Oregon Investor-owned Utilities

Seven-Year Electric Service Reliability Statistics Summary

2018-2025

August 2025

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Table of Contents

Introduction

The mission of the Public Utility Commission of Oregon (PUC) is to ensure Oregonians have access to safe, reliable, and fairly-priced utility services that advance state policy and promote the public interest. Part of that mission is focused on the reliability of electric services provided by Oregon's three investor-owned utilities (IOUs) – Portland General Electric Company (PGE), PacifiCorp, dba Pacific Power, and Idaho Power Company.

How electric utility reliability is measured and evaluated for individual customers at the distribution level has changed over the years. After restructuring of electric utilities in the late 1990's, the PUC implemented regulations in OAR Chapter 860, Divisions 23, 24, and 28 to promote robust distribution systems. Although today's wide variety of home and business electronics makes our lives better, they make us increasingly dependent on high quality, reliable electric service. Thus, the expectations and needs of the average electric customer continue to become higher. The challenge is to find the right balance between keeping rates affordable and making investments to ensure high service quality.

OAR 860-023-0101 requires utilities to collect and report reliability data. Accurate data allows meaningful comparisons year-to-year and utility-to-utility, even though the systems and the areas served are different. Additionally, accurate data allows the utility to direct operations and maintenance expenditures in a more efficient manner, based on solid facts related to the condition and performance of each individual circuit. OAR 860-023-0081 thru 0161 contain OPUC's electric reliability rules. These rules conform to the nation's industry standard (i.e. ANSI/IEEE Standard 1366-2012[1]) to evaluate utilities' reliability performance accurately and consistently with practice that other utilities across the nation exercise.

This report presents information about the reliability trends of Oregon IOUs based on four reliability indices. These multi-year graphs provide a representation of what Oregon IOUs' customers experienced over the past seven years. The comparisons in performance in this report give a variety of ways of looking at the same general subject.

The report focuses on the system outages, only a portion of which are attributable to "failures." Although the PUC does not provide analysis of the utilities' reported reliability data, it is important to recognize that Oregon's IOUs' customers are receiving reliable service consistent with the mission outlined above.

[1] A new version of IEEE 1366 was reapproved in 2021 with no changes to the calculation methods cited in this report.

General Information

This report:

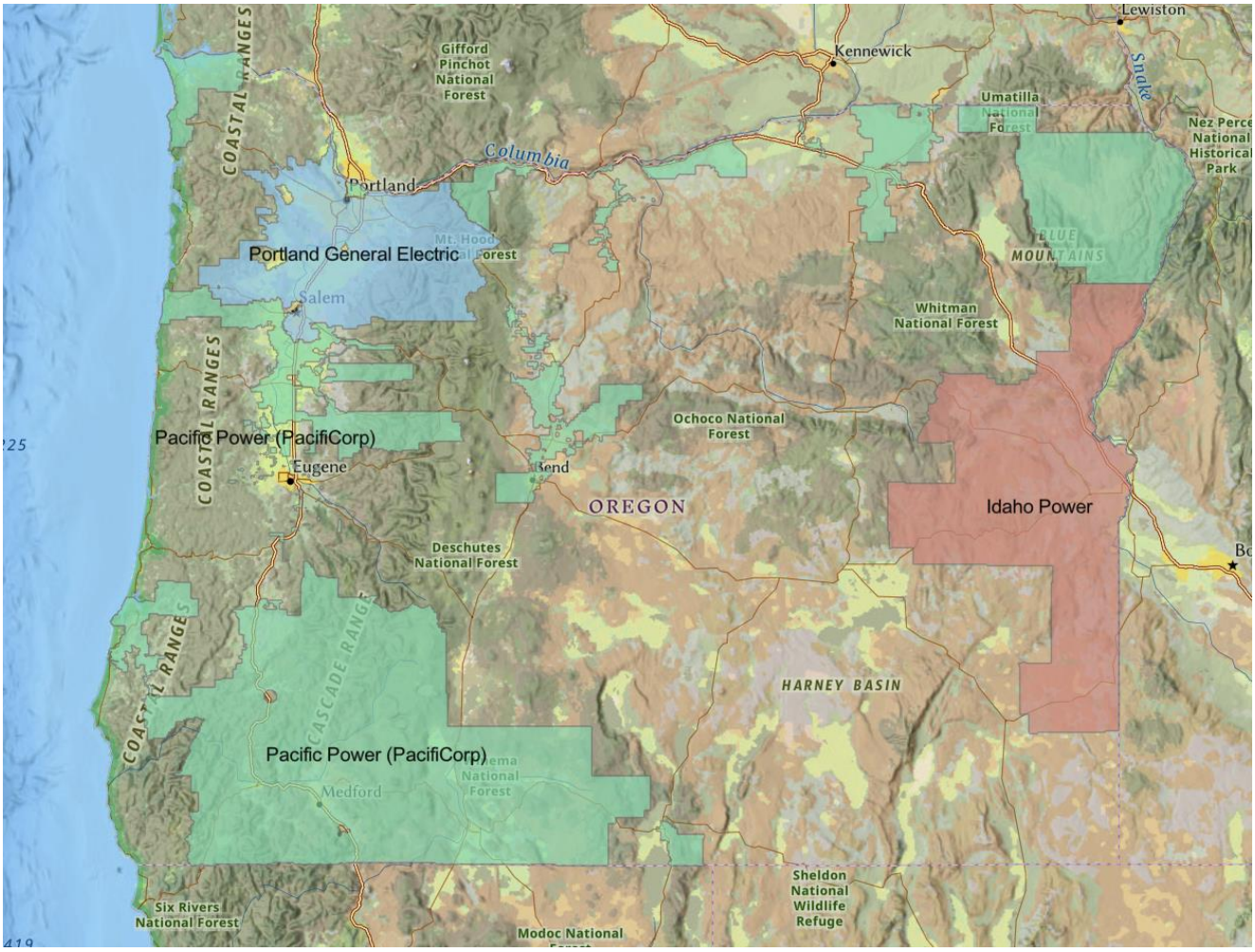
A. Compares three IOUs, whose service territories are different in nature:

PGE: Has a compact urban and suburban service territory in northwestern Oregon. PGE's system includes almost 700 circuits whose average length is about 23.4 miles and which serves on average 56.7 customers per circuit mile.[2]

PacifiCorp: Includes some larger Oregon cities but serves several geographically dispersed areas and is generally more rural. PacifiCorp's Oregon system includes just over 500 circuits with an average length of 37.6 miles and which serves on average 32.1 customers per circuit mile.

