Whitepaper: Comparing the Reliability of Central Maine Power to Consumer-Owned Utilities

May 2021

www.ceadvisors.com

ELECTRIC RELIABILITY

Central Maine Power ("CMP" or the "Company") has retained Concentric Energy Advisors, Inc. to evaluate claims regarding electric reliability in Maine generally and for CMP specifically. Maine's electric reliability is influenced by the fact that Maine is the most heavily forested state in the U.S., with nearly 90% of CMP's outages resulting from tree contact and related damage. Furthermore, Maine has a relatively low customer density per line mile, making it more time consuming to restore power to customers during outages. These fundamental facts would not change whether electric service is provided by an investor-owned utility or a consumer-owned utility.[1] While claims have been made publicly that consumer-owned utilities have better reliability than CMP,[2] this is misleading. In fact, when compared to comparable consumer-owned utilities in Maine, New Hampshire, and Vermont, CMP has had lower outage frequency and duration over the last five years.[3]

1.1 ELECTRIC RELIABILITY METRICS

Utilities track and report reliability performance using metrics in Standard 1366 of the Institute of Electrical and Electronics Engineers ("IEEE"). Utilities, regulators, and other government agencies widely recognize these metrics as standard measures of reliability. The United States Energy Information Administration ("EIA") compiles IEEE reliability metrics as part of its Annual Electric Power Industry Report (Form EIA-861). These metrics are defined as follows:

Interruption: A customer's power is interrupted for more than five minutes.

System Average Interruption Frequency Index ("SAIFI"): The total number of customers interrupted in a one-year period divided by the total number of customers served. Said another way, the number of sustained interruptions experienced by all customers. SAIFI indicates the average number of times in a year a customer could expect to experience a sustained interruption.

System Average Interruption Duration Index ("SAIDI"): The total number of customer minutes interrupted in a one-year period, divided by the total number of customers served. Said another way, the time (in minutes) that every customer was without power due to a sustained interruption. SAIDI indicates the average time in a year a customer could expect to experience a sustained interruption.

Major Event Day ("MED"): A day in which the daily SAIDI is above a threshold value. A MED usually occurs because of a severe weather event that causes infrastructure damage and

[1] The term "consumer-owned utility" is a term of art that encompasses non-profit rural electric cooperatives and government-owned electric systems such as municipal electric districts. In Maine. Eastern Maine Electric Cooperative ("EMEC") is non-profit rural electric cooperative, Houlton Water Company is a wholly-owned corporate subsidiary of the Town of Houlton that also provides local electric service, Madison Electric Works is a department of the Town of Madison, and electric systems in Kennebunk and Van Buren are quasi-municipal government entities. All of these entities are referred to as "consumer-owned utilities."

[2] For example, Our Power, an organization that supports establishing a consumer-owned power authority in Maine to acquire and operate the existing transmission and distribution systems of CMP and Versant Power, has stated that, "Maine currently has the worst reliability in the United States. Historically, consumer-owned utilities have far better reliability and better customer service than investor-owned utilities."; *see*, https://ourpowermaine.org/faq/.

[3] SAIFI and SAIDI data from EIA-861 data for 2015-2019.

interruptions affecting a significant portion of a utility's service territory. Utilities typically report reliability indices with and without MED.

These reliability metrics help measure performance over time. Utilities can use the metrics to understand what level of performance (target) is achievable at a cost that customers can afford to pay and are willing to pay. The metrics can also help a utility monitor trends and track reliability impacts from design changes and maintenance programs. Each utility can use these standard metrics to improve its performance – but the appropriate targets for each metric are utility-specific.

However, in order to reasonably compare these reliability metrics across electric utilities, the differences between each utility's service territory must be considered. When evaluating electric reliability, it is important to recognize that power outages result from numerous factors, including weather, vehicle accidents, equipment failure, and wildlife on energized equipment. Every part of the U.S. has unique weather challenges, and utilities design their electric systems accordingly. For example, Florida experiences hurricanes and lightning; tornadoes batter Oklahoma and Kansas; intense heat storms stress equipment in the southwest; and in heavily forested northern states like Maine, high winds and freezing temperatures bring tree limbs down on ice-laden wires causing wires, and sometimes poles, to break.

As highlighted by the EIA, tree coverage, weather, and population density – all of which are significant factors in Maine's electric reliability – are important in understanding a utility's electric reliability:

> Factors such as weather, population density, and tree density also affect utilities' ability to maintain service. For example, co-ops are generally suppliers to rural homes with more powerline miles and trees per customer, increasing the likelihood that distribution lines will be affected by storms. Municipalities are more likely to serve customers living in higher-density urban areas, which have fewer powerline miles per customer and, in some locations, underground distribution lines.[4]

EIA's comments also underscore their observation that rural electric cooperatives generally have lower reliability ratings than municipal electric districts, which tend to serve more urban areas with fewer trees and more customers per line mile. Both types of entities are "consumer-owned," yet underlying factors such as trees, weather, and population density result in substantially different reliability metrics.

