices (Including MED)

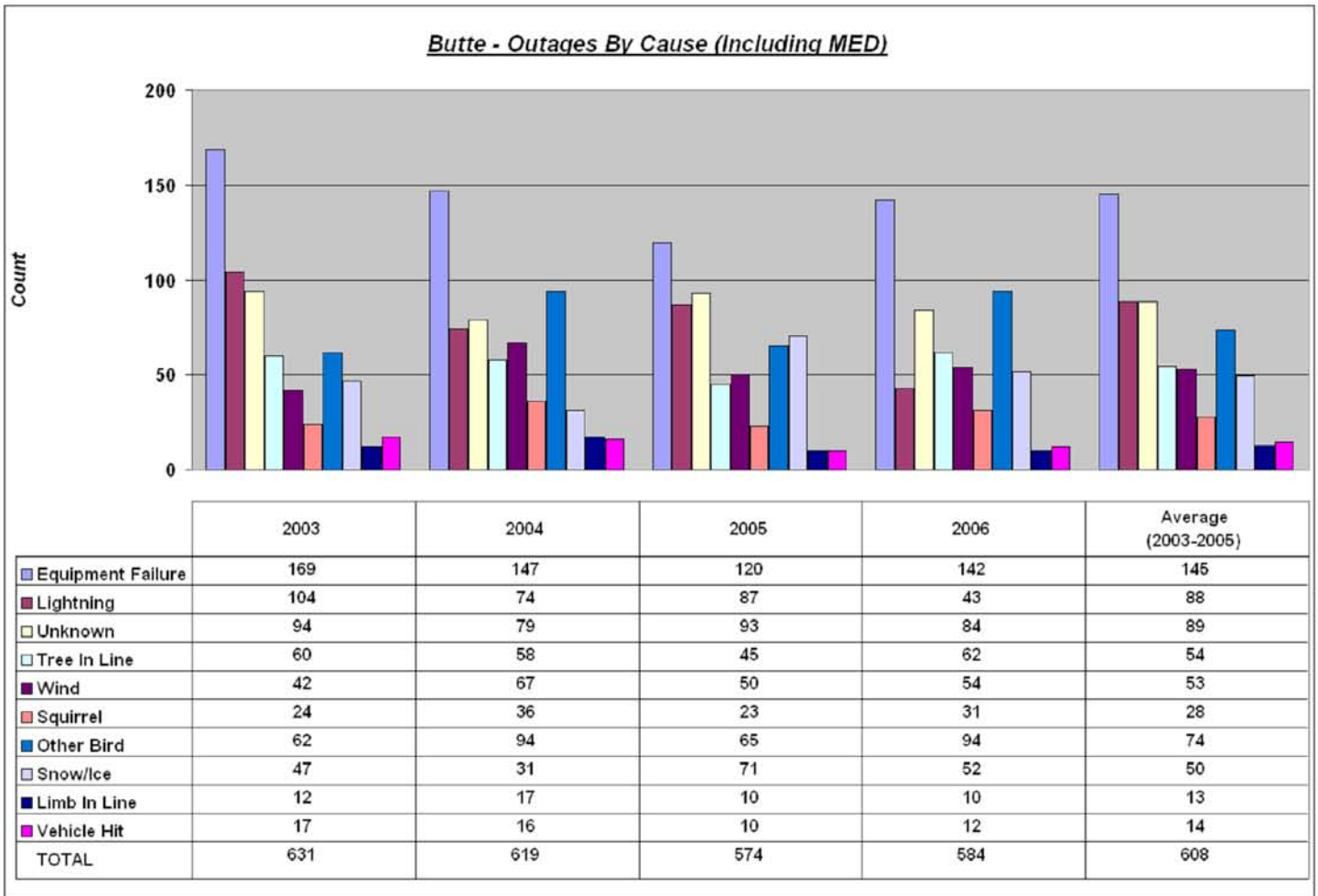


Figure 6.0d – Butte – Outages By Cause (Including MED)

7.0 Great Falls – System Reliability

7.1 Discussion – There were three outages in Great Falls on the “Top 20 SAIDI” excluding MED’s list. A strong windstorm caused an outage that lasted a little over 25 hours in June. Fireworks were the cause of another “Top 20 SAIDI” outage in June. System equipment failure was the cause of the third outage.

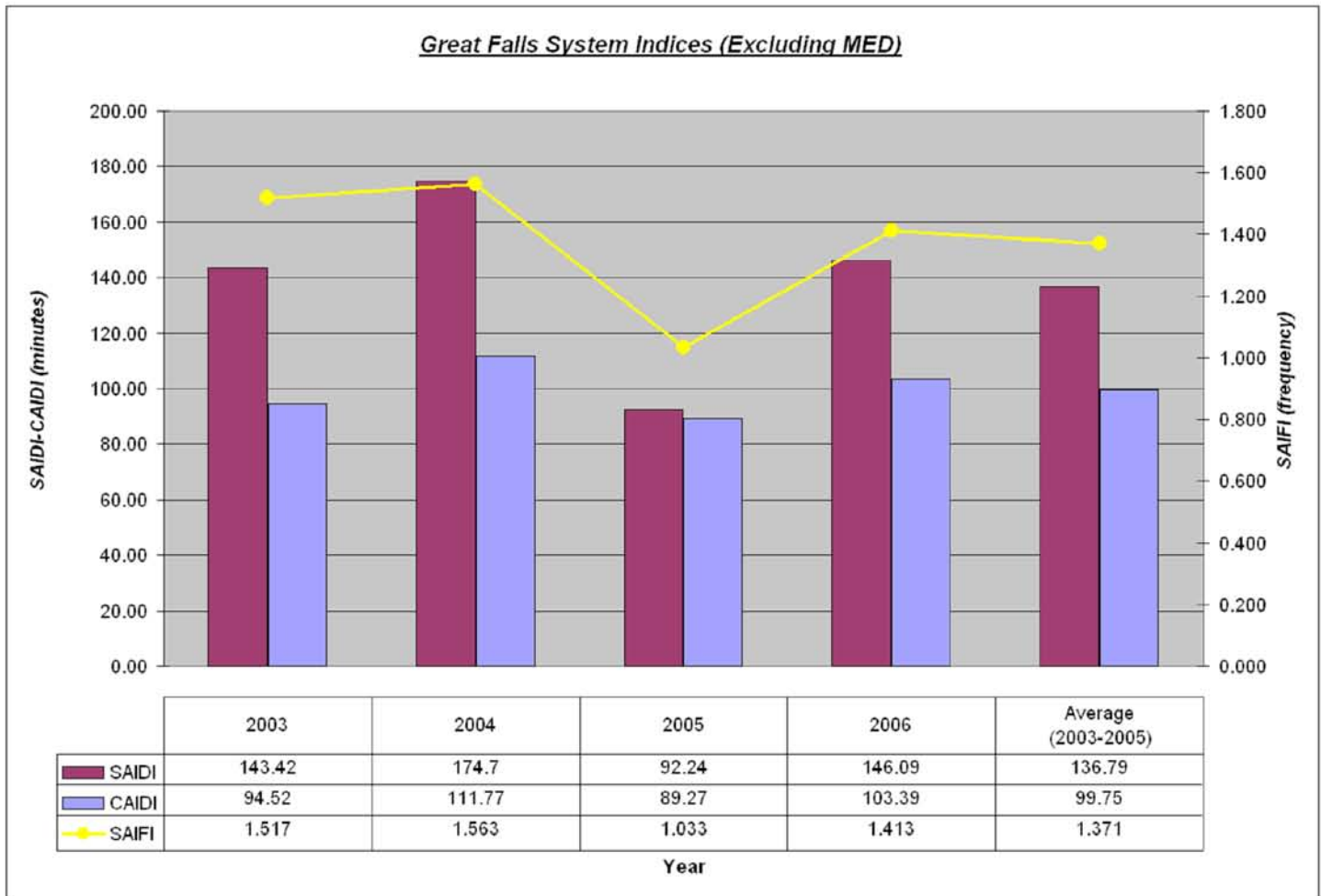


Figure 7.0a – Great Falls – System Indices (Excluding MED)

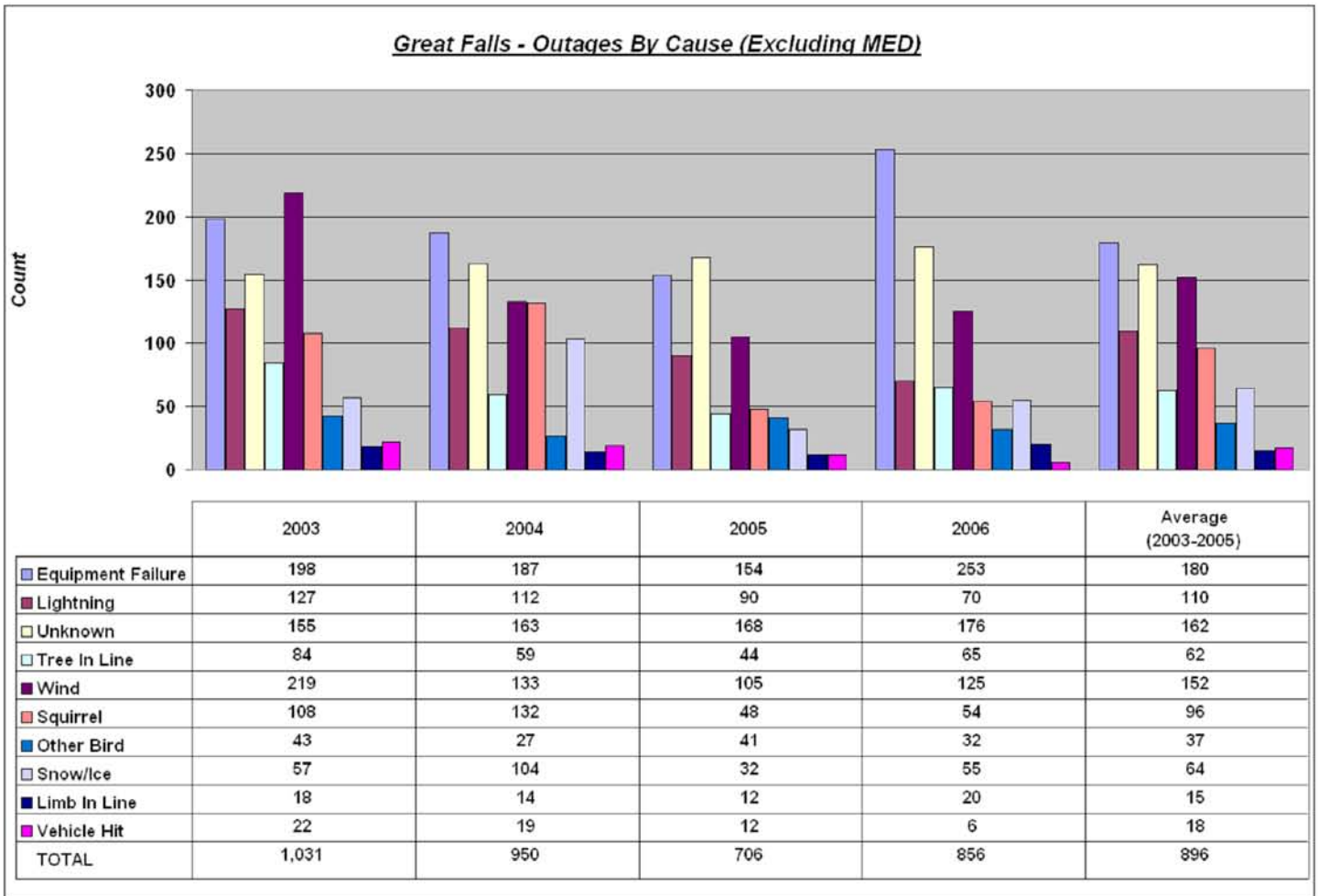


Figure 7.0b – Great Falls – Outages By Cause (Excluding MED)

