

AEMR

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AEMR Case Study

Problem Statement

The American Energy Market Regulator (AEMR) is responsible for looking after the United States of America's domestic energy network. The regulator's responsibility is to ensure that America's energy network remains reliable with minimal disruptions, which are known as outages.

There are four key types of outages:

- *Consequential*
- *Forced*
- *Opportunistic*
- *Planned*

The AEMR **penalizes only forced outages** among the four types of outages. This is because a forced outage indicates that the energy system is under stress when the demand exceeds the available supply. Such situations pose a threat to network reliability, which the AEMR aims to prevent.

The AEMR management team has observed a significant increase in the number of outages reported by energy providers during the calendar years of 2016 and 2017. As a result, the management team has identified two primary areas of concern that require attention:

1. Energy Stability and Market Outages
2. Energy Losses and Market Reliability

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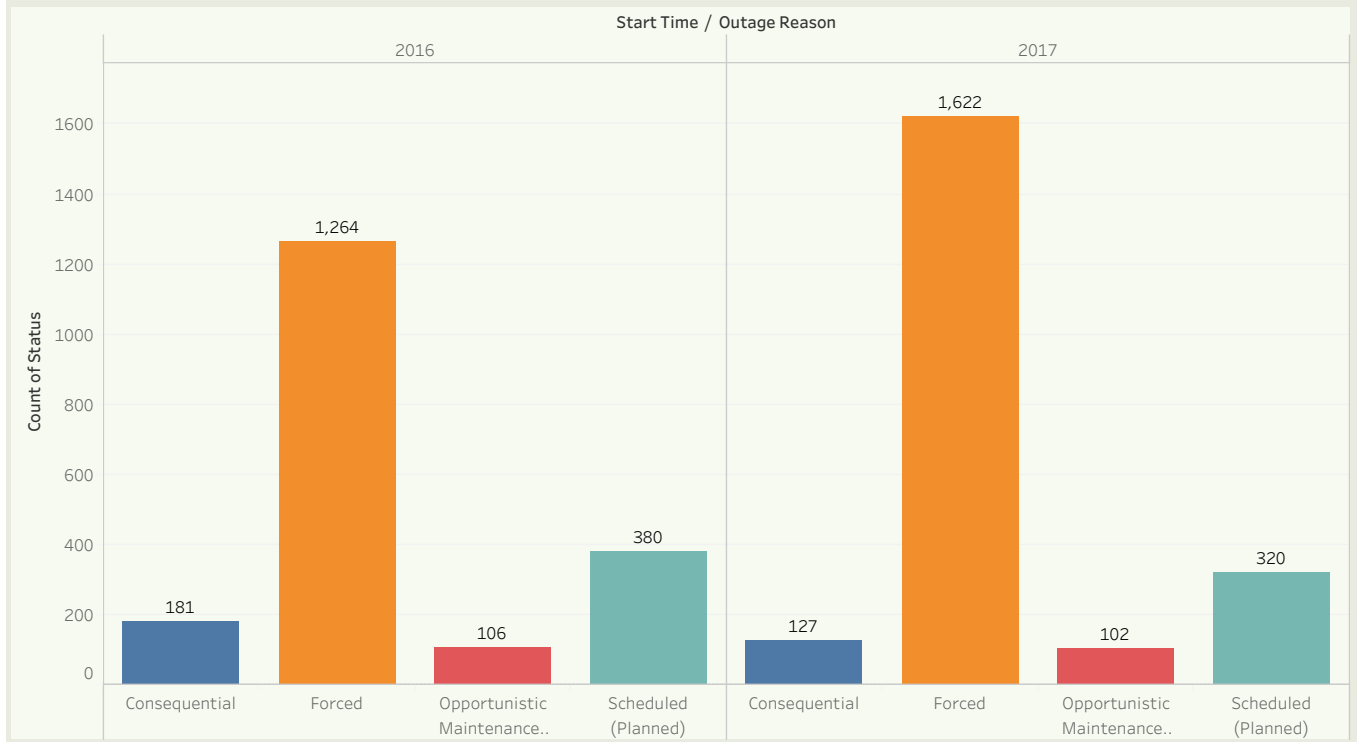
The most Common type of outage is Forced 60% out of total (~2886 times), with total energy loss of 60%(~152.31k/253k) and with an average of 0.58 days of outage from 2016-2017.