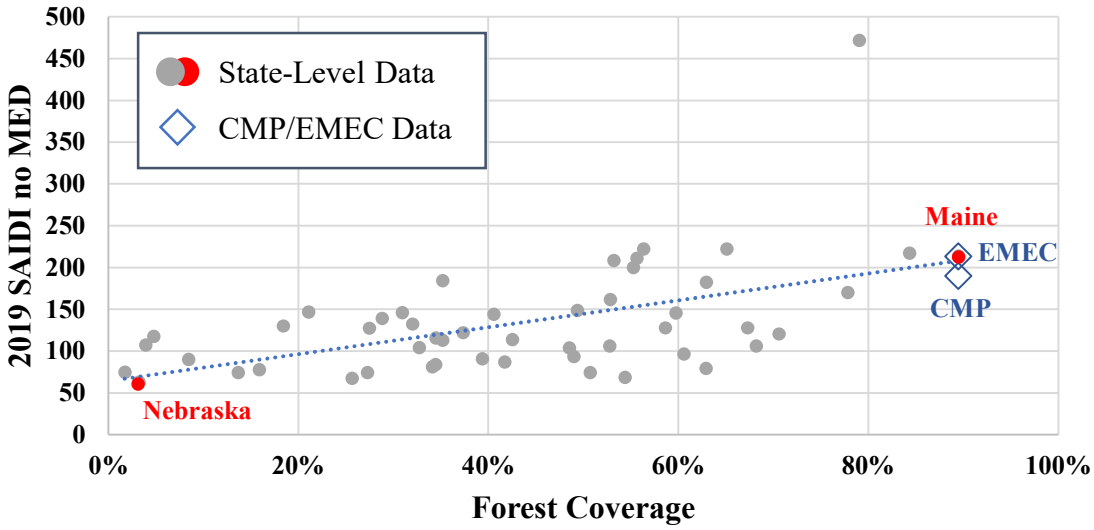
1.2 THE IMPACT OF TREE COVERAGE AND ELECTRIC RELIABILITY

Maine has the highest percentage of forest coverage of any state in the U.S., and it is also susceptible to high winds, hurricanes, icing and storms throughout the year. Trees account for 87% of the outage time experienced by CMP's customers. Vegetation management can help to manage tree contacts and the electric outages they cause; however, over 82% of CMP's tree-related outages are caused by trees outside CMP's rights-of-way – trees that CMP does not have the right to trim or remove.

As shown in Figure 1, EIA electric reliability data shows that states with a higher proportion of forest coverage have higher SAIDI (higher duration of interruption time). As shown, Maine's reliability is consistent with the level of its forest coverage.

[4] EIA; https://www.eia.gov/todayinenergy/detail.php?id=27892

FIGURE 1: CORRELATION BETWEEN SAIDI AND FOREST COVERAGE[5]