Idaho Power: Covers a rural part of Eastern Oregon, including some remote areas. Idaho Power's system includes just under 70 circuits with an average length of 32.0 miles and which serves on average 8.9 customers per circuit mile.

The geography for which the utilities provide service is shown in the graphic below.



[2] These are approximate customer and circuit counts as reported in DOE EIA 861 and circuit distribution mileage as reported through reliability data request responses and includes both overhead and underground circuit mileage (regardless of numbers of phase conductors present).

B. Uses standard IEEE 1366-2012 formulas to calculate the following reliability indices:

SAIFI – System Average Interruption Frequency Index

SAIFI indicates how often the average customer experiences a sustained interruption over a predefined period. (Note: This does not include automatic operations or "blinks." See $MAIFI_E$, below). Mathematically,

$$SAIFI = \frac{\sum Total\ Number\ of\ Customers\ Interrupted}{Total\ Number\ of\ Customers\ Served}$$

SAIDI – System Average Interruption Duration Index

SAIDI indicates the total duration of interruption for the average customer during a predefined period. Mathematically,

$$SAIDI = \frac{\sum Total\ Duration\ of\ Interruption}{Total\ Number\ of\ Customers\ Served}$$

CAIDI – Customer Average Interruption Duration Index

CAIDI represents the average time required to restore service. Mathematically,

$$CAIDI = \frac{\sum Customer\ Duration\ of\ Interruption}{\sum Total\ Number\ of\ Customers\ Interrupted} = \frac{SAIDI}{SAIFI}$$

$MAIFI_E$ – Momentary Average Interruption Event Frequency Index

The average number of times that an average customer experiences momentary interruption events during a year. This does not include events immediately preceding a sustained interruption.

$$MAIFI_E = \frac{\sum Total\ Number\ of\ Customer\ Momontary\ Interruption\ Events}{Total\ Number\ of\ Customers\ Served}$$

C. Other

In this report, some of the statistics are shown excluding and including major events.[3]

For purposes of this report, a major event is an outage event that:

a. May exceed the reasonable design and or operational limits of the electric power system.

b. Contains at least one Major Event Day (MED) as defined by IEEE 1366 – 2012.

[3] Historically, the definition of "major event" was interpreted differently by various electric utilities and other state regulatory commissions across the nation. Prior to incorporating IEEE 1366 into Oregon's Electric Service Reliability reporting in 2012, PGE and PacifiCorp had different definitions of a major event and Idaho Power did not report major events separately. Starting with 2012, all three utilities must use the IEEE 1366 definition of Major Event Day (MED) which has been incorporated into OAR 860-023. Further, OAR 860-023-0161 requires utilities to file major event reports within 30 business days of the conclusion of the event if the event CAIDI exceeds five hours. Reports must include a description of the event, the numbers of customers impacted by the event and other reliability-relevant data.

Data Collection Methodologies

Each of the three electric utility companies use somewhat different data collection methods for reliability reporting:

Portland General Electric

PGE's service territory includes three operating regions in Northwest Oregon. They are the Eastern Region, Southern Region, and Western Region.

PGE's Outage Management System (OMS) logs and tracks outages on the system. The OMS utilizes the AMI, GIS, SCADA, Customer Information Systems (CIS), and Interactive Voice Response (IVR) data to evaluate and generate outage records when trouble calls come in. This data is reviewed in the OMS on a daily basis to ensure that the information is as accurate as possible. The outage information is then used to calculate SAIDI, SAIFI, and other information presented in PGE's Annual Reliability Report.

Momentary outages are logged and reported for the stations equipped with SCADA and MV90 (a meter-based data collection system) except for circuits where reclosing is disabled. A substantial number of PGE's distribution substations are equipped with SCADA; in the company's DSP filing it report approximately 80% of the circuits are equipped with SCADA. More than 20 percent are equipped with MV90, which is a meter data collection and processing computer application. The remaining distribution substations with neither SCADA nor MV90 have readings collected monthly.

In 2024 PGE recorded SAIDI value when MED are included at 12.87 hours, which is the second highest value in the past seven years behind the record-breaking value of 45.4 that PGE reported in 2021. This 12.87 SAIDI value is the highest among Oregon IOUs.

PacifiCorp

PacifiCorp service territory in Oregon includes five reliability regions, namely, Central Oregon, Coast Plus, Northeast Oregon, South Oregon, and Willamette Valley. The five reliability regions include 23 operating areas including Albany, Bend, Redmond, Prineville, Madras, Clatsop (Astoria), Coos Bay/Coquille, Corvallis, Cottage Grove/Junction City, Dallas/Independence, Enterprise, Grants Pass, Hermiston, Hood River, Klamath Falls, Lakeview, Lebanon, Lincoln City, Medford, Pendleton, Portland, Roseburg/Myrtle Creek, and Stayton.

PacifiCorp operates automated outage management and reporting systems. Customer trouble calls and events captured by its Supervisory Control and Data Acquisition (SCADA) system are interfaced with the company's real-time network connectivity model—Computer Aided Distribution System Operations System (CADOPS). When a SCADA event records a momentary loss of voltage which was successfully cleared (i.e., trip and reclose), that operation is recorded, and no additional response is required. By overlaying the sustained outages (those which were not able to be successfully cleared) onto the network model, the program infers outages at the appropriate devices (such as a transformer, fuse, or other interrupting device) for all customers down line of the interrupting device. The outage is then

routed to appropriate field operations' staff for restoration, and the outage event is recorded in the Company's Prosper/US outage repository.

In addition to this real-time model of the system's electrical flow, PacifiCorp relies heavily upon the SCADA system that it has in place to perform calculations that comply with IEEE 1366-2012 for determining momentary interruption indices. This includes the Dispatch Log System (an SQL database application) which serves to collect all events on SCADA-operable circuits and has since been migrated to a vendor-supported application, SunNet's iTOA System. All data is then analyzed for momentary interruptions to establish state-level momentary interruption indices.

