

AEMR Case Study	Overview	Number of Approved Outages	Monthly Approved Outage Frequency	Total Energy Loss From Approved Outa..	Avg. Duration Day of Approved Outages	Number of Approved Fo..
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American Energy Market Regulator Case Study

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Overview

The American Energy Market Regulator (AEMR) is responsible for overseeing the United States’ domestic energy network. Also known as AEMR, this entity ensures the reliability and stability of the energy system. Among the four types of outages, the only one penalized by AEMR is a forced outage. If the number of forced outages increases and energy demand surpasses supply, stress is placed on the system, threatening reliability—something AEMR aims to prevent.

This analysis evaluates the stability and reliability of the energy service during 2016-2017, focusing on energy losses and market disruptions. The goal is to assess the different types of outages and their impact, helping management take proactive actions for future years.

Types of Energy Outages

There are four types of outages or disruptions:

- Consequential
- Forced
- Opportunistic
- Planned

Key Areas of Concern

This study will focus on two major concerns:

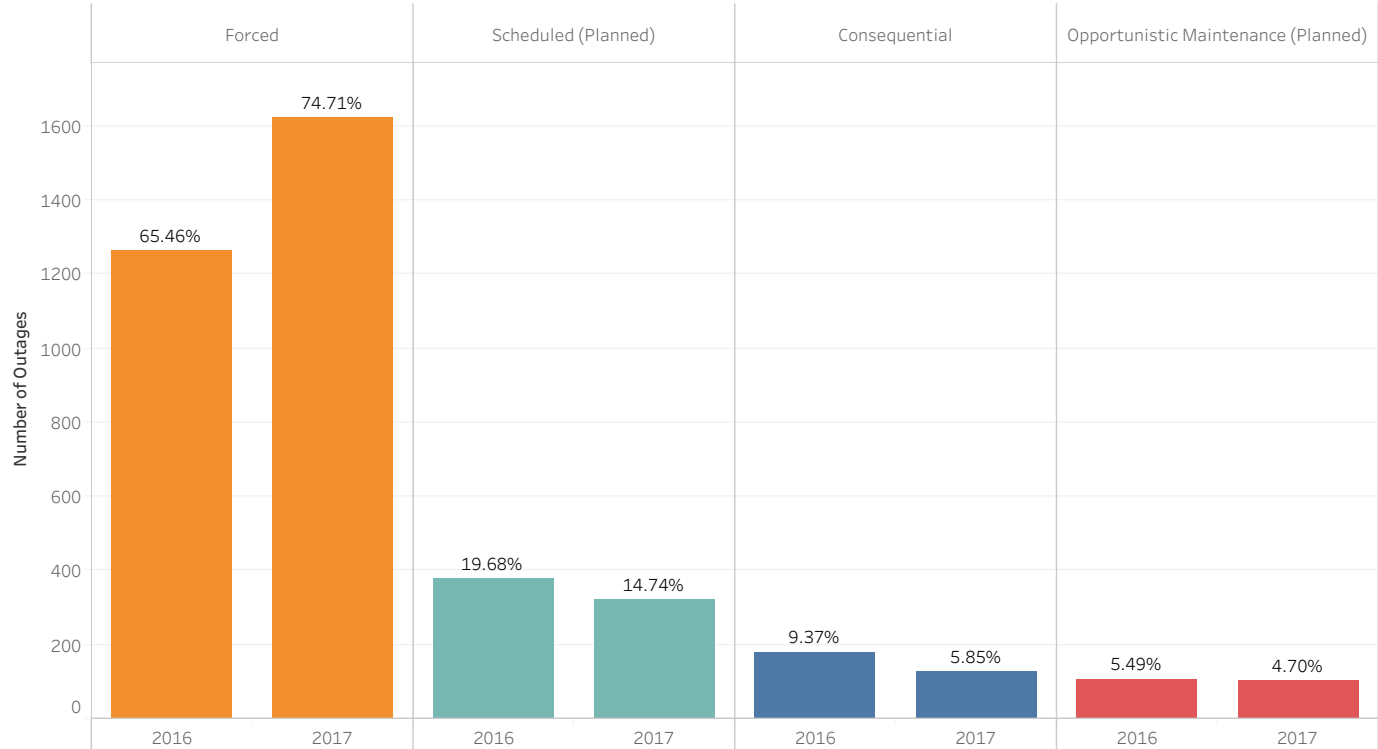
- A) Energy Stability and Market Outages
- B) Energy Losses and Market Reliability