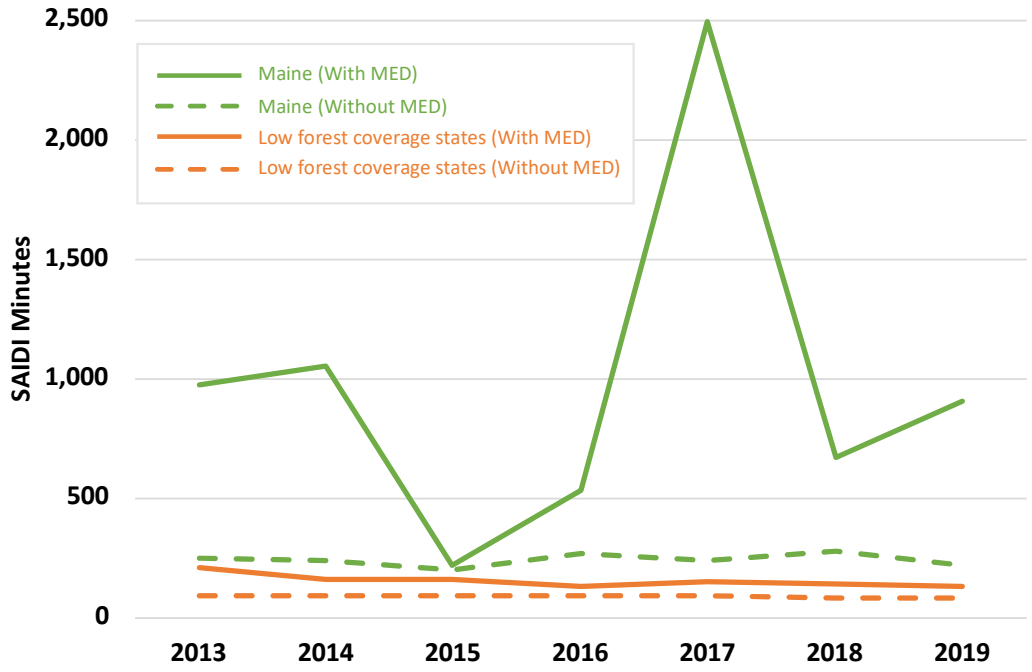


In heavily forested states like Maine, tree contacts are responsible for customer outages throughout the year, during fair weather and storms, causing significantly higher and more variable average outage durations than states with low forest coverage. High winds and ice make tree-caused outages worse and can result in significant differences in outage durations year-to-year based on the frequency and severity of major storms that can affect large portions of a utility's service territory. Figure 2 presents a comparison between outage durations with and without major event days for Maine and states with less than 20% forest coverage.[6] As shown in Figure 2, electric utilities in states with negligible tree cover can experience fewer severe outages and significantly less variation in outage durations year-to-year as compared to Maine.

[5] EIA Form-861 and Concentric analysis. Figure 1 assumes that CMP and EMEC have the same average forest coverage as Maine overall.

[6] In order from least percentage of forest coverage, these states are: North Dakota, Nebraska, South Dakota, Kansas, Iowa, Illinois, Nevada and Wyoming.

FIGURE 2: TREE COVERAGE CAN CAUSE LARGE VARIATIONS IN OUTAGE DURATIONS FROM MAJOR EVENTS[7]

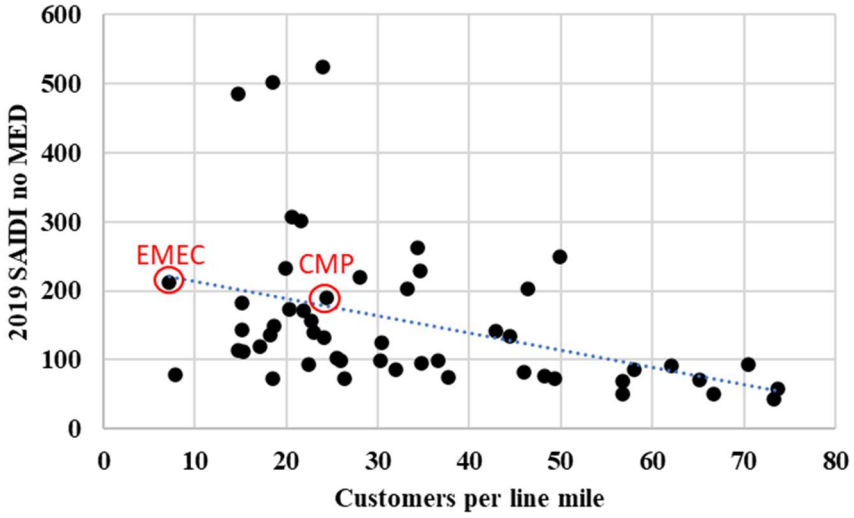


1.3 THE EFFECTS OF CUSTOMER POPULATION DENSITY AND ELECTRIC RELIABILITY

CMP serves a broad, largely rural geographic region across southern and central Maine that includes over 26,000 miles of transmission and distribution lines providing service to over 646,000 customers spread over 11,000 square miles. This translates into a system average of just over 24 customers per line mile. As shown in Figure 3, longer distribution lines serving fewer customers per line mile can experience higher outage durations than shorter lines serving denser populations. As these lines stretch far out into rural areas, each line can have more exposure to variable weather and associated tree contacts. In denser service areas utilities sometimes build connections between two different distribution feeders to provide temporary backup in the event of an outage. In sparsely populated service areas, long distances between adjacent feeders can make backup connections prohibitively expensive.

[7] EIA Form-861 and Concentric analysis.

FIGURE 3: LOWER CUSTOMER DENSITY SERVICE TERRITORIES HAVE HIGHER OUTAGE DURATION[8]



1.4 CMP'S RELIABILITY IS BETTER THAN COMPARABLE CONSUMER-OWNED UTILITIES IN NORTHERN NEW ENGLAND

As noted, CMP has a very large, predominantly rural service territory that has a relatively low customer density of approximately 58 customers per square mile. CMP serves its customers with over 475 distribution circuits, which results in an average of approximately 1,350 customers per circuit. Maine's "consumer-owned" utilities have much smaller service territories than CMP, and differ considerably in customer density. For example, EMEC has a rural service territory of about 300 square miles served by 20 distribution circuits, with approximately 42 customers per mile. By comparison, Kennebunk Light & Power District serves a town of approximately 44 square miles with 11 distribution circuits, with approximately 162 customers per square mile (about four times the customer density of EMEC in a much smaller footprint).[9] While EMEC is smaller than CMP, it is the most comparable consumer-owned utility in Maine to CMP in terms of its service area and customer density, both important factors in tree-caused outages and restoration time.