Outage Reason	Year of Star..	Energy Lost MW	NrofEvents	Avg. Outage Duration In Days
Consequential	2016	9.60K	181	0.39
	2017	6.48K	127	0.56
Forced	2016	70.30K	1,264	0.49
	2017	82.01K	1,622	0.64
Opportunistic Maintenance (Planned)	2016	10.99K	106	0.35
	2017	8.61K	102	0.31

Outage Reason

- Consequential
- Forced
- Opportunistic Main..
- Scheduled (Planned)

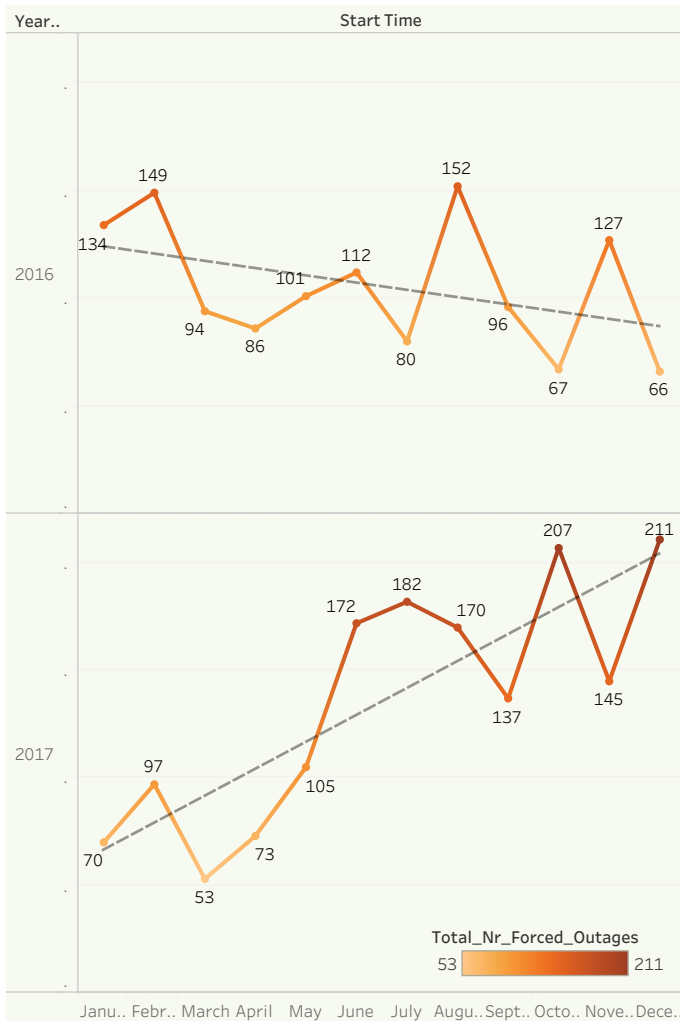
The Forced Outage jumped by 28% from 2016 to the following year, while the rest of the outage types slightly went down.



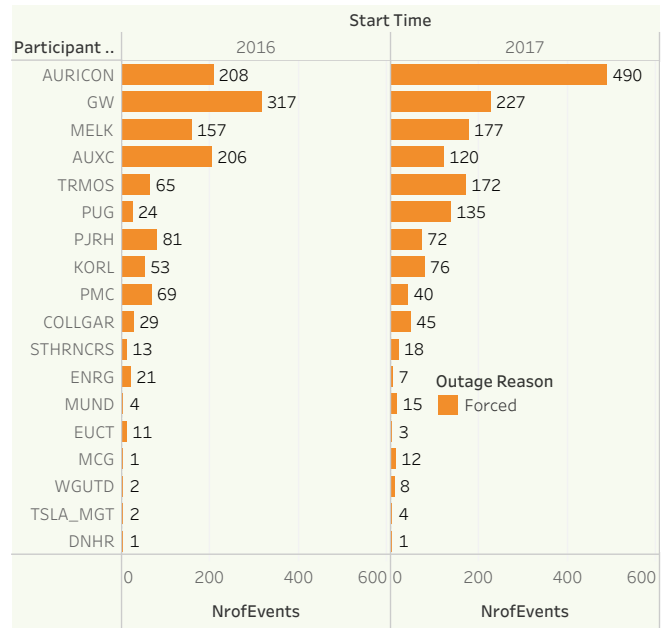
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Seasonality of Forced Outage type by month from 2016-17



The total number of events by Participant Code for 2016- 2017.



Key Insights

Looking at the micro view , Auricon, GW and MELK contributed more than 50% of number of forced outages .

2016: the outages fluctuate month to month without a clear upward or downward trend in 2016 .

Peaks in March (149), September (152), and November (127).

Lowest in December (66).

However , in 2017 the number of forced outages shows a strong upward trend.