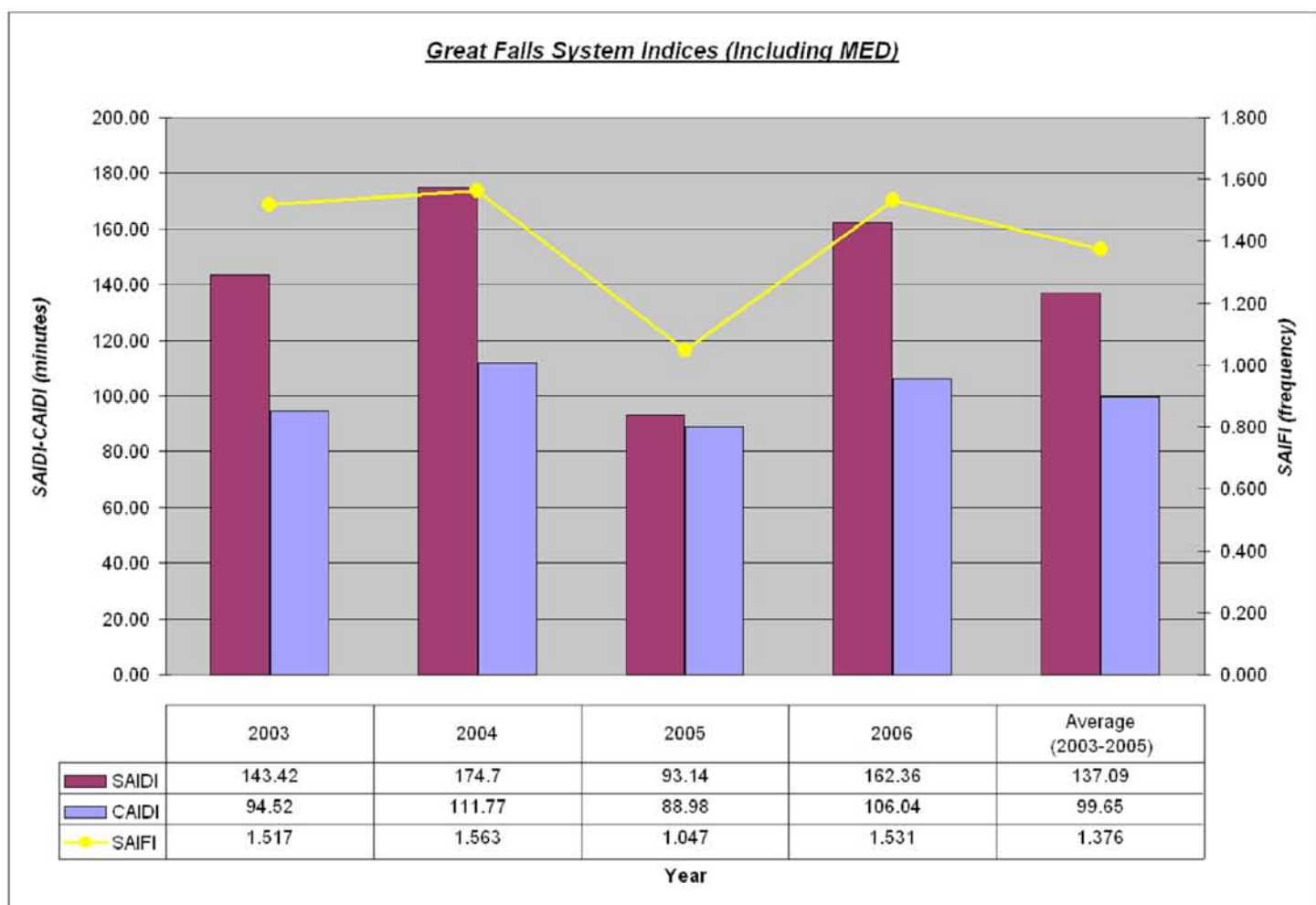


Figure 7.0c – Great Falls – System Indices (Including MED)

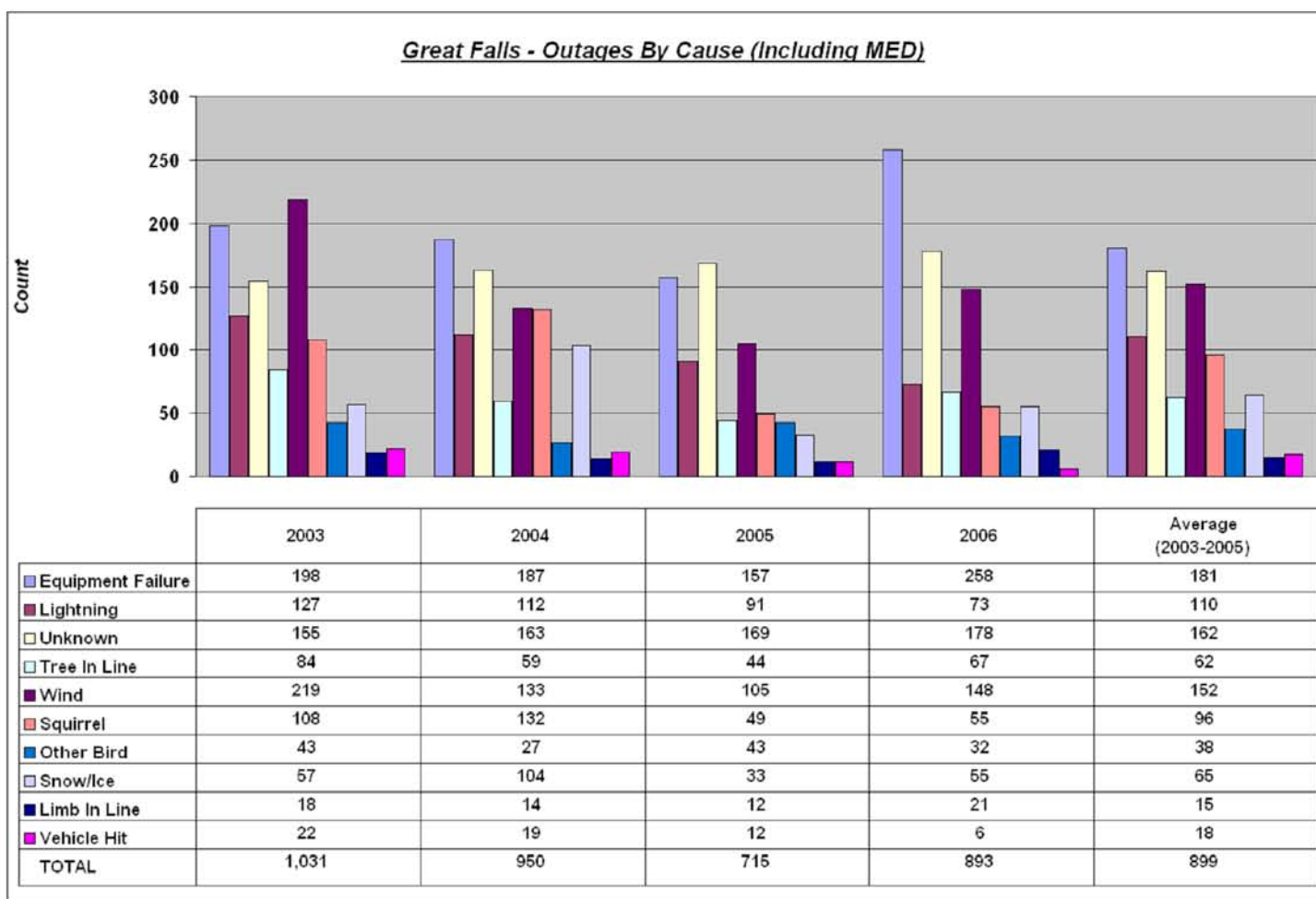


Figure 7.0d – Great Falls – Outages By Cause (Including MED)

8.0 Havre – System Reliability

8.1 Discussion – There were two outages in Havre on the “Top 20 SAIDI” excluding MED’s list. Both were system equipment failures on the Transmission system where rain was a contributing weather factor.