In 2024, PAC recorded the best values of all metrics with one exception, where its CAIDI value when MED are included is second best value after IPC.

Idaho Power Company

Idaho Power's service territory includes one operating area in Eastern Oregon.

IPC gathers data for the Oregon Annual Electric Service Reliability Report (AESRR) through its Outage Management System (OMS) and dispatch entry process. The OMS receives trouble orders in real time from the Customer Relations and Billing System as they are entered by call center staff. The OMS analyzes the call pattern and predicts the potential extent of each outage. The Mobile Workforce operators (located in the dispatch center) perform switching real-time on an electronic map in the OMS to reflect all distribution switching performed in the field and any SCADA operations. Transmission events are entered in the Operations Working Log (OWL) system.

Dispatchers also enter any sustained interruption or switching on a Switching Log. OMS records and switching logs are compared and reconciled each evening by dispatch center personnel, to ensure accuracy and consistency. Momentary outages are gathered from the SENTRY monitoring system and automatically stored in the SENTRY database. Archived OMS and SENTRY data are used to report reliability statistics for sustained and momentary outages.

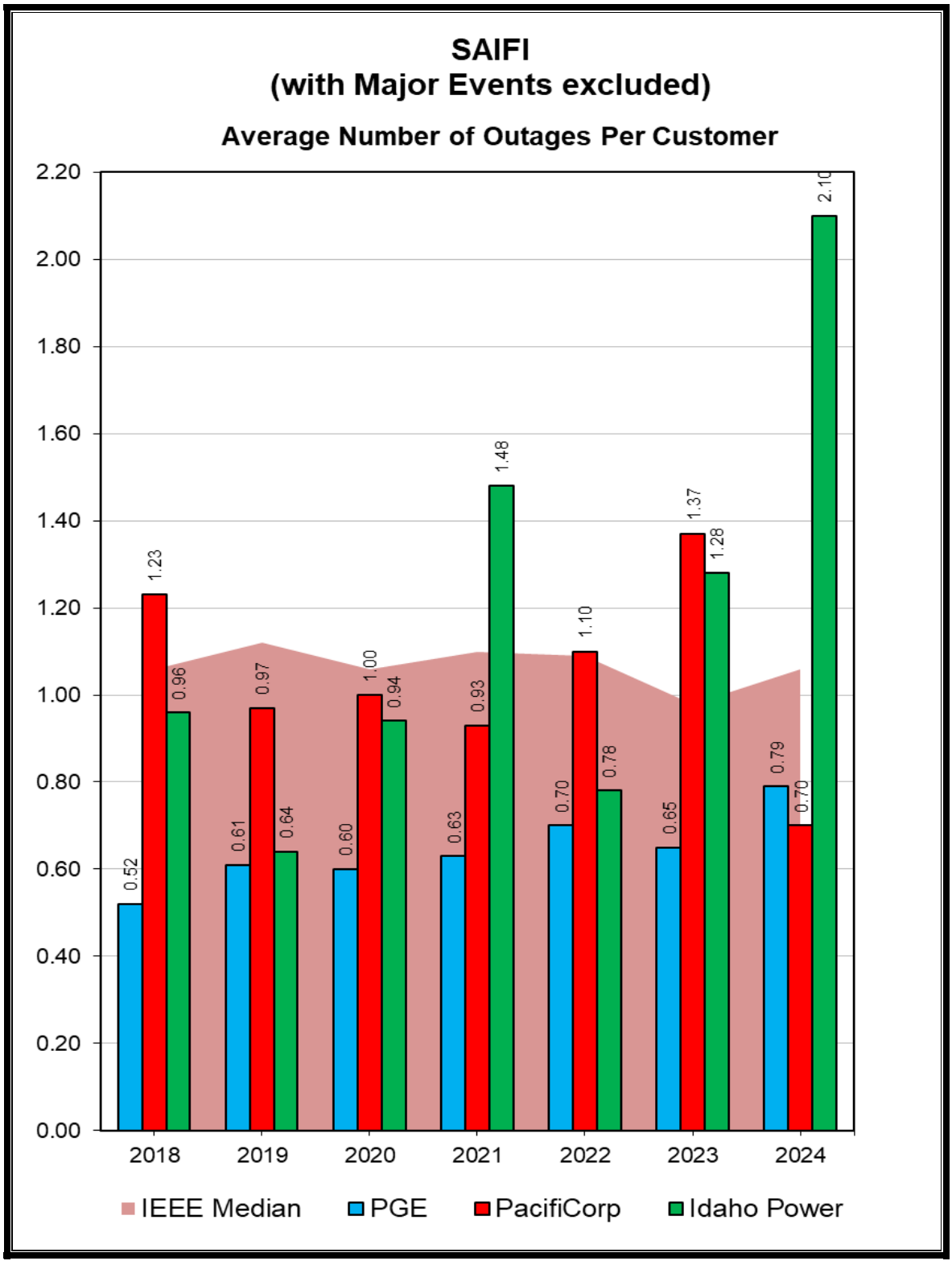
The information from several events, performance data, outage causes, SENTRY data, equipment and statistical reports from OMS are run on IPC's Oregon operating area and each Oregon circuit. The reports are used to create Excel tables and charts and geographic information system (GIS) maps for the AESRR.