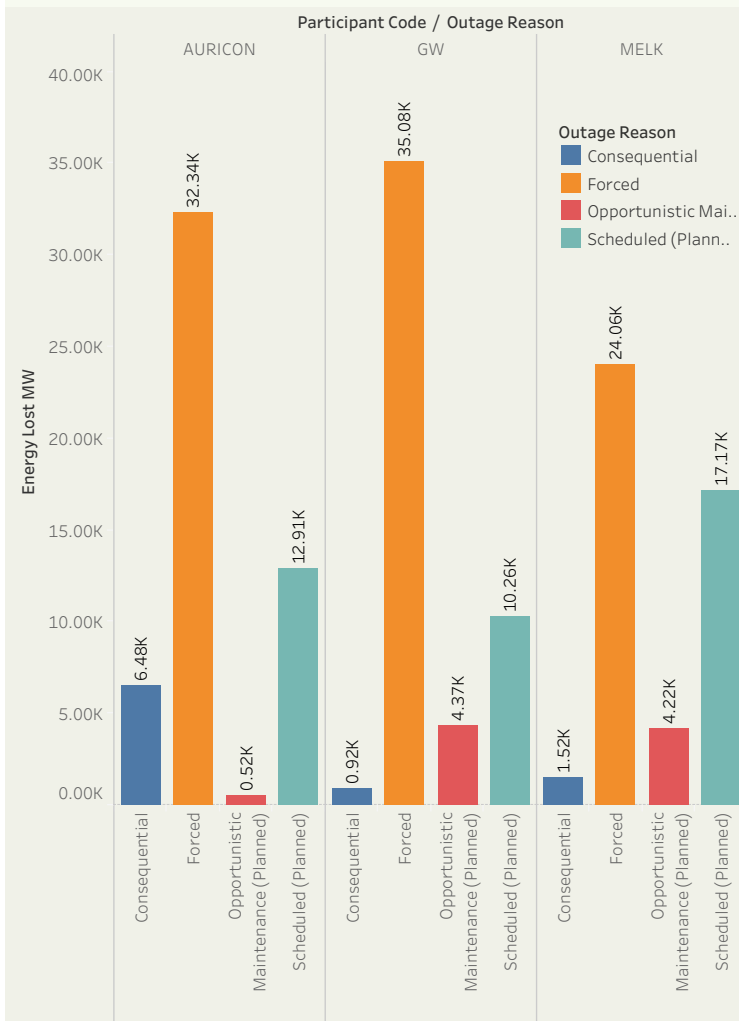
Starts low in January (70) and February (97), dips a bit, then rises sharply.

Peaks in December (211), with other high points in August (182) and October (207).

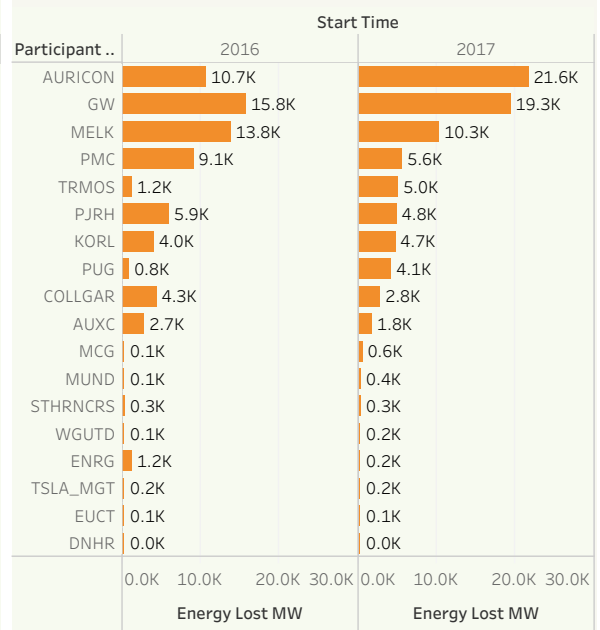
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Top 3 unreliable energy providers that contributed to forced outage.



Total Energy Loss by Participants 2016-17.



Key Insights:

There are top 3 unreliable energy providers like are : **AURICORN** 62% (~32.34k), **GW** 70% (~35.08k) and **MELK** 51% (~24.06k). Majority of the forced type energy losses happened in 2017 for **Auricorn** (~22k) and **GW**(~19.3k) except for **MELK**.