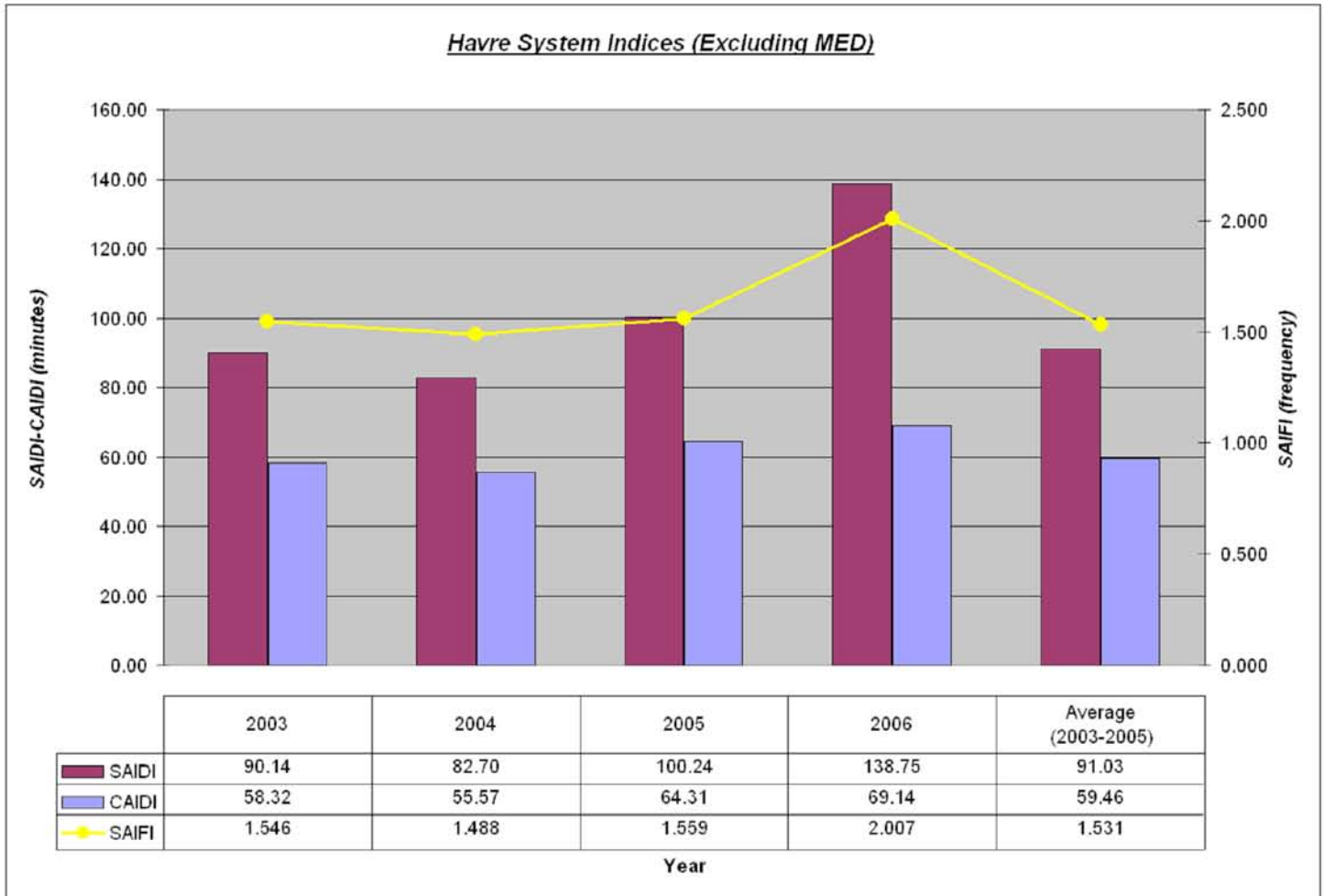


Figure 8.0a – Havre – System Indices (Excluding MED)

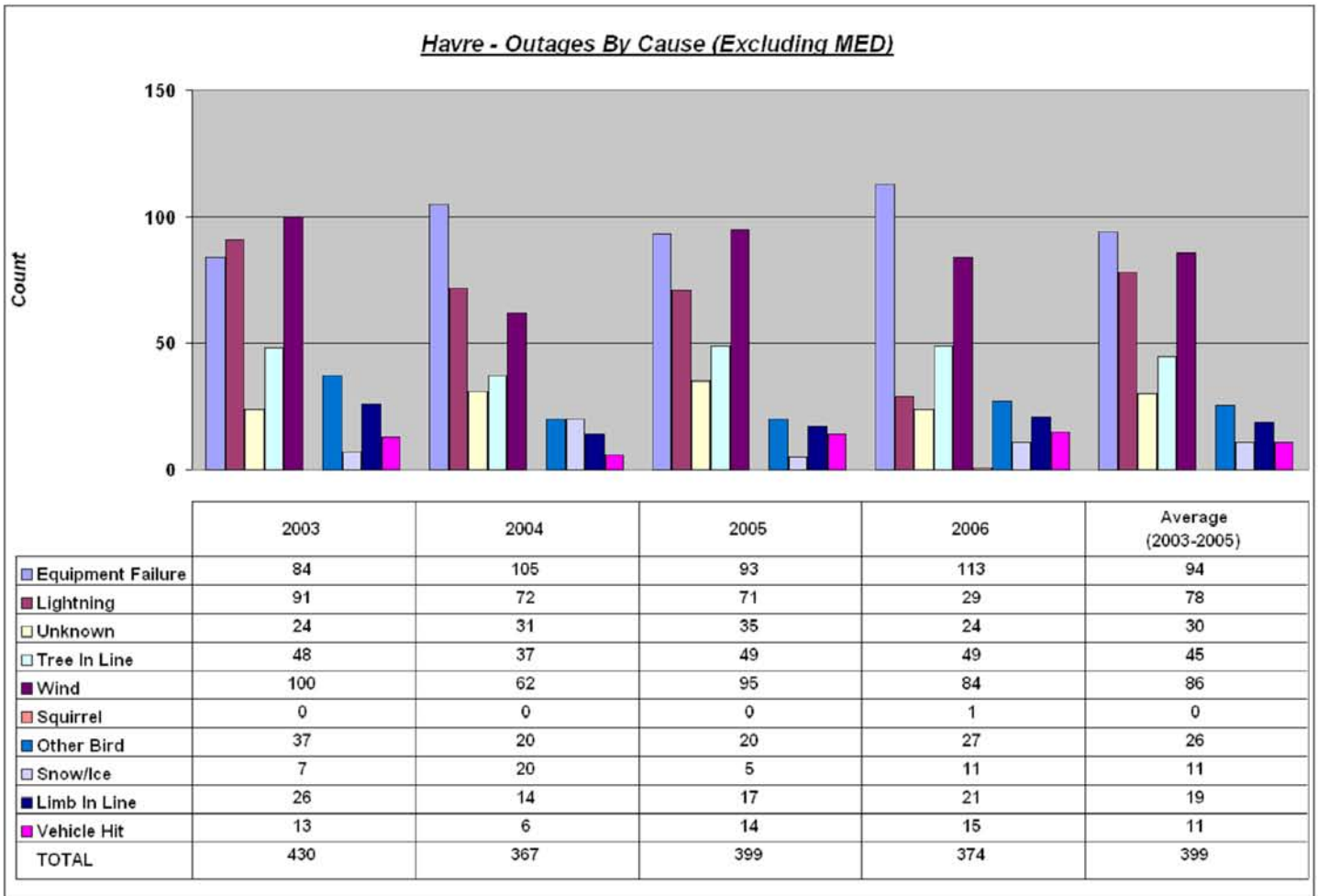


Figure 8.0b – Havre – Outages By Cause (Excluding MED)

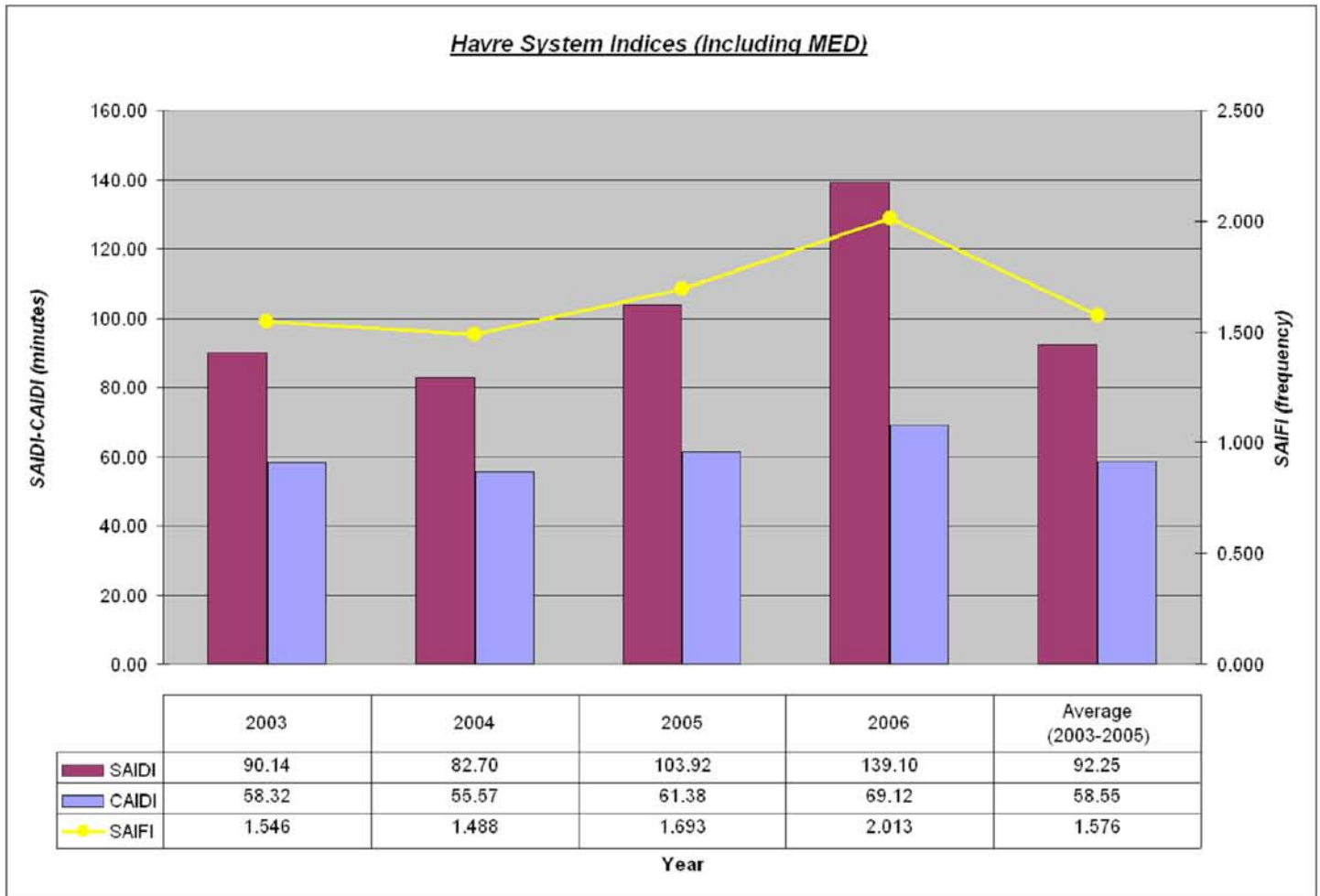


Figure 8.0c – Havre – System Indices (Including MED)