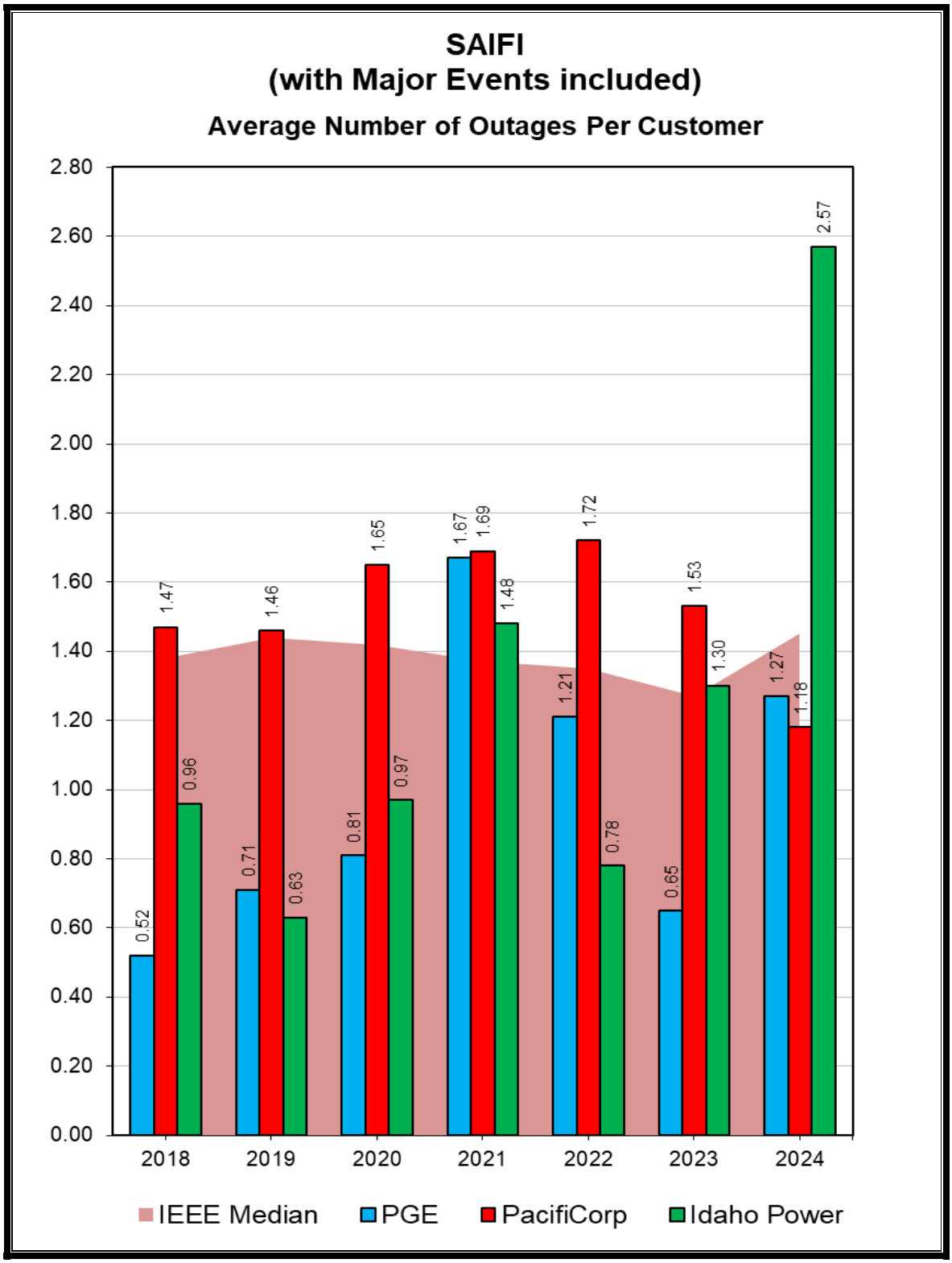
It is worth noting that IPC recorded the highest $MAIFI_E$ among Oregon IOU for six straight years. Furthermore, in 2024, IPC recorded the highest SAIDI value among Oregon IOUs when MED are excluded and the highest SAIFI values whether MED are included or excluded.

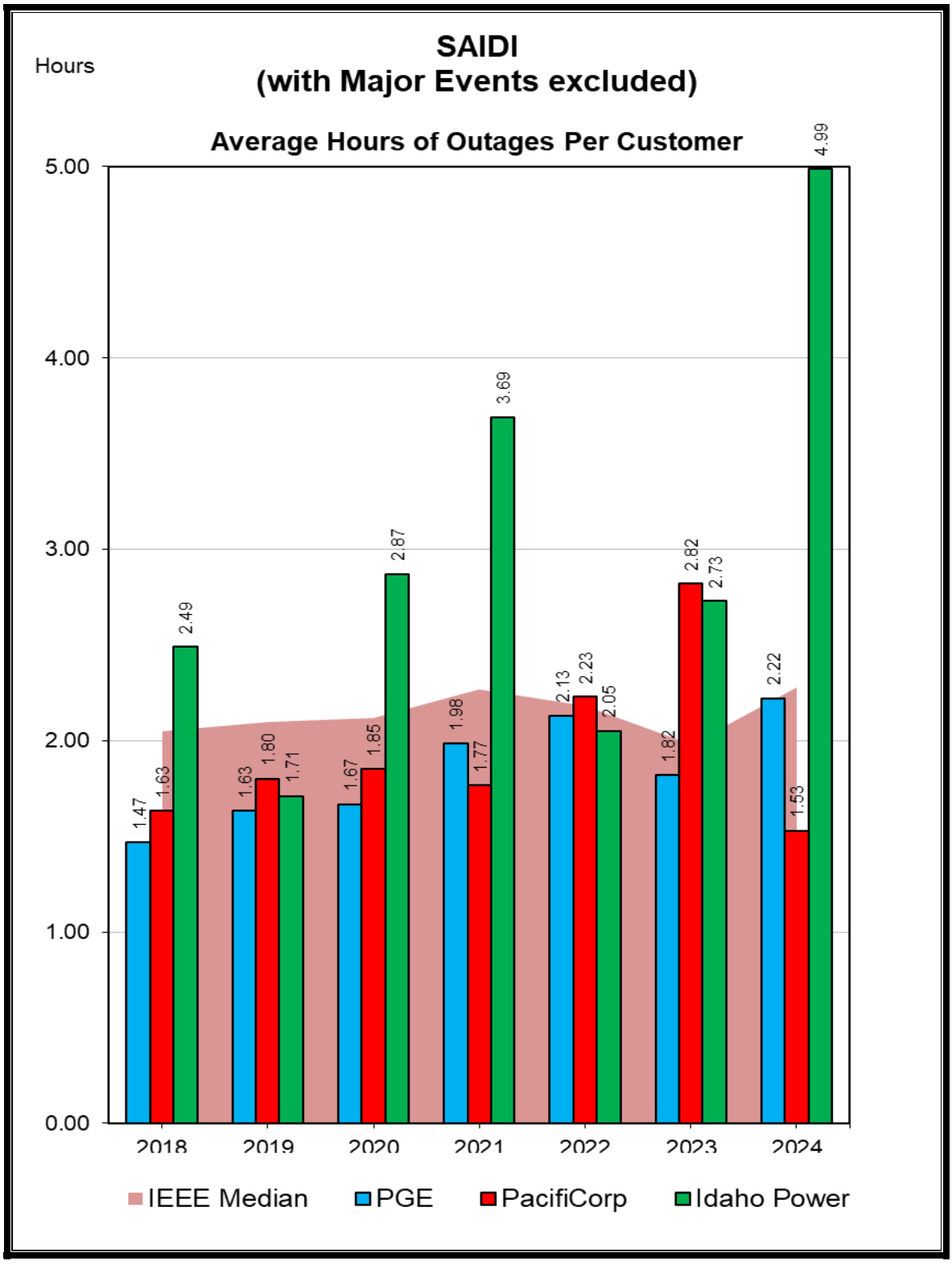
Oregon Electric Reliability Compared Nationally