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- Forced outages are the most common type of outage accounting for 65.46% of all outages in 2016 and 74.71% of all outages in 2017.
- Scheduled (Planned) outages are the second most common and decreased from 2016 (20% of all outages) to 2017 (15% of all outades)
- Forced outages increased by about 14%, while Scheduled (Planned) outages decreased from 2016 to 2017, indicating there was not enough maintenance work being done to reduce forced outages...

Number of Approved Outages

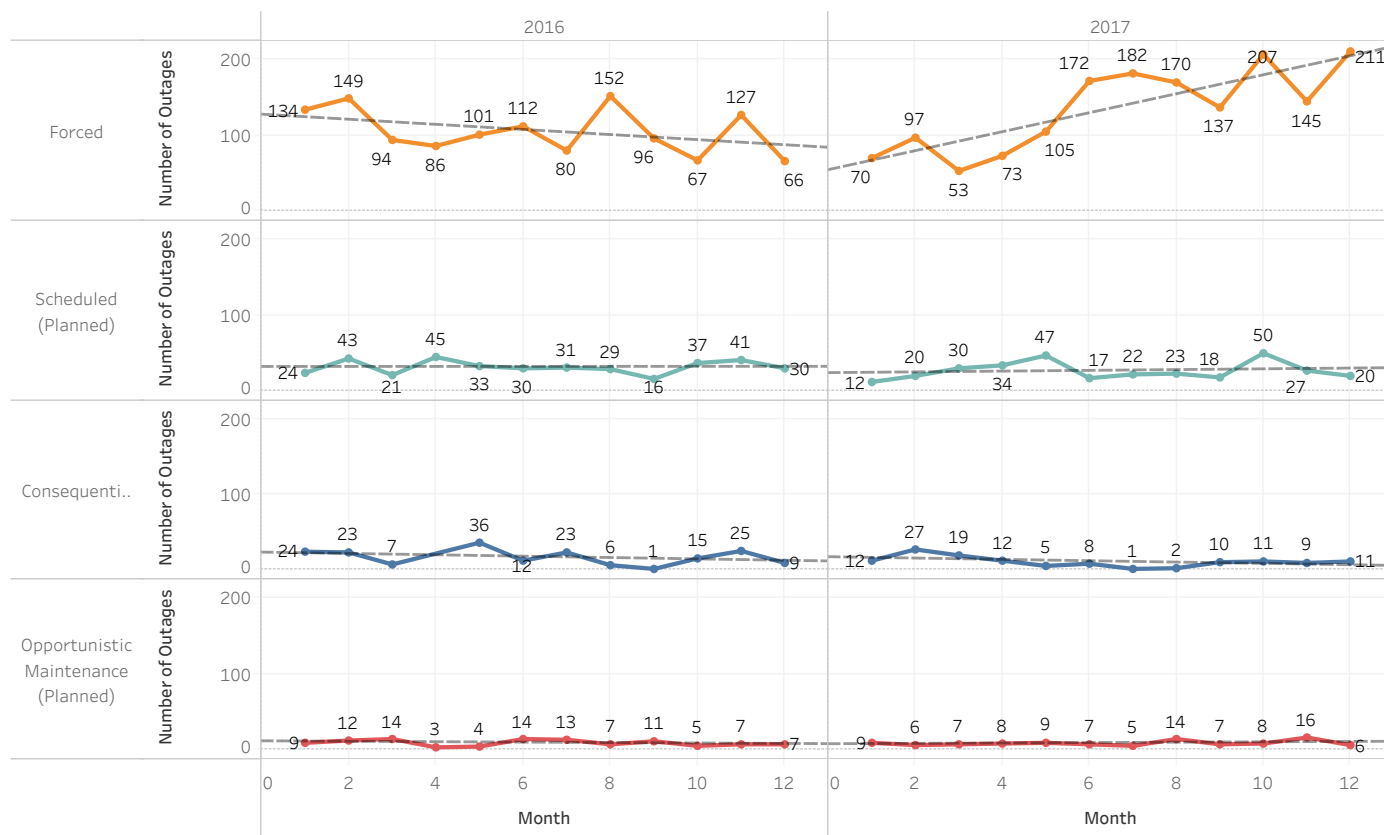


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- Forced outages happened most frequently each month and became more frequent over time, peaking in Dec 2017 with 210 outages.
- Forced outages show variability, while the other types of outages are more consistent.
- Forced outages are growing and making the energy system increasingly unreliable. ...