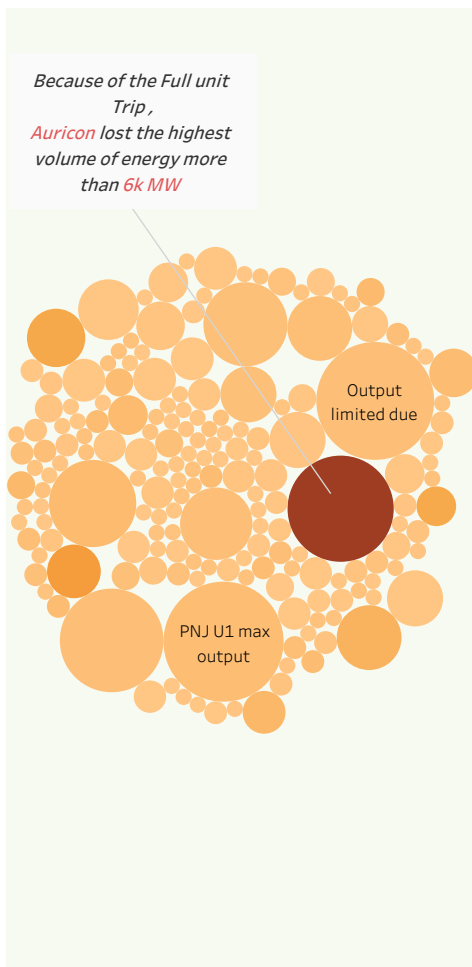
Recommendation:

AEMR should consider divesting from the above mentioned 3 providers and might invest in providers like **DNHR** , **EUCT**, **WGUTD** and **MCG** to name the few.

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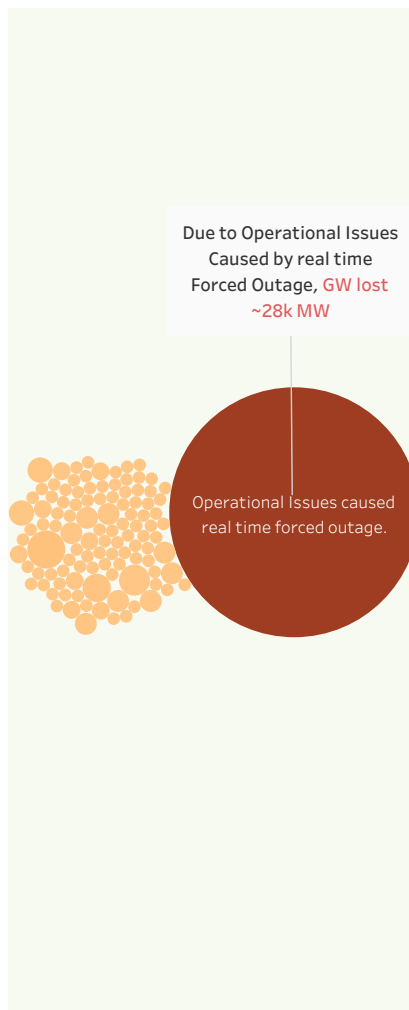
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Auricon's Reason of Forced Outage