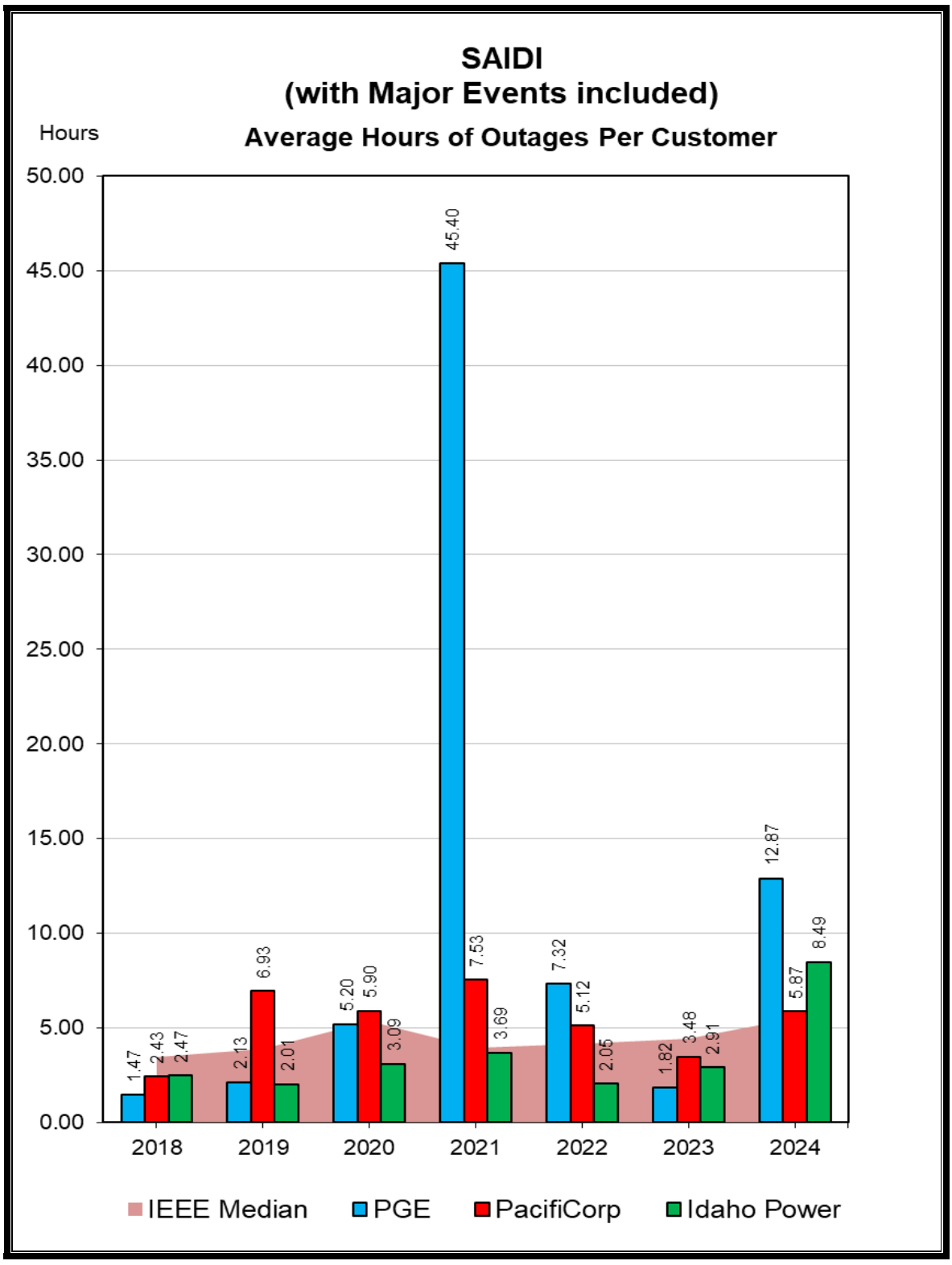
This report attempts to evaluate how Oregon IOUs are doing as compared to benchmarking participants throughout North America. For the purposes of this report, the PUC used IEEE Distribution Reliability Working Group's annual Benchmark Survey that is released annually. The PUC was able to plot North American median data (identified on the charts as IEEE Median) for SAIDI, SAIFI, and CAIDI on some of the graphs, which are included in this report.