Monthly Approved Outage Frequency

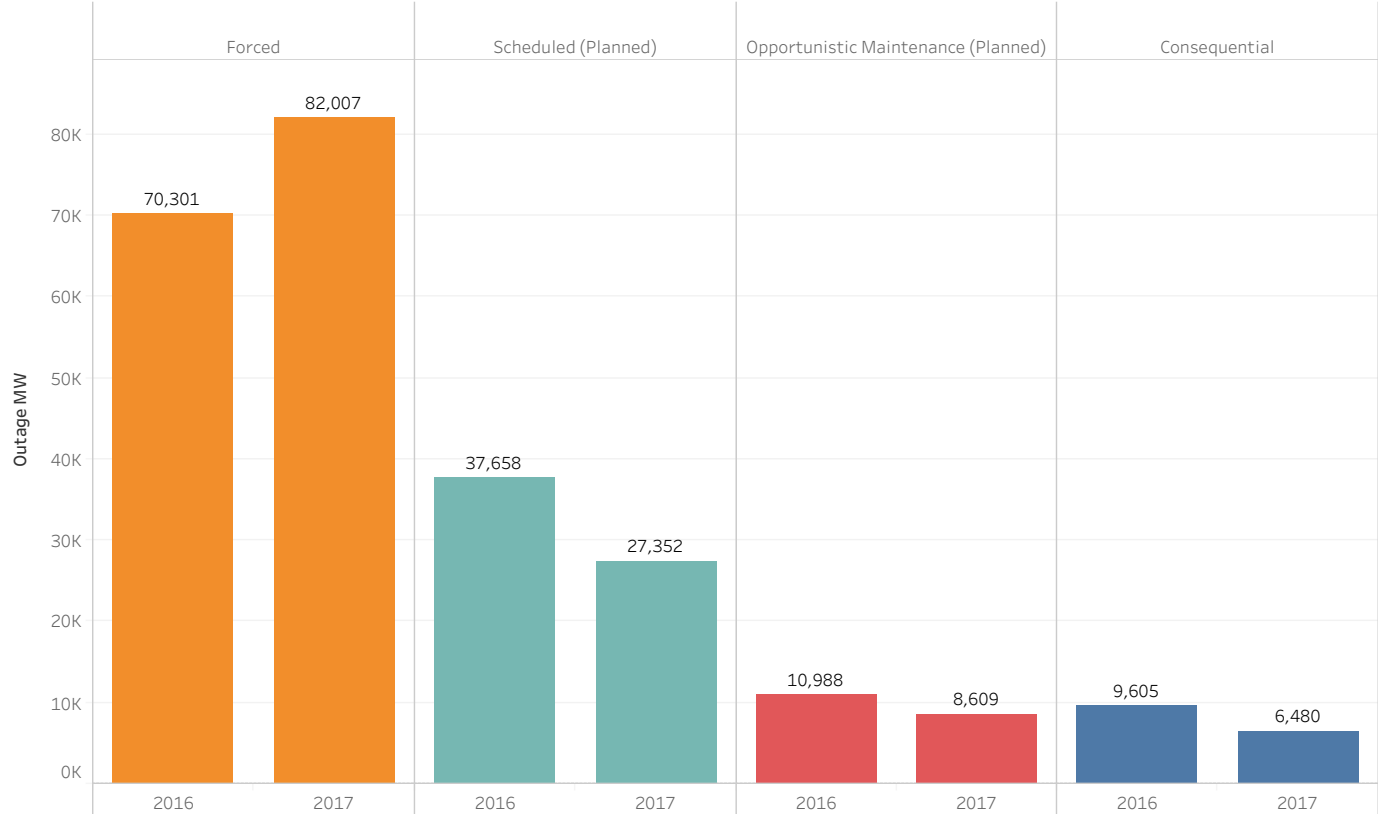


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- Forced outages had the highest total energy loss and saw an increase of over 10K MW from 2016 (70.3K MW) to 2017 (82K MW).
- The remaining outage types experienced a decrease in energy loss from 2016 to 2017.
- Forced outages accounted for over 50% of total outage energy loss in both 2016 (55%) and 2017 (66%).