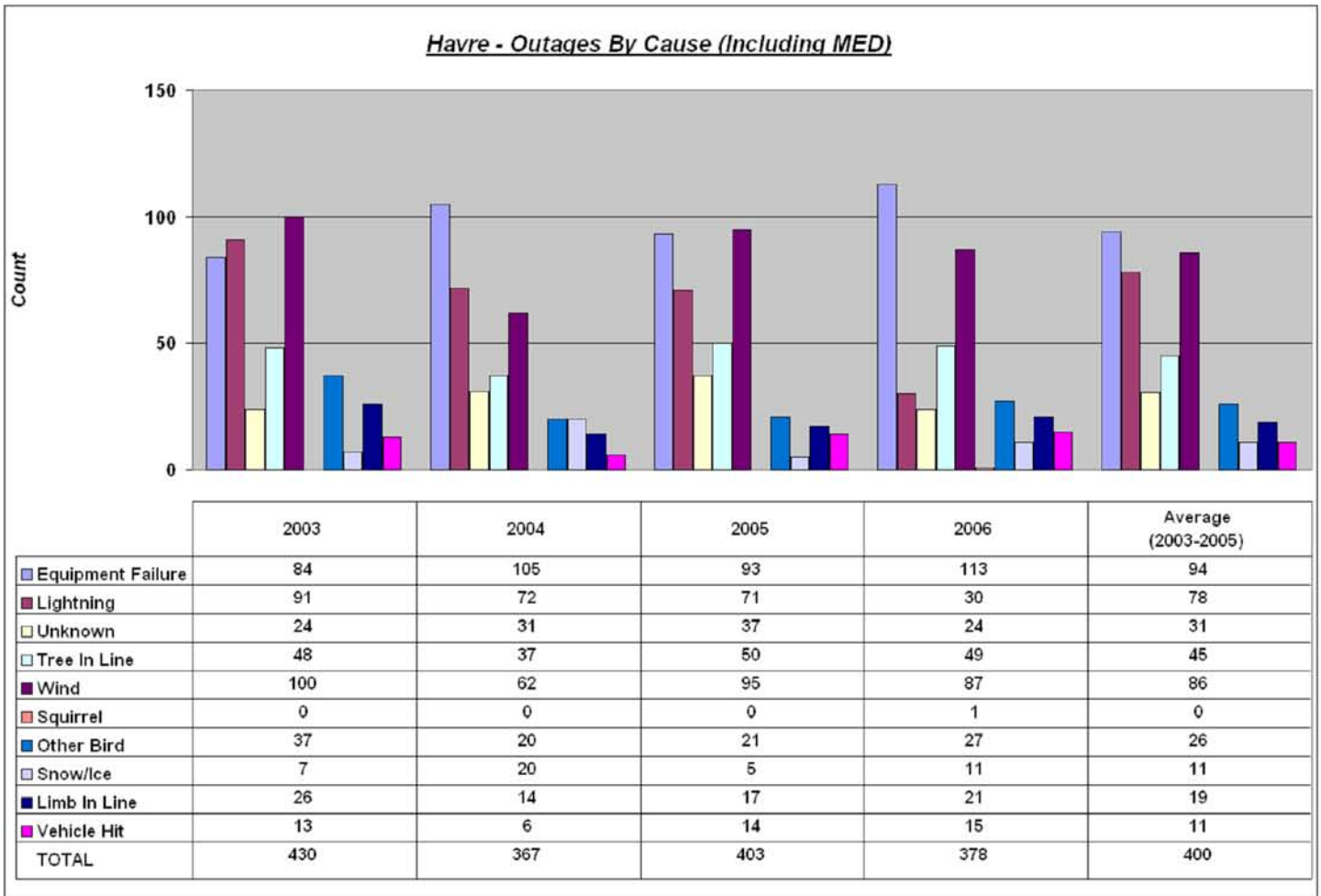


Figure 8.0d – Havre – Outages By Cause (Including MED)

9.0 Helena – System Reliability

9.1 Discussion – There was one outage in Helena on the “Top 20 SAIDI” excluding MED’s list that was caused by a system equipment failure in June.

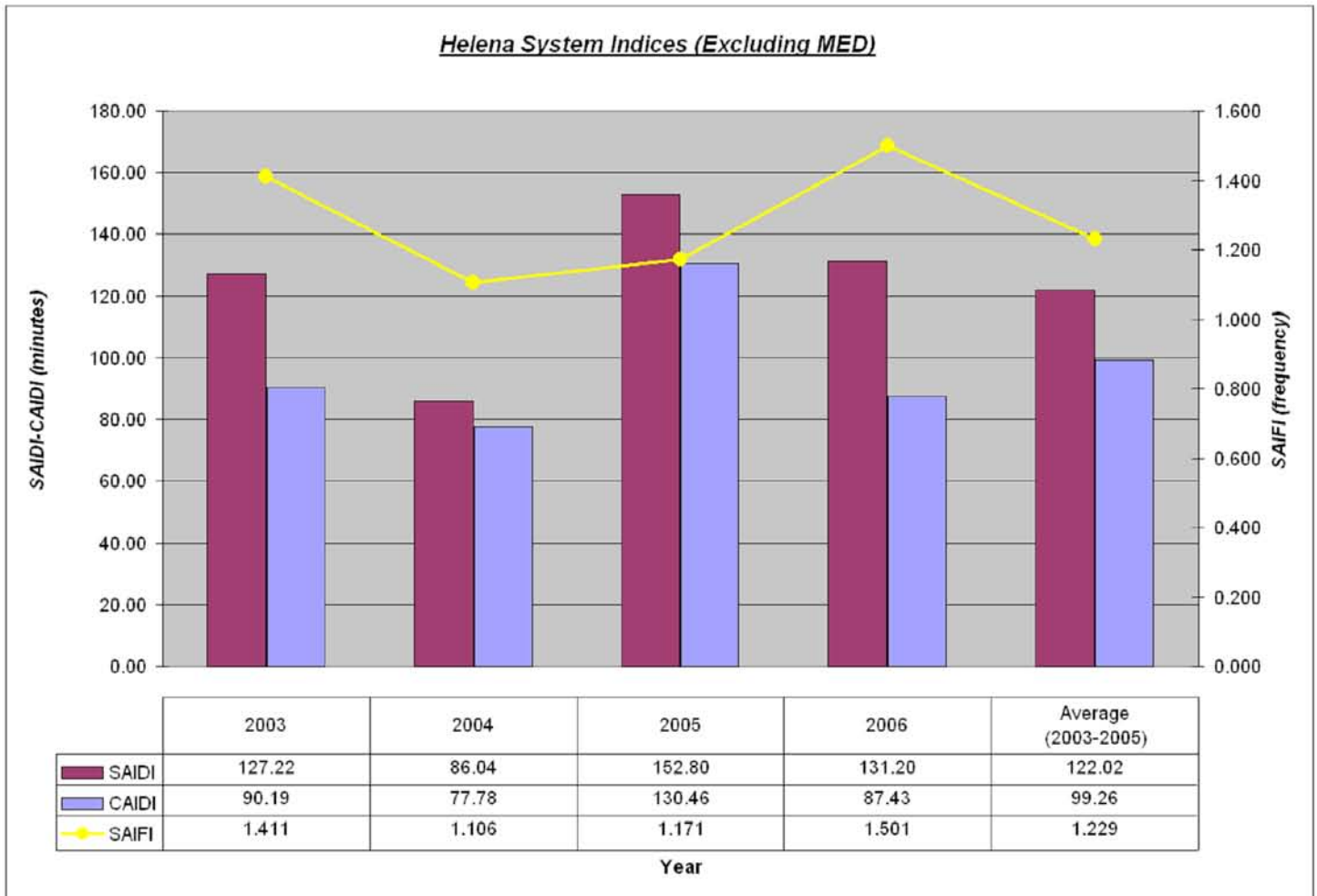


Figure 9.0a – Helena – System Indices (Excluding MED)