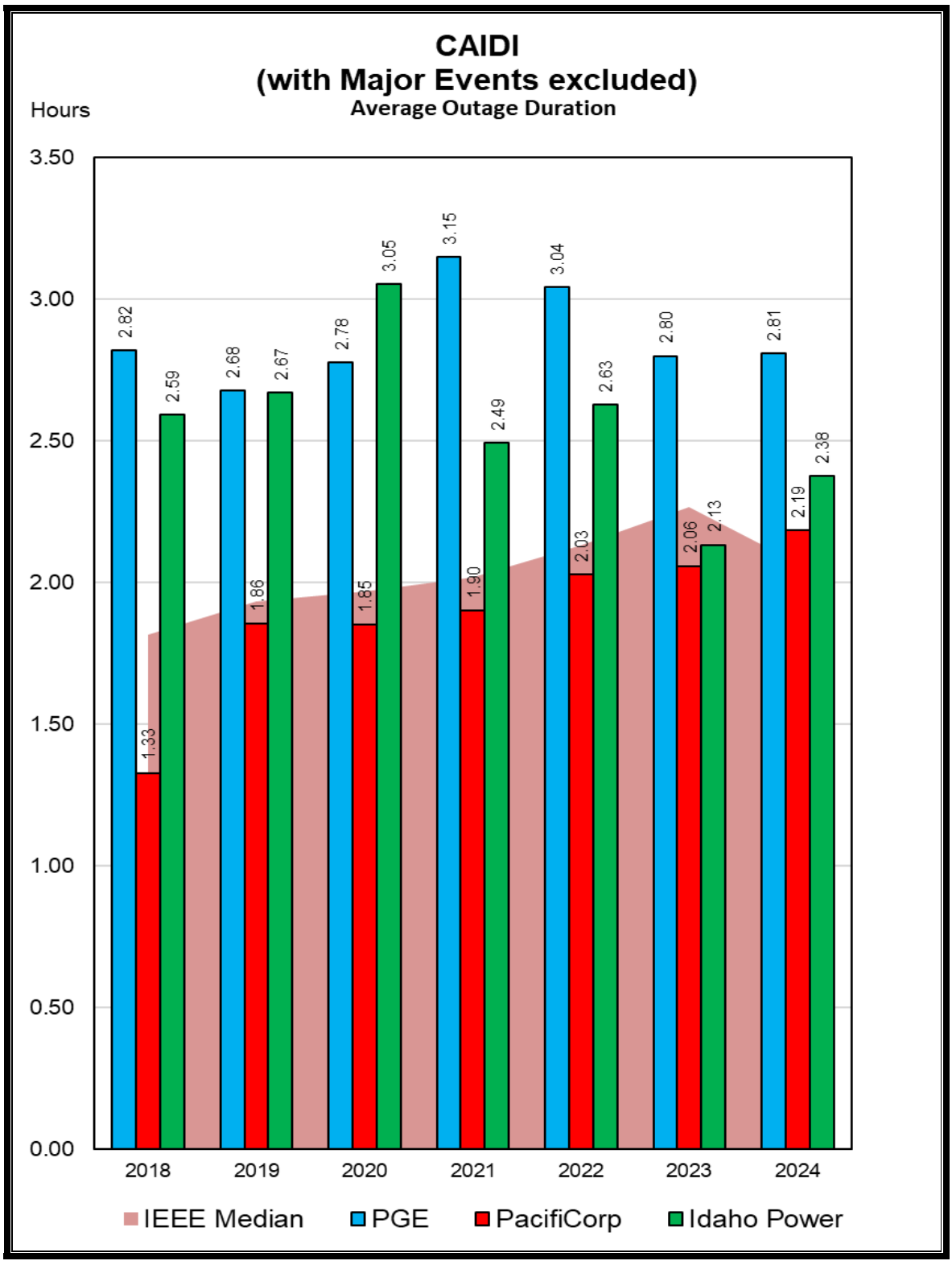
Although not every single utility participates in the study, the IEEE data comes from utilities across North America and represents a good comparison with Oregon IOUs. The IEEE data responses are voluntary and represent electric energy suppliers that are actively working to improve their reliability, which should be one of the goals of every well-managed utility.