Total Energy Loss (MW) From Approved Outages



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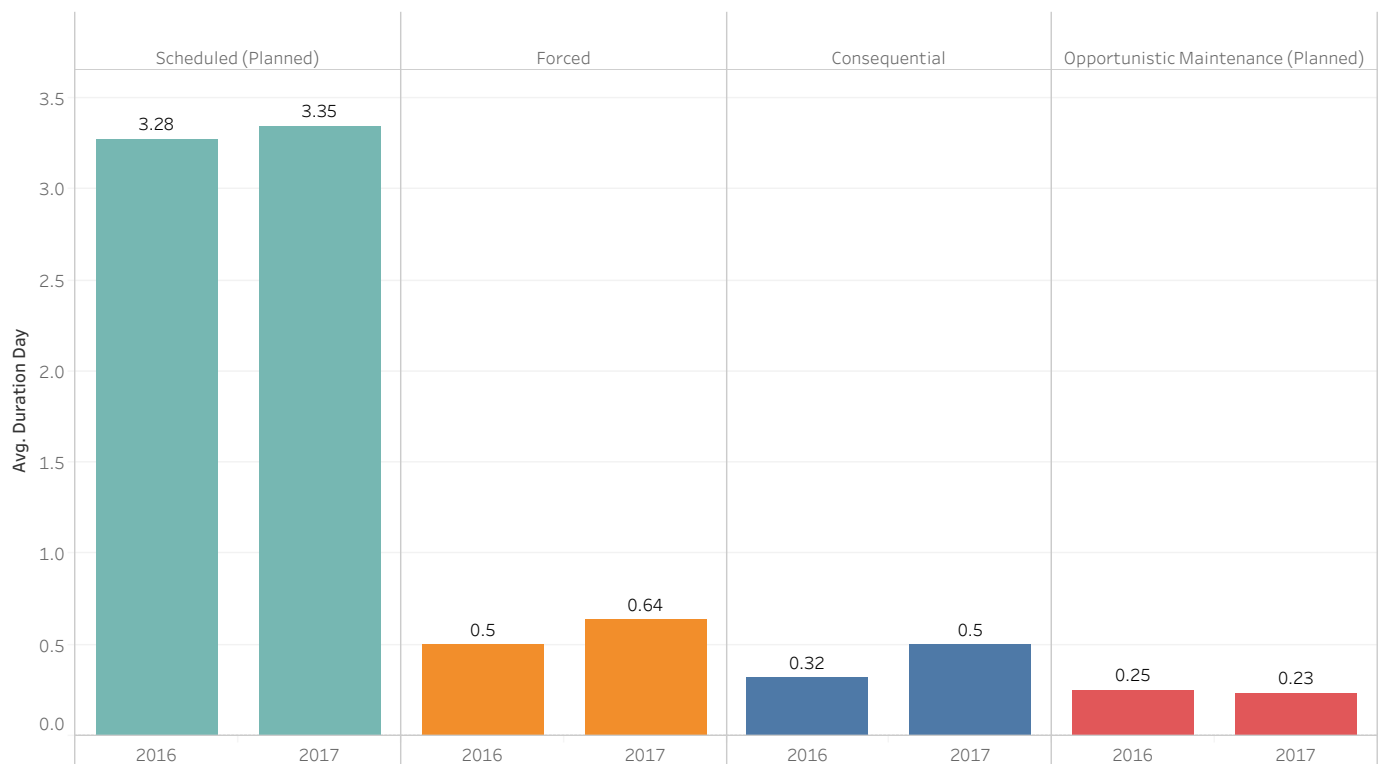
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- Scheduled (Planned) outages had the longest average duration in days with the average duration increasing from 2016 (3.28 days) to 2017 (3.35 days).