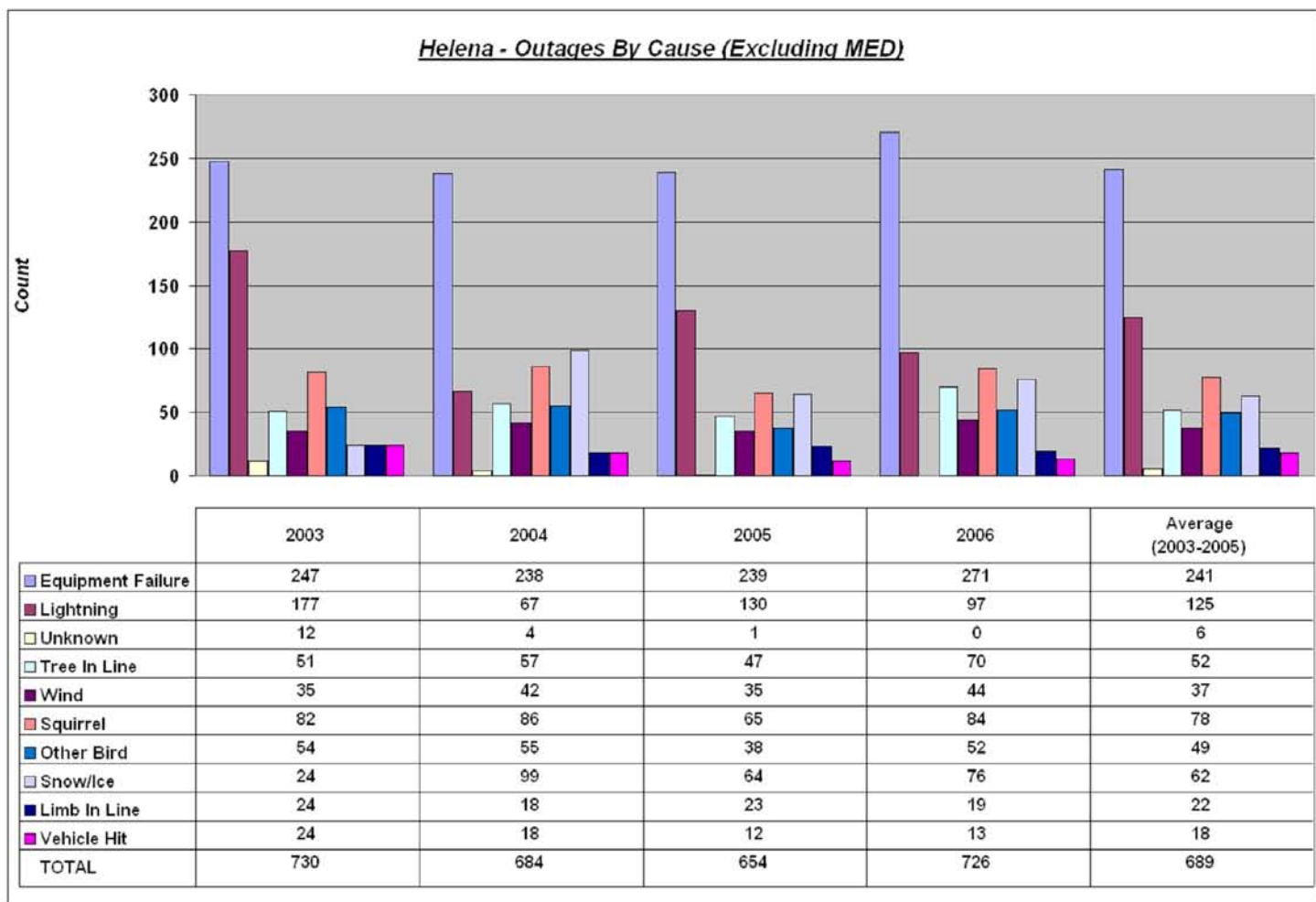


Figure 9.0b – Helena – Outages By Cause (Excluding MED)

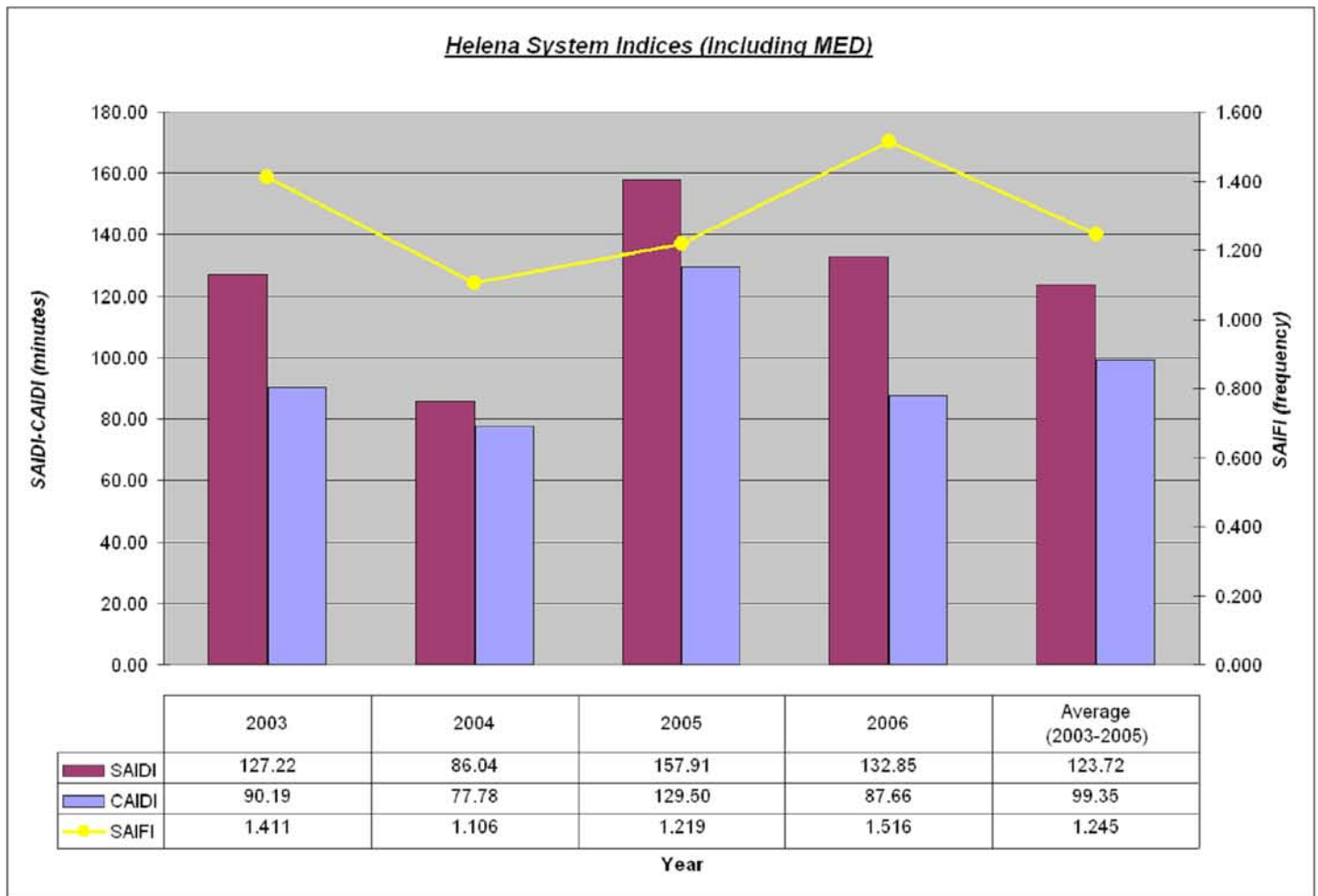


Figure 9.0c – Helena – System Indices (Including MED)

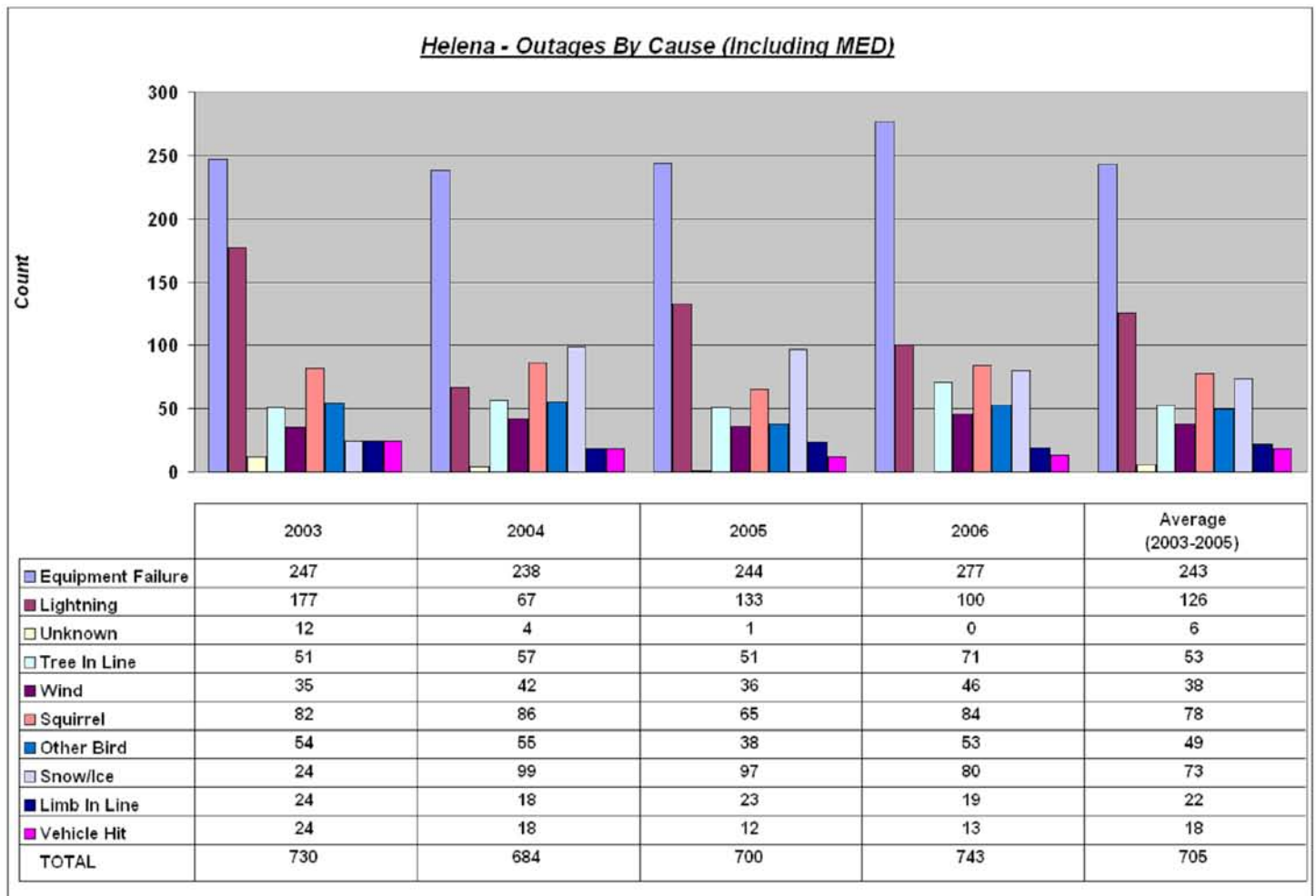


Figure 9.0d – Helena – Outages By Cause (Including MED)

10.0 Lewistown – System Reliability

10.1 Discussion – There were two outages in Lewistown on the “Top 20 SAIDI” excluding MED’s list. Both were caused by a snow/ice storm on the same day in April.