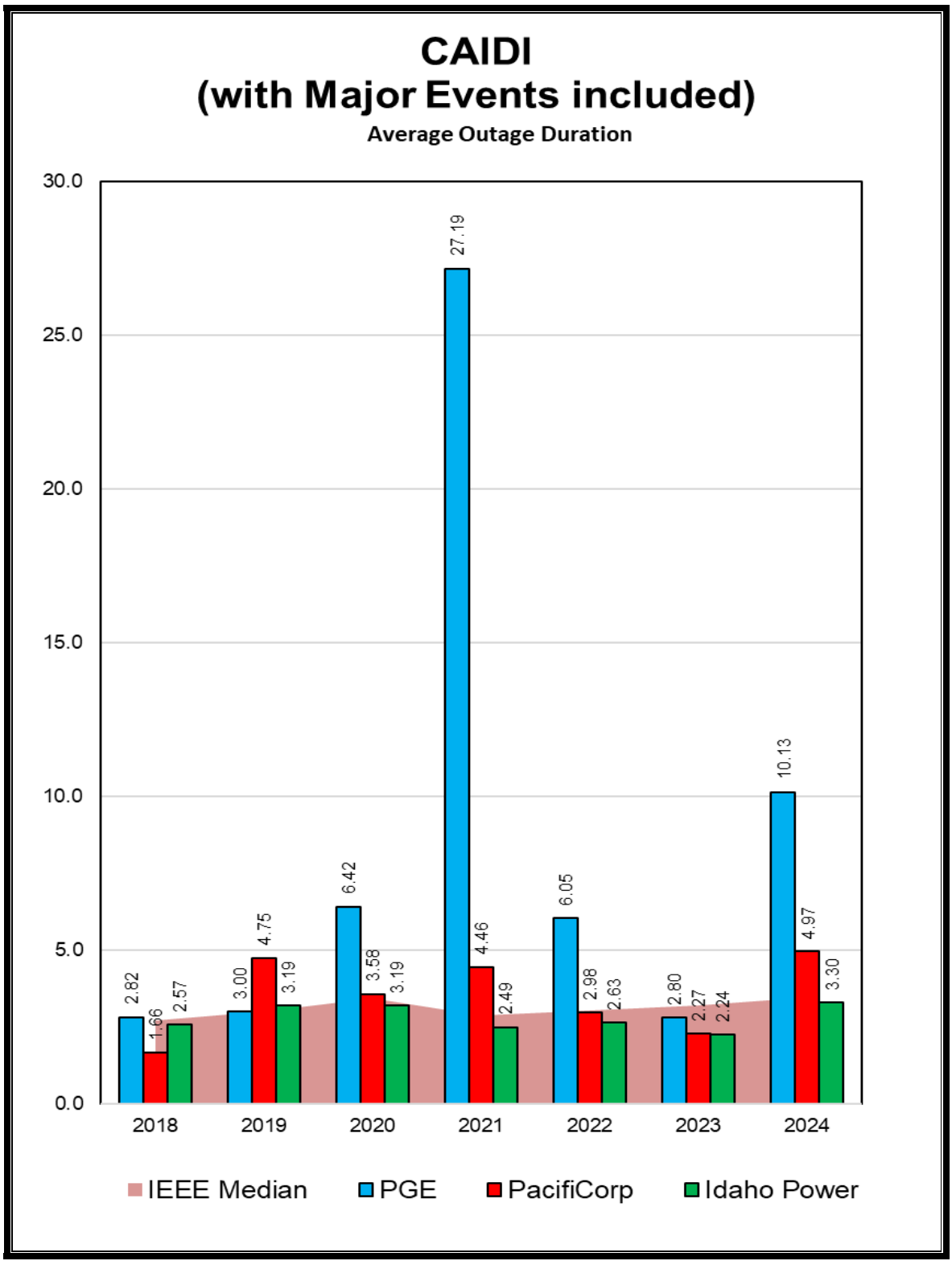

SAIFI
(with Major Events excluded)
Average Number of Outages Per Customer
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.52
1.23
0.96
0.61
0.97
0.64
0.60
1.00
0.94
0.63
0.93
1.48
0.70
1.10
0.78
0.65
1.37
1.28
0.79
0.70
2.10
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power

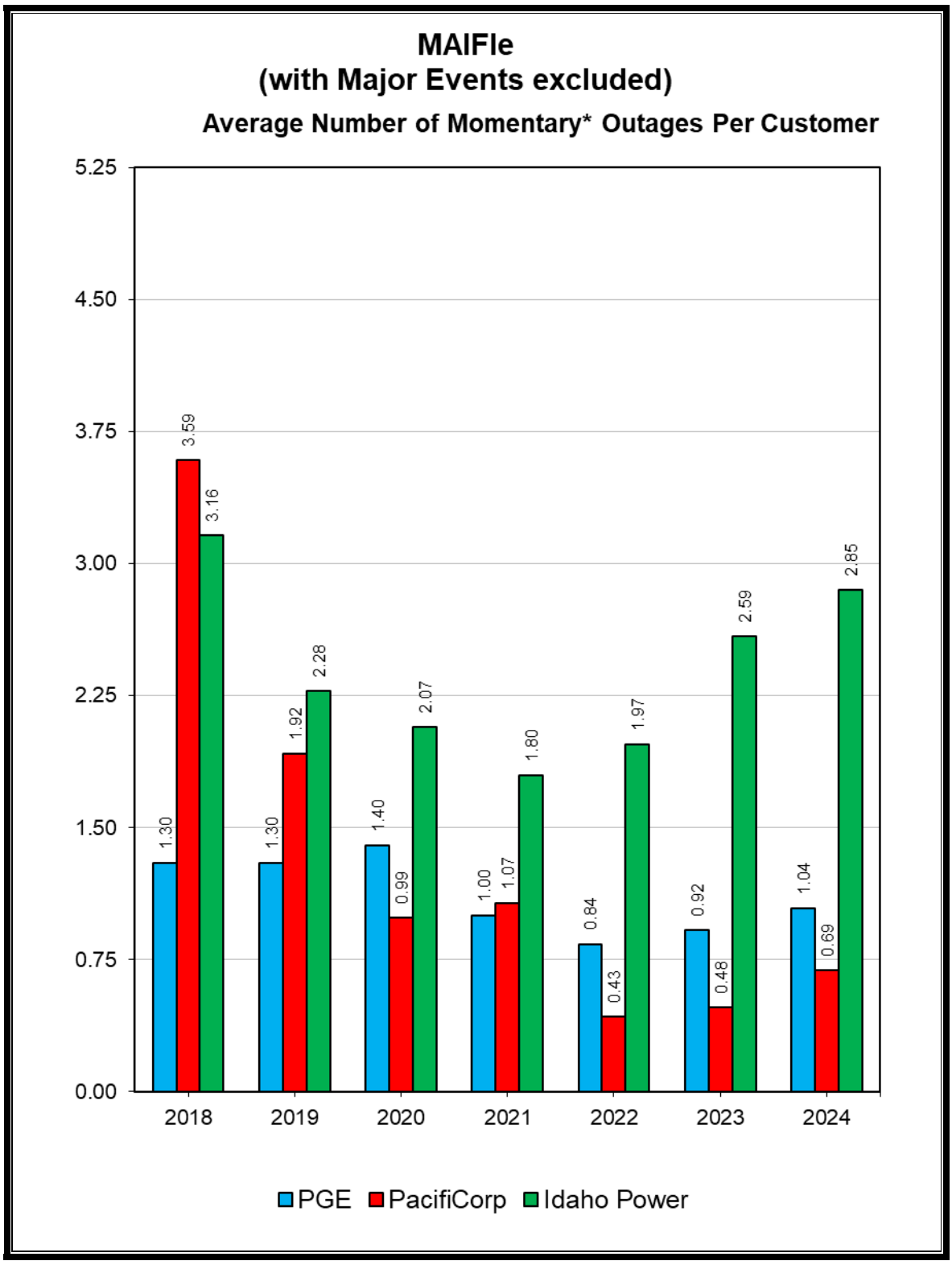

SAIFI
(with Major Events included)
Average Number of Outages Per Customer
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.52
1.47
0.96
0.71
1.46
0.63
0.81
1.65
0.97
1.67
1.69
1.48
1.21
1.72
0.78
0.65
1.53
1.30
1.27
1.18
2.57
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power


SAIDI
(with Major Events excluded)
Hours
Average Hours of Outages Per Customer
5.00
4.00
3.00
2.00
1.00
0.00
1.47
1.63
2.49
1.63
1.80
1.71
1.67
1.85
2.87
1.98
1.77
3.69
2.13
2.23
2.05
1.82
2.82
2.73
2.22
1.53
4.99
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power