- Forced outages had the second-longest average duration and they also saw an increase from 2016 (0.5 days) to 2017 (0.64 days).

- Increases in average duration for Scheduled (Planned) and Forced outages indicates that maintenance is taking longer and unforeseen outages are getting longer, both signs of system stress. ...

Avg. Duration (Days) of Approved Outages

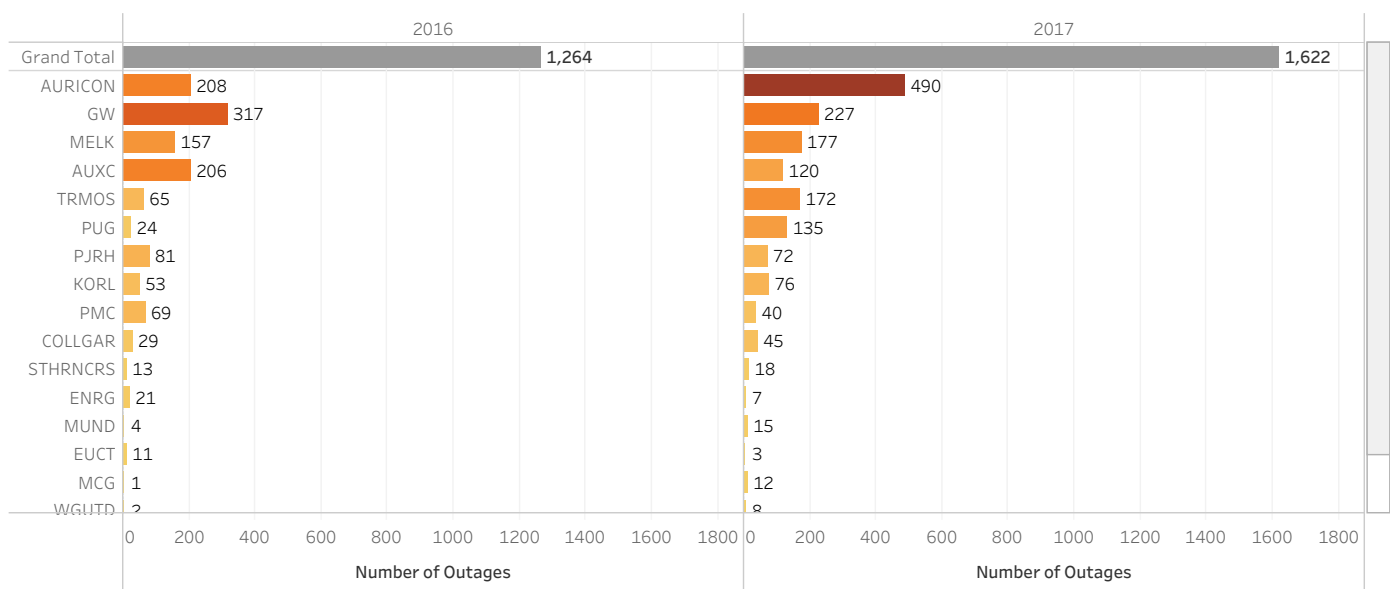


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- AURICON participant code had the highest number of Forced outages (698 outages). and saw outages more than double from 2016 (208 outages) to 2017 (490 outages).
- GW saw a decrease of 90 outages from 2016 (157 outages) to 2017 (227 outages).
- MELK saw a small increase of 20 outages from 2016 (157 outages) to 2017 (177 outages).
- The top 3 participant codes account for 55% of all Forced outages: AURICON (698 outages), GW (544 outages), and MELK (334 outages).
- Overall, there was a 28% increase in the number of Forced outages from 2016 (1,264 outages) to 2017 (1,622 outages).

Number of Approved Forced Outages



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- AURICON participant code saw its energy loss more than double from 2016 to 2017, increasing from 10,696 MW to 21,640 MW.