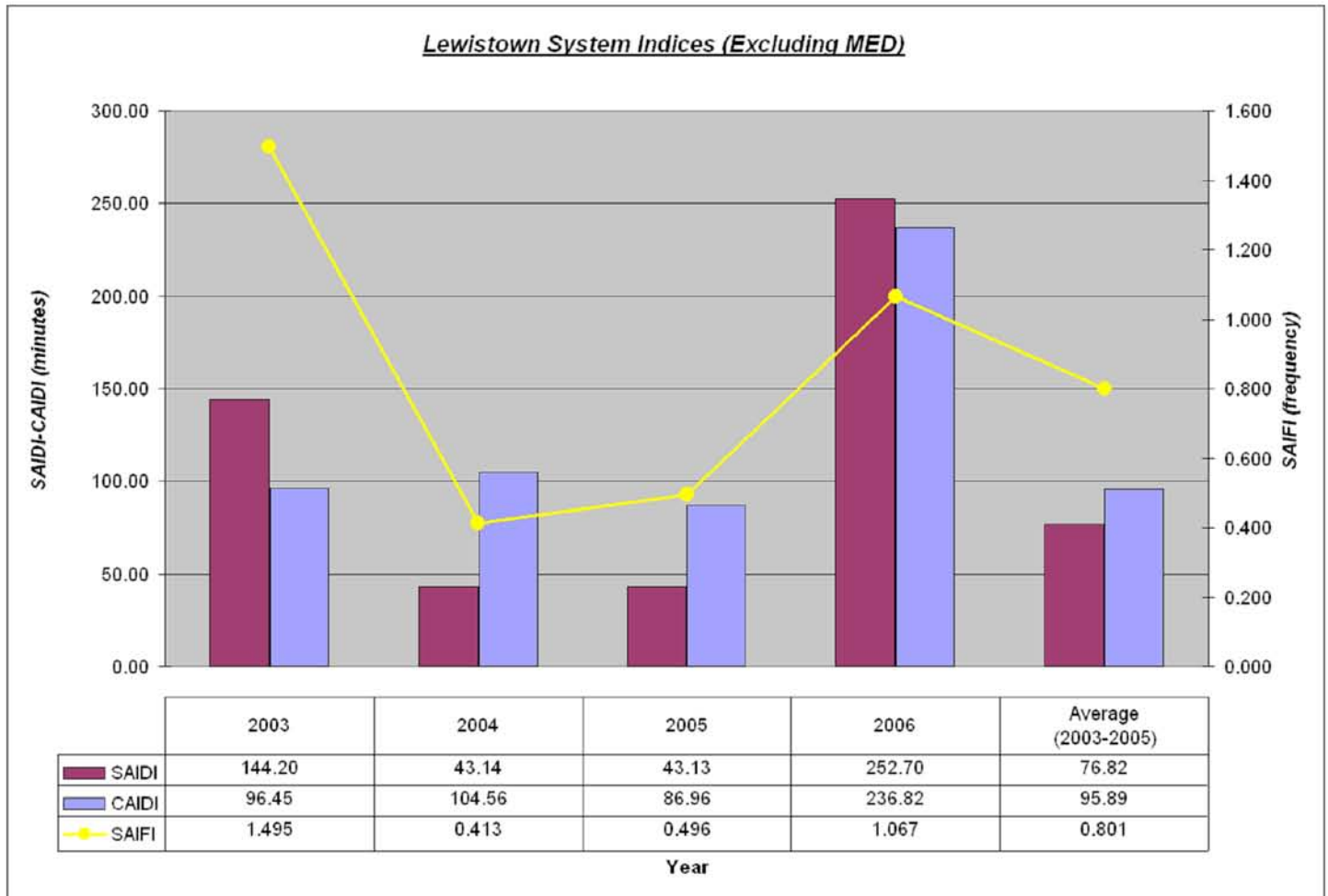


Figure 10.0a – Lewistown – System Indices (Excluding MED)

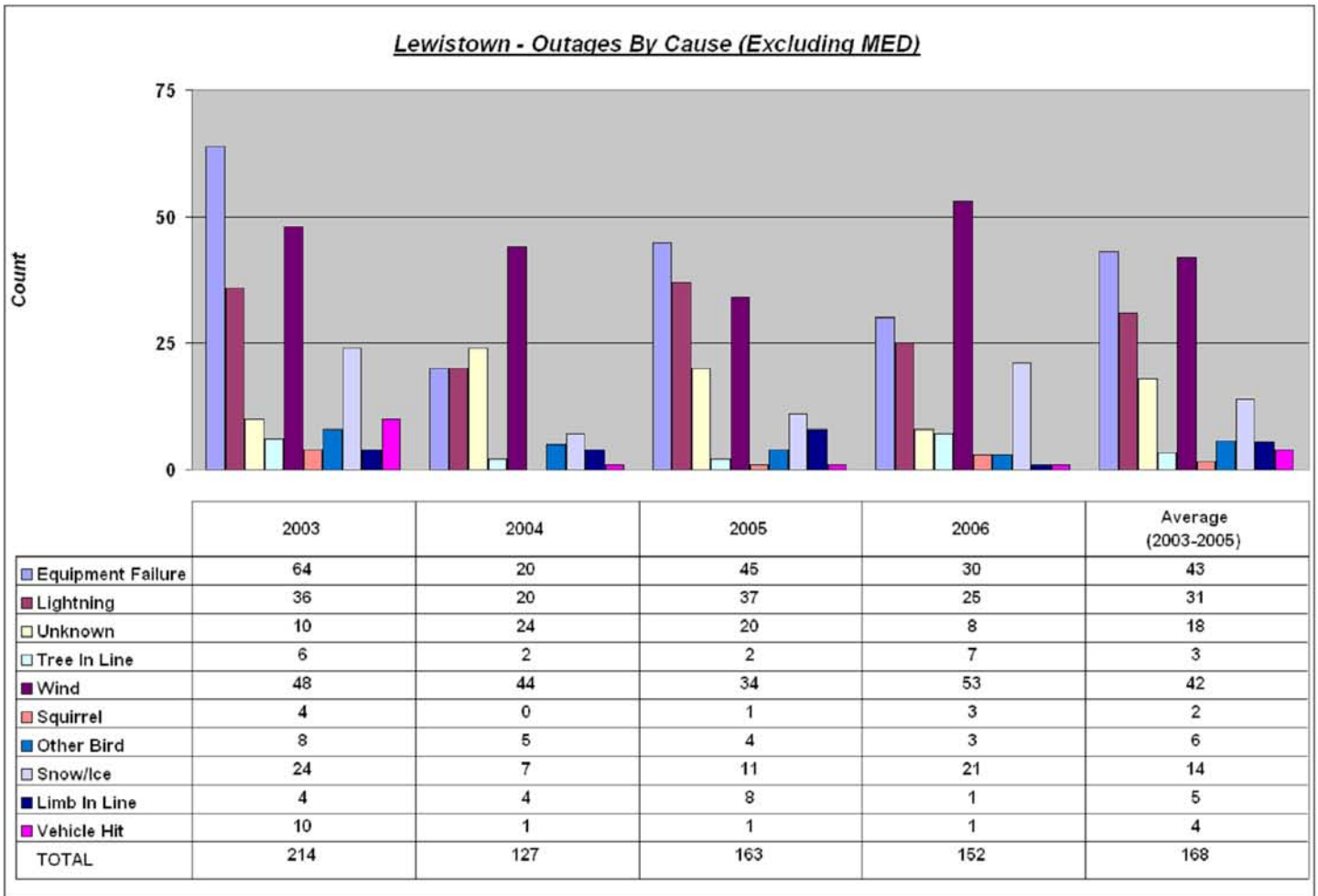


Figure 10.0b – Lewistown – Outages By Cause (Excluding MED)

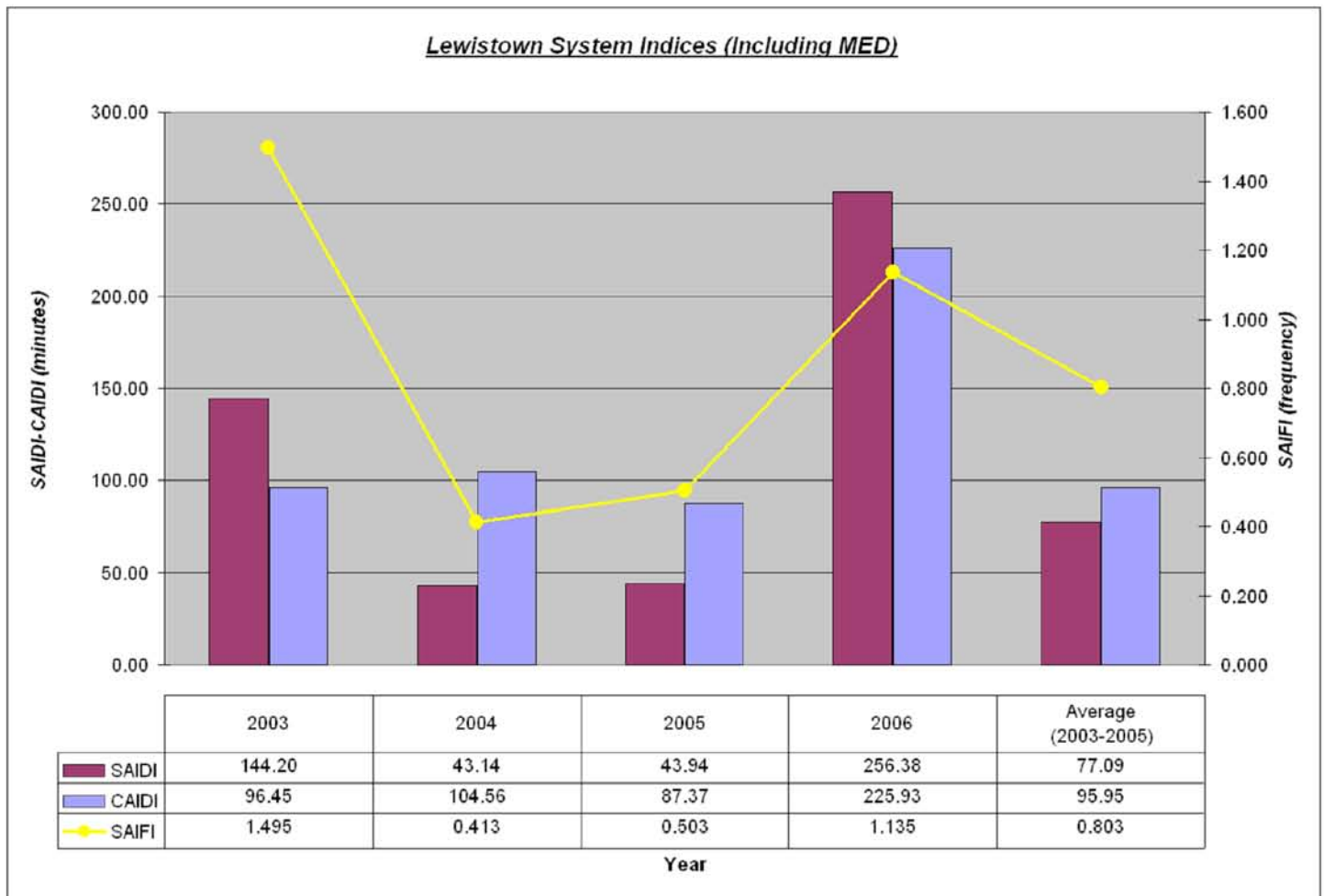


Figure 10.0c – Lewistown – System Indices (Including MED)