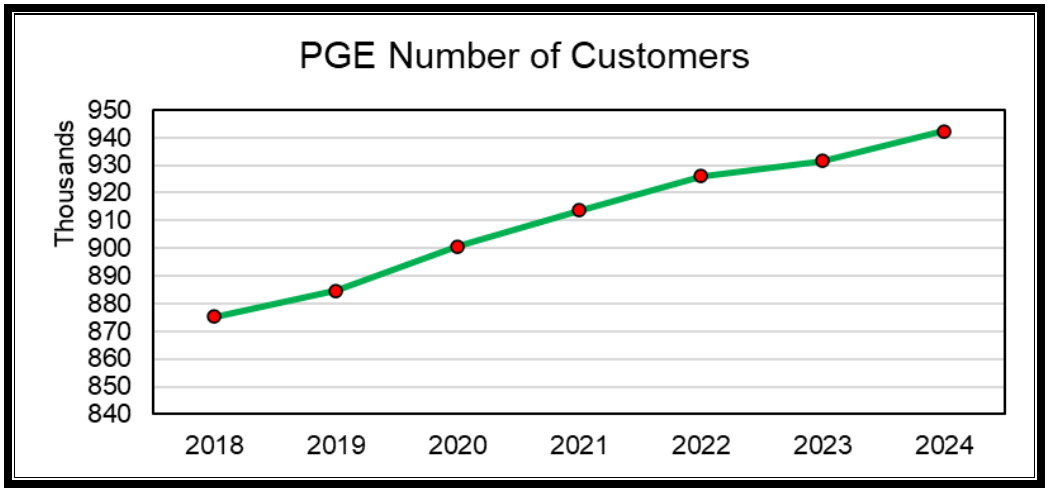

SAIDI
(with Major Events included)
Average Hours of Outages Per Customer
Hours
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1.47
2.43
2.47
2.13
6.93
2.01
5.20
5.90
3.09
45.40
7.53
3.69
7.32
5.12
2.05
1.82
3.48
2.91
12.87
5.87
8.49
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power

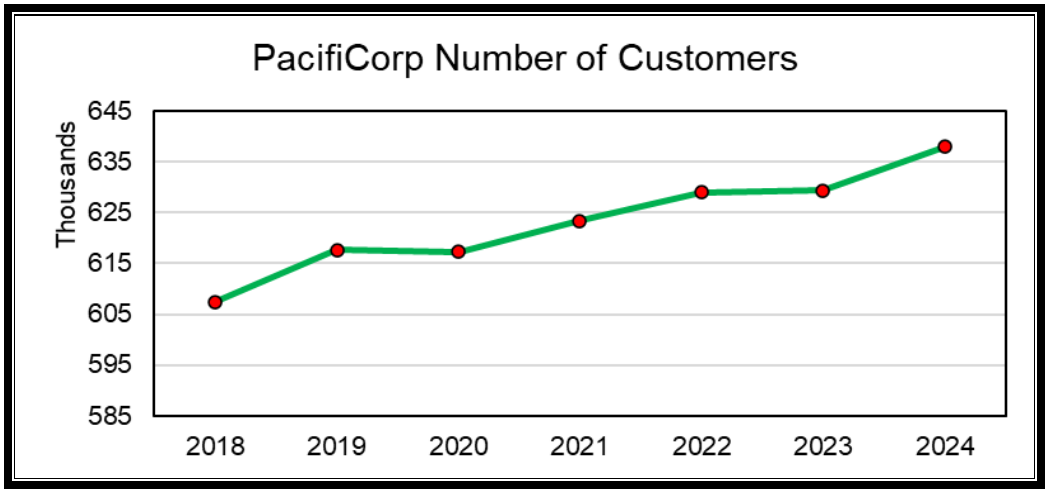

CAIDI
(with Major Events excluded)
Average Outage Duration
Hours
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2.82
1.33
2.59
2.68
1.86
2.67
2.78
1.85
3.05
3.15
1.90
2.49
3.04
2.03
2.63
2.80
2.06
2.13
2.81
2.19
2.38
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power

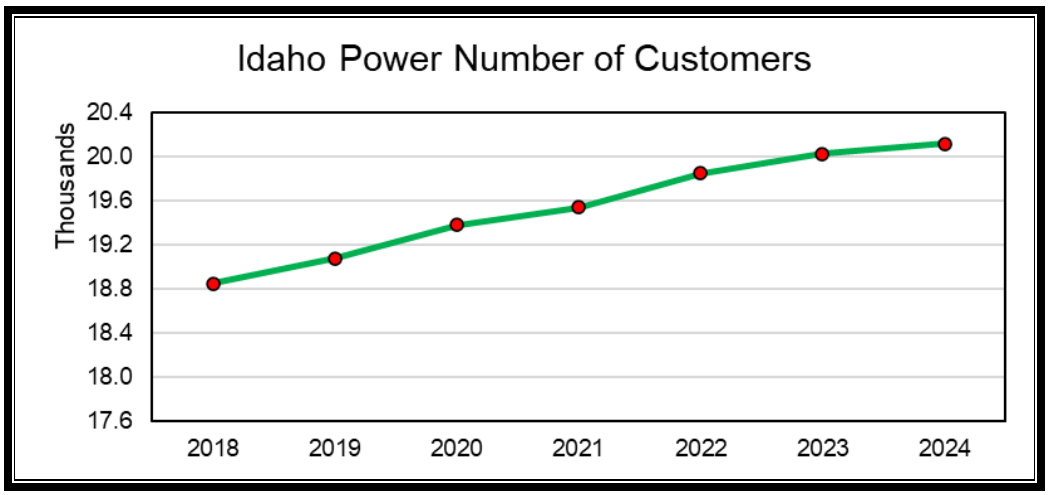

CAIDI
(with Major Events included)
Average Outage Duration
30.0
25.0
20.0
15.0
10.0
5.0
0.0
2.82
1.66
2.57
3.00
4.75
3.19
6.42
3.58
3.19
27.19
4.46
2.49
6.05
2.98
2.63
2.80
2.27
2.24
10.13
4.97
3.30
2018
2019
2020
2021
2022
2023
2024
IEEE Median
PGE
PacifiCorp
Idaho Power



* Momentary outages are interruptions under five minutes.







Reporting of utilities' number of customers is required by OAR 860-023-0150.

- This report and previous reports are available at http://www.oregon.gov/puc (Click on "Reports & Forms," type "seven-year" in the Search field, and press Enter)