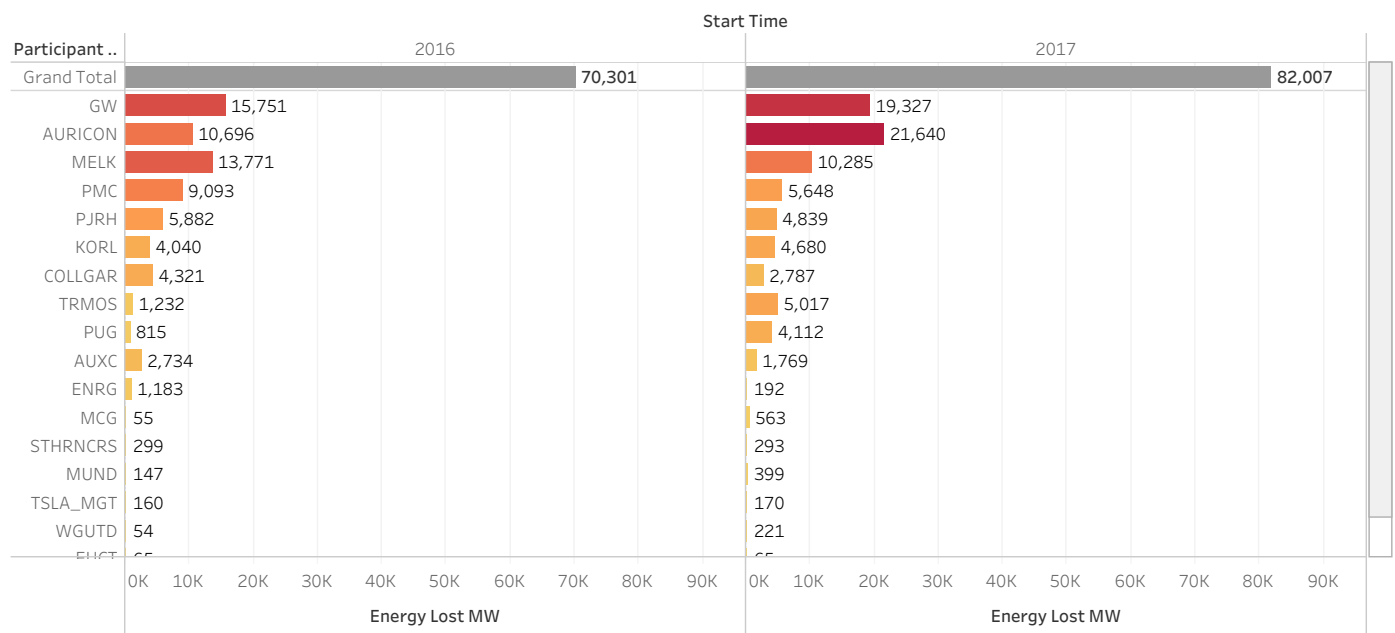
- GW had the greatest Forced outage energy loss overall (35,078 MW) with an increase of more than 4,000 MW from 2016 (15,751 MW) to 2017 (19,327 MW).

- MELK saw its energy loss drop more than 3,000 MW from 2016 (13,771 MW) to 2017 (10,285 MW).

- The top 3 participant codes account for 60% of all Forced outage energy loss.

- Overall, there was a 17% increase in Forced outage energy loss from 2016 (70,301 MW) to 2017 (82,007 MW)..

Total Energy Loss (MW) Approved Forced Outages



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Conclusion

1.) The energy network is becoming more unstable over time

- Forced outages are the most common outage type, accounting for **70% of all outages from 2016 to 2017**. The **average duration of forced outages is increasing** over time, going from **0.56 days in 2016 to 0.79 days in 2017**.
- Forced outages account for **60% of all energy loss**.
- Forced outages are growing more frequent over time, increasing from **134 outages per month in January 2016 to 210 outages per month in December 2017**.

2.) The most unreliable providers are AURICON, GW, and MELK

- Together these **three providers account for more than 55% of all forced outages and 60% of all energy loss** from forced outages.

Recommendation:

To **improve the stability and reliability** of the energy system, there should be **planned maintenance** done on these facilities to **decrease the number of forced outages** in the future.