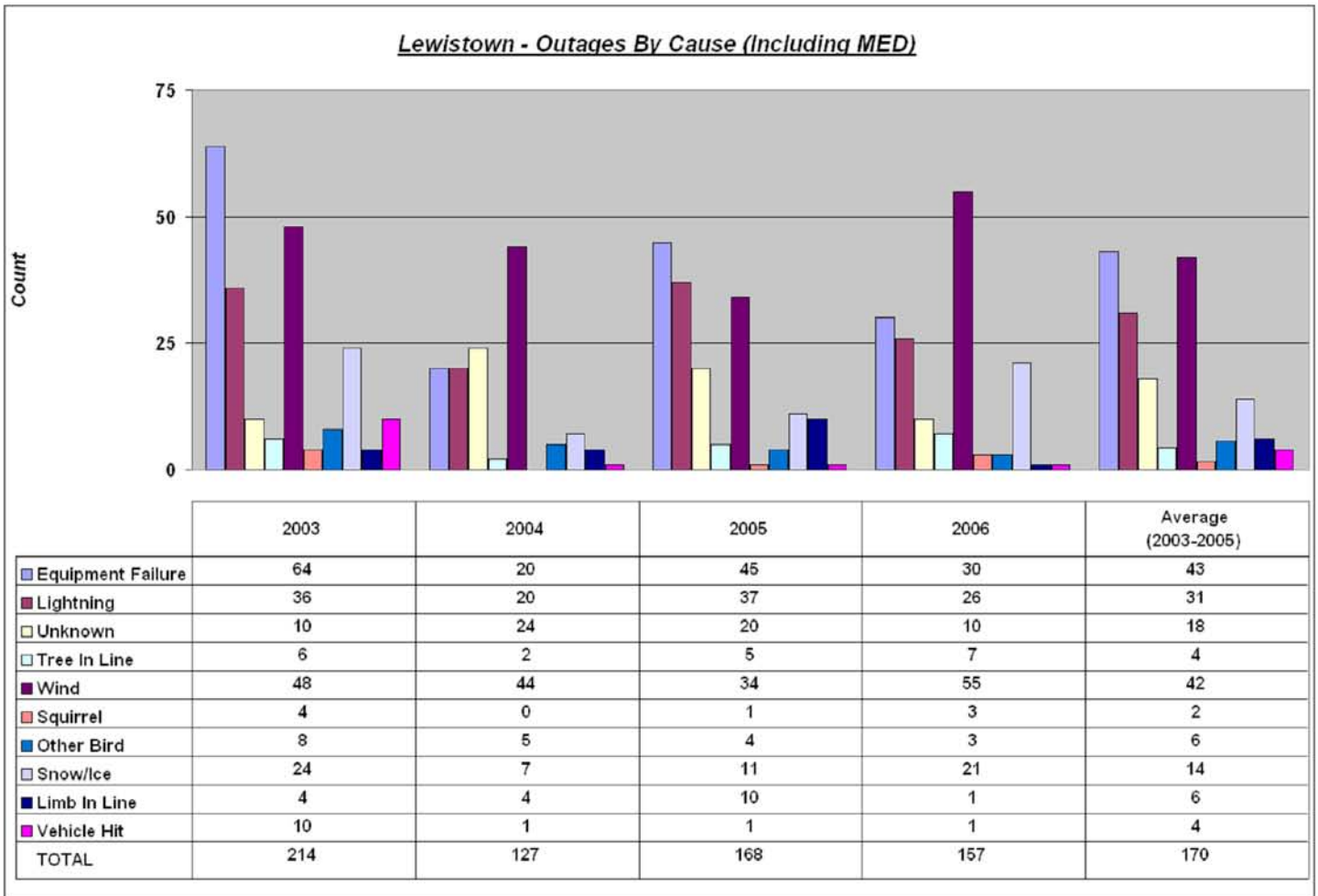


Figure 10.0d – Lewistown – Outages By Cause (Including MED)

11.0 Missoula – System Reliability

11.1 Discussion – There were seven outages in Missoula on the “Top 20 SAIDI” excluding MED’s list. One was a “shoulder” (that is adjacent) day from the MED in December. Three were due to strong winds and/or snow and ice. One was a vehicle that hit a pole. The remaining two were system equipment failures.

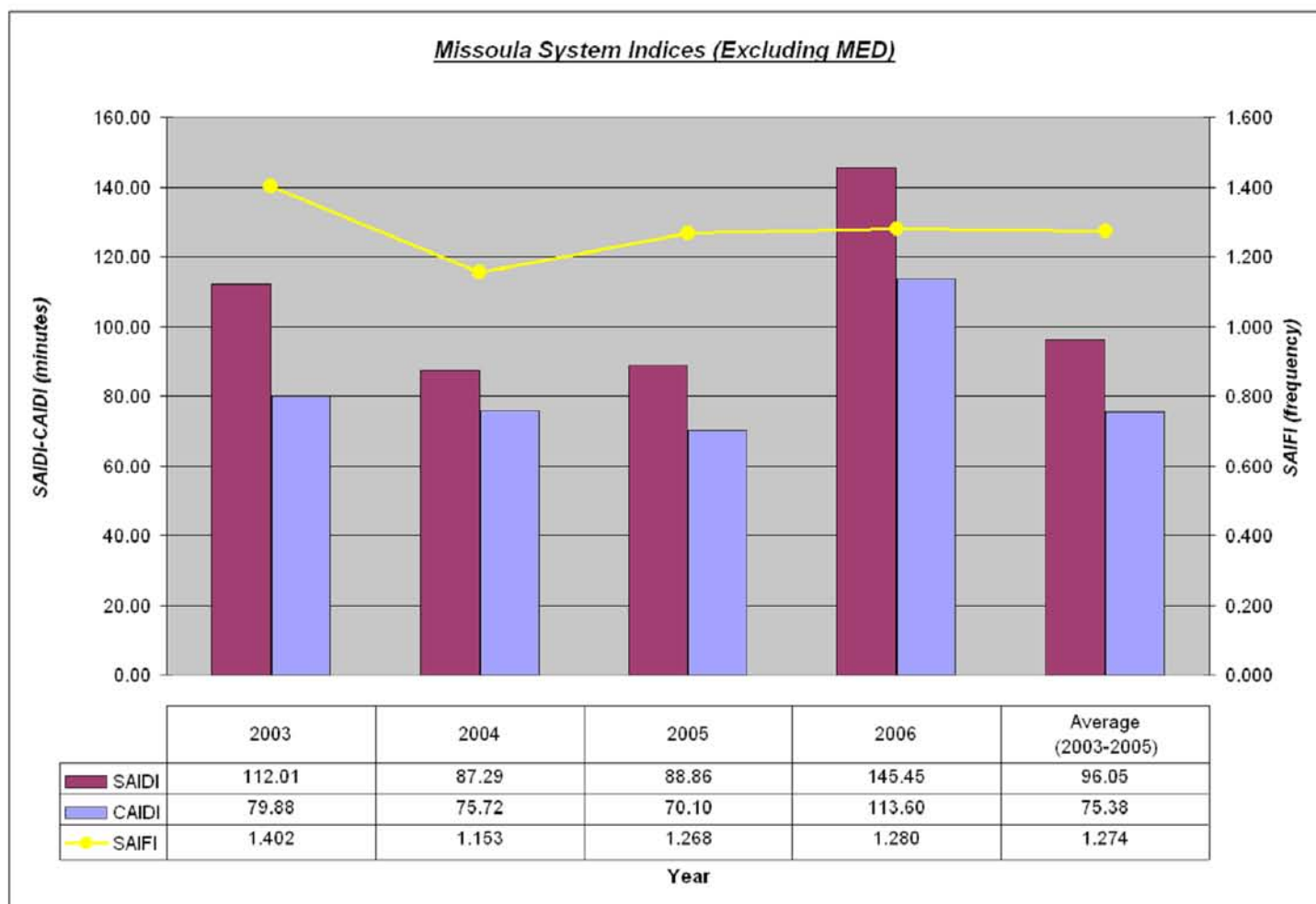


Figure 11.0a – Missoula – System Indices (Excluding MED)