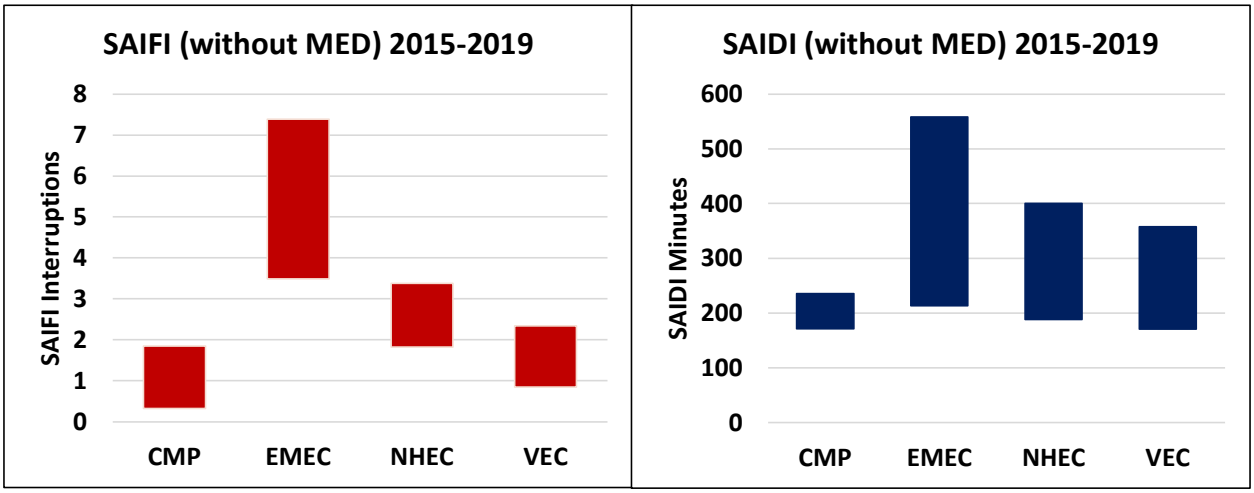
In addition to EMEC, Concentric has compared CMP's reliability to other comparable consumer-owned utilities in northern New England, namely, New Hampshire Electric Cooperative ("NHEC"), and Vermont Electric Cooperative, Inc. ("VEC"). EMEC, NHEC and VEC have relatively large service territories with characteristics more similar to CMP. When comparing reliability experience over the most recent five years for which there is data available (*i.e.*, 2015-2019), CMP's outage frequency and duration have been consistently better than EMEC, NHEC and VEC. Figure 4 reflects the range of the SAIFI and SAIDI measures during the past five years. As shown, CMP's reliability performance was better (*i.e.*, lower

8 EIA Form-861 and Concentric analysis. Utilities analyzed have greater than 100,000 customers.

9 Maine's other "consumer-owned" electric systems generally occupy a small geographic footprint, including small mainland systems in Madison, Van Buren, and Houlton, as well as a small number of island-based systems off the Maine coast.

SAIFI and SAIDI measures) and less variable (*i.e.*, smaller range over the 5-year period) than that of consumer-owned utilities in northern New England.

FIGURE 4: ELECTRIC RELIABILITY OF CMP RELATIVE TO COMPARABLE CONSUMER-OWNED UTILITIES IN NORTHERN NEW ENGLAND[10]



1.5 ELECTRIC RELIABILITY AND ELECTRIC RATES

In heavily forested states such as Maine, providing reliable electricity service requires a robust and durable transmission and distribution system, as well as an ongoing vegetation management program to keep trees and branches away from power lines. The cost of these programs does not change based on utility type, so there would be no savings if such programs are conducted by a "consumer-owned" utility as opposed to an investor-owned utility. In addition to these operational programs, there are a range of capital investments that that Maine's utilities can follow in order to enhance reliability such as hardening the system; building additional connections to support backup supply; and increasing automation to reduce the scope of outages when they occur. These investments increase costs to customers regardless of whether the utility is investor-owned or consumer-owned, and thus the level of reliability must be balanced with the cost of providing such reliability. Overall, Concentric's analysis confirms that CMP has experienced better reliability over the past 5 years as compared to comparable consumer-owned utilities in northern New England (see Figure 4), and CMP has lower electric transmission and distribution service rates than comparable consumer-owned utilities in northern New England – in fact, CMP has the lowest residential electric distribution rates of an any investor-owned utility in the same region.[11]

[10] EIA Form-861 and Concentric analysis.

[11] Whitepaper: Northern New England Electric Rates (Concentric Energy Advisors, 2021), 4-6.