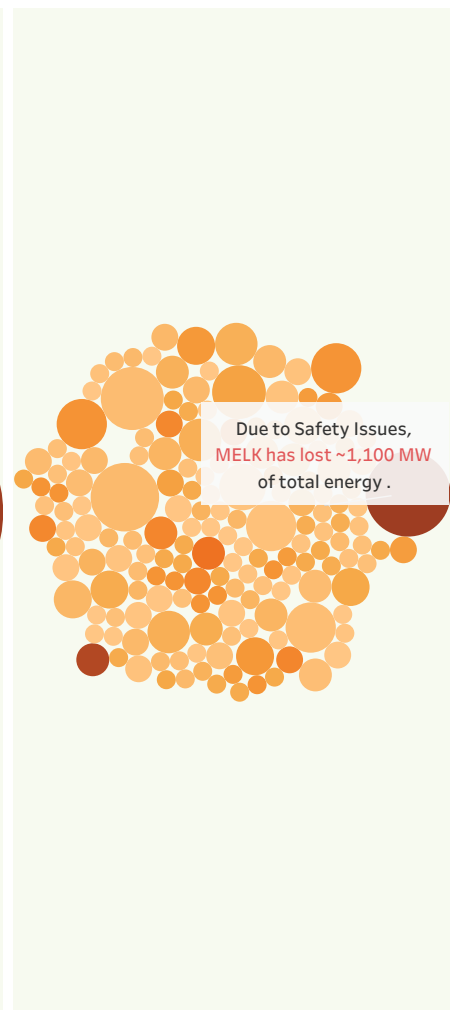


Energy Lost MW
1 6,034

GW's Reason of Forced Outage



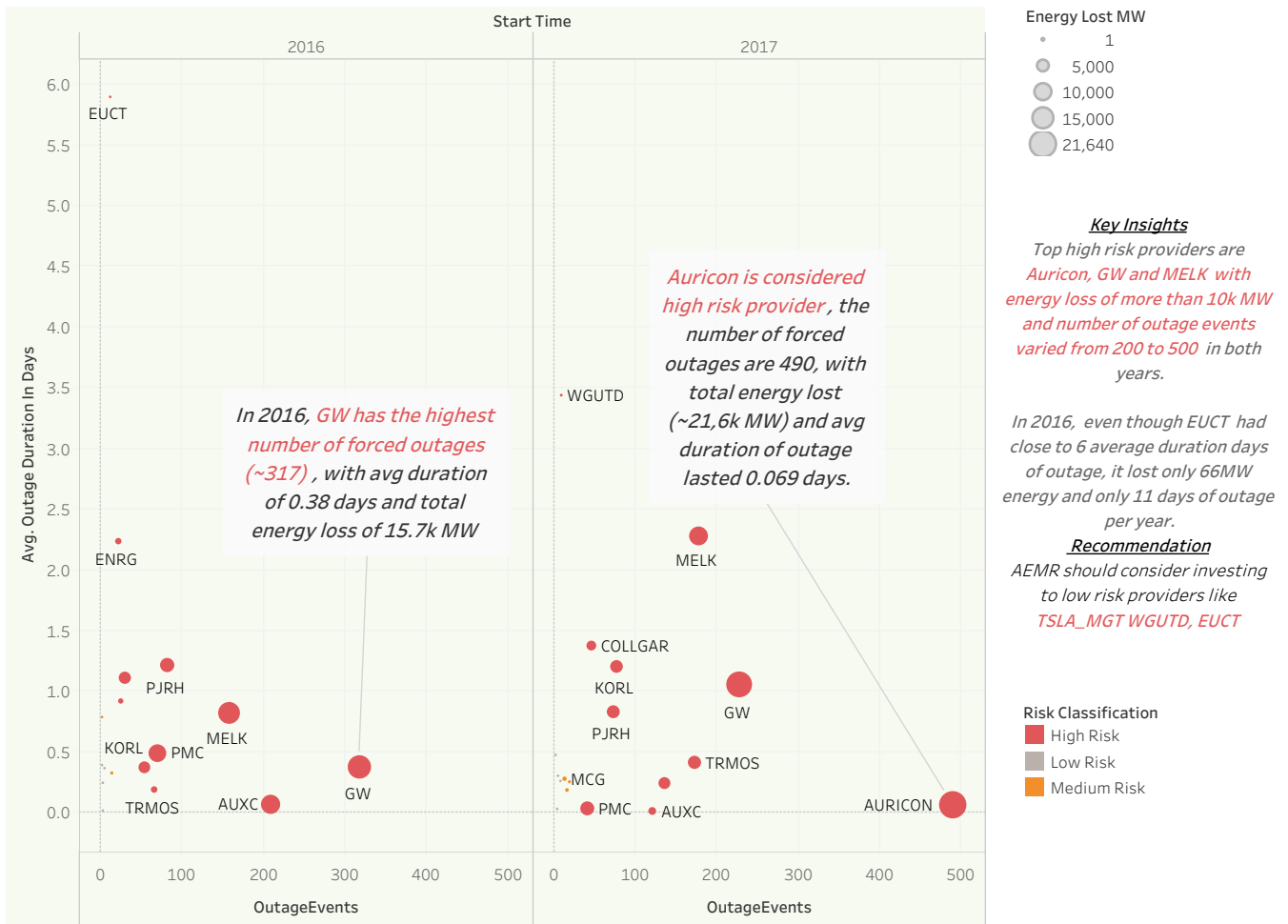
MELK's Reason of Forced Outage



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High Risk Providers based on the number of forced outages and avg duration in days.



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Summary

A) Energy Stability and Market Outages

Forced was the common outage type in AEMR with 60% of total energy loss and number of records in 2016 and 2017.

Looking at the micro view , **Auricon, GW and MELK contributed more than 50% of number of forced outages** .

The reasons of outage for **3 unreliable providers** were **Auricon full unit trip, GW operational issues and MELK safety issues**

B) Energy Losses and Market Reliability

Top high risk providers are **Auricon, GW and MELK** with energy loss of more than 10k MW and number of outage events **varied from 200 to 500 in both years.**

*AEMR should consider investing to low risk providers like **TSLA_MGT WGUTD, EUCT***