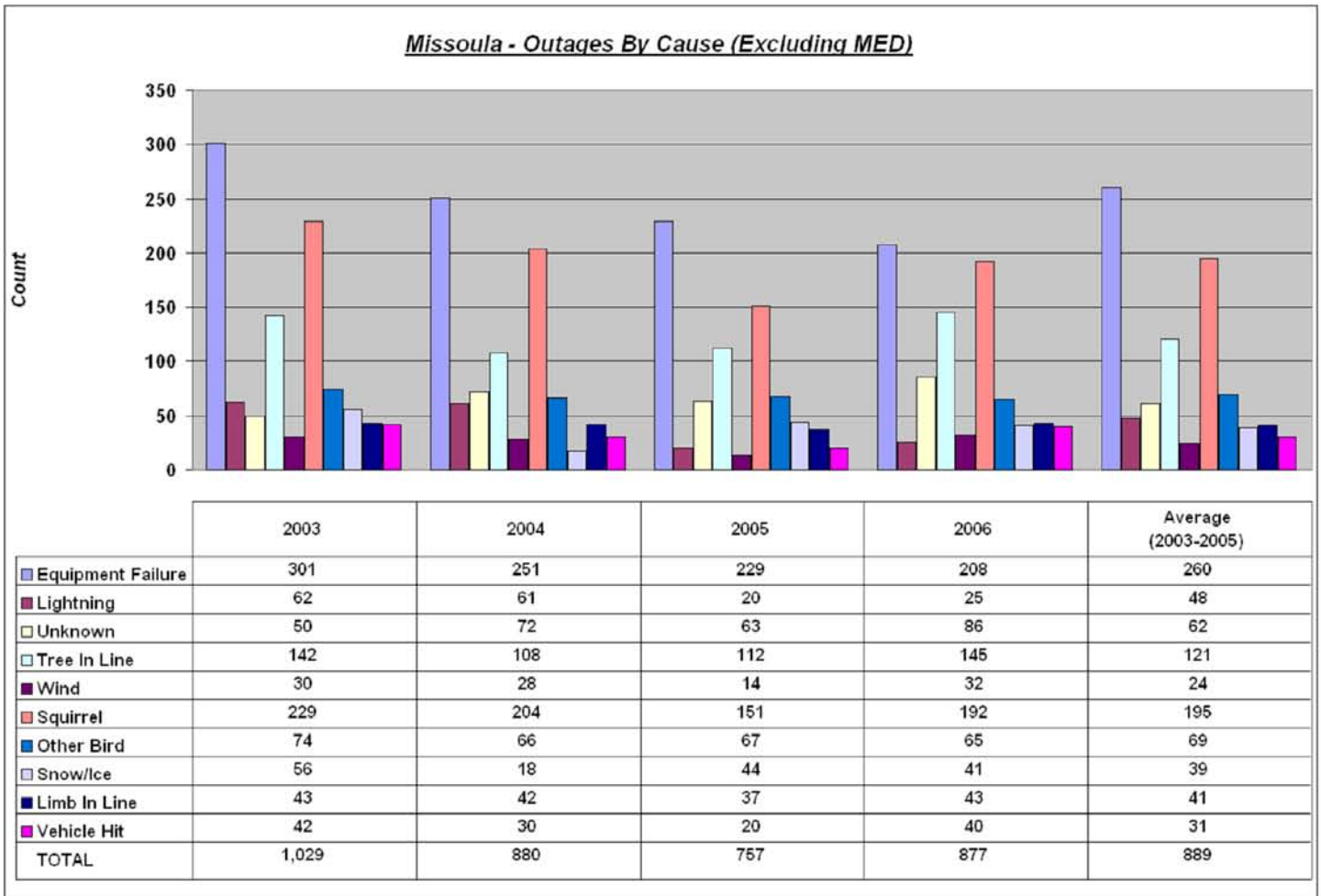


Figure 11.0b – Missoula – Outages By Cause (Excluding MED)

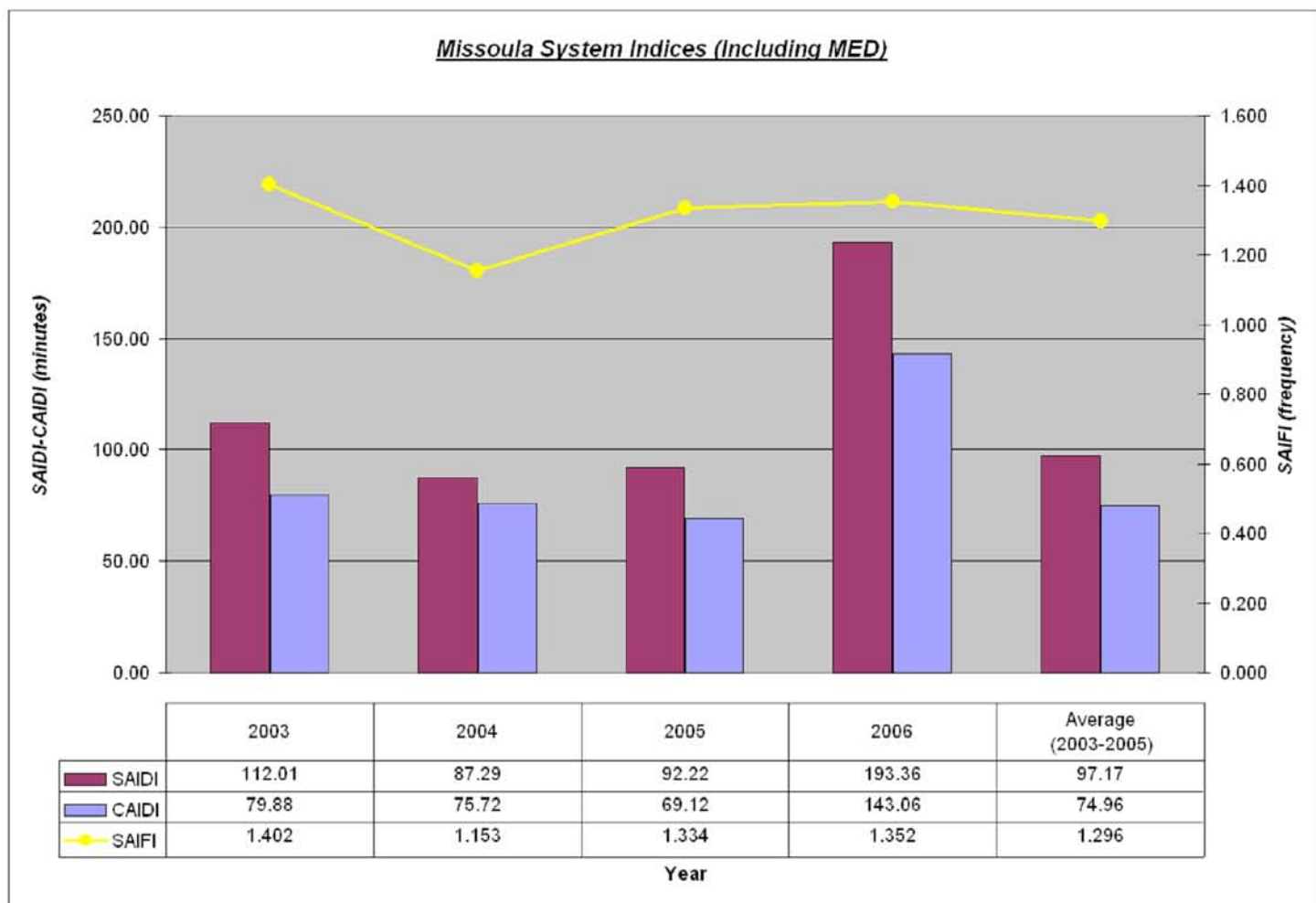


Figure 11.0c – Missoula – System Indices (Including MED)

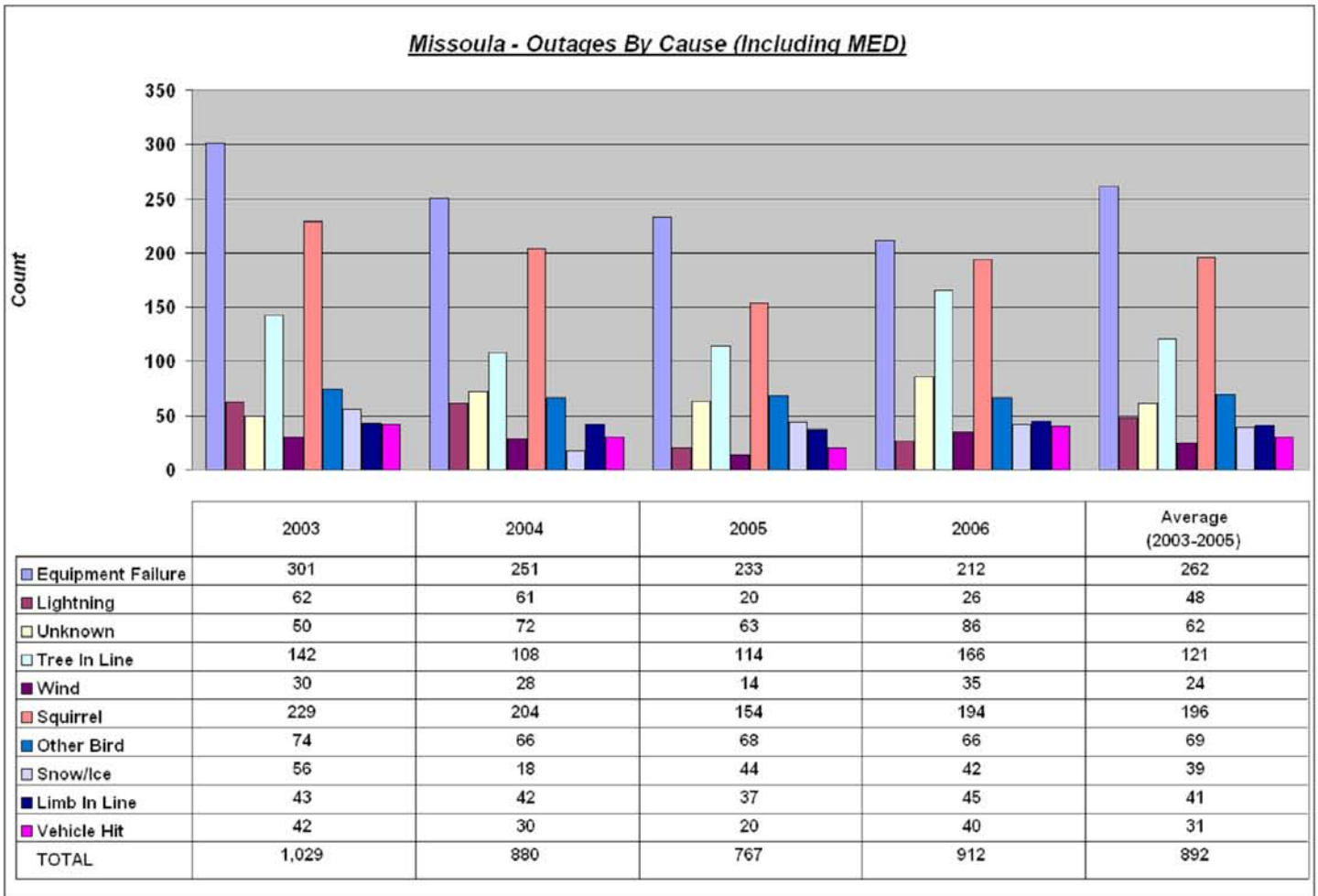


Figure 11.0d – Missoula – Outages By Cause (Including MED)

12.0 Summary

Substation, or transmission problems were large contributors to outages in the “Top 20 SAIDI” events in 2006. These outages tend to impact reliability the most due to the large areas and numerous customers fed from substations. In addition, there were three publicly caused outages in that list, two of which involved vehicles hitting poles and one was due to fireworks. System equipment failures, such as poles breaking, and other equipment failing in storms, are additional causes to those “Top 20 SAIDI” items for 2006.

In reviewing outage causes, trees and limb in line are two causes that are up for the system. This may be a result of storms and a delayed reaction to the newly implemented cycle tree trim plan.

The system experienced a slight reduction in squirrel related outages, with Great Falls reducing squirrel outages by nearly 44%. This is most likely attributed to squirrel mitigation work done on the system.

Outages due to lightning went down significantly, nearly 42% from 2005 and over the three year average (2003-2005). Wind related outages (excluding MED's) went up slightly, while snow/ice (excluding MED's) went down slightly. However, wind, snow/ice, and lightning were all contributors to the outages experienced during the major event days, as would be expected.