CAN'T TAKE THE HEAT?

EXAMINING THE PHILIPPINES' PERENNIAL POWER OUTAGES PROBLEM CAUSED BY FOSSIL FUELS

Can't Take The Heat?
Examining the Philippines' Perennial Power Outages Problem caused by Fossil Fuels

May 2024

Published by: Center for Energy, Ecology, and Development

Authored by: Jovanni Baligad

Reviewed by: Gerry Arances, Avril De Torres, and Brent Ivan Andres

Designed by: Jen Derillo

Photo cutout from: newsinfo.inquirer.net and bilyonaryo.com

This report is available at https://ceedphilippines.com.

TABLE OF CONTENTS

EXECUTIVE SUMMARY AND KEY FINDINGS

Forced Outage as the Primary Reason Behind Yellow/Red Alerts

Plant outages result in a power outage or power interruption when they trigger a yellow or red alert in the transmission grid. A yellow alert is issued when the operating margin is insufficient to meet the transmission grid's contingency requirement. A red alert status is issued when the power supply is insufficient to meet consumer demand and the transmission grid's regulating requirement.

From 2019-2023, the number of incidents of forced outages is significantly greater than maintenance and planned outages, this indicates that forced outages are the primary reason behind yellow and red alert triggers from 2019 to 2023 that mostly lead to power interruptions.

System-Related Issues as Main Culprit Behind Forced Outages

From 2019 to 2023, most power plants experienced outages due to system functionality issues. These outages are attributed to boiler issues, fuel feeder issues, compressor issues, furnace temperature and pressure issues, turbine issues, water leaks, and a host of other issues throughout the power plant's facilities and processes. Conversely, the identification of fuel-related factors, notably restrictions in gas supply, emphasizes the necessity of enhancing energy security through greater reliance on domestic renewable energy sources, rather than increasing dependence on imported fossil fuels.

Fossil Fuels as the Usual Suspects

Unsurprisingly, coal, fossil gas, and oil-based power plants topped the list with the highest incidents of forced outages from 2019 to 2023. Examining recorded outages from 2019 to 2023, it has been observed that fossil fuels are the usual suspects when it comes to forced outages. Units of 1) Sem Calaca Coal Power Plant, 2) San Buenaventura Power Plant, 3) KEPCO Ilijan Gas Power Plant, 4) MPPCL Coal Power Plant, 5.) Sta. Rita Gas Power Plant, 6) SMC Limay Coal Power Plant, 7) Panay Energy Development Corporation Coal Power Plant, and 8) TLI Pagbilao Coal Power Plant have been consistently undergoing forced outages since 2019 with at least 10 incidents of forced outages each.

Unreliability of Relatively New Fossil Fuel Power Plants

Age does not matter in the performance reliability of fossil fuel power plants as relatively new coal power plants that have been operating for less than a decade contribute significantly to the country's energy supply woes. Unit 3 of San Miguel Power Corp's MPPCL Coal Power Plant already went on a 118-day forced outage due to repairs. MPPCL Unit 3 is merely three years old. The same power plant also accounts for 25 of the annual forced outages from 2019-2022. MERALCO's four-year-old San Buenaventura Coal Power Plant did not fare any better. It consistently went on forced outages every year from 2019-2023 and accounts for 26 recorded forced outages.

San Miguel Corporation, Aboitiz Power, First Gen, and Dmci Holdings as Main Drivers of Forced Outage

Amidst 15 to 21 April 2024 outages and WESM price spikes, the separate units of Sta. Rita Gas Power Plant was either on forced outage or injecting supply into the WESM. Moreover, power firms that owned power plants that went on a forced outage, could still potentially profit from the circumstance as the other power plants they own, or are affiliated with, are injecting supply into the WESM during the period. These power firms that may still have profited during the 15 to 21 April 2024 are SMC Global Holdings Power Corp, the power arm of San Miguel Corporation, Aboitiz Power, and First Gen

The usual power firms such as AboitizPower, First Gen, and DMCI Holdings have their own fair share of young power plants that consistently go on forced outages. AboitizPower's four-year-old Therma Visayas Coal Power Plant Units 1 & 2 went on outage every year from 2020-2023 and accounted for a total of 26 forced outages. First Gen's seven-year-old San Gabriel Gas Power Plant went on outage every year from 2010-2021 and accounted for 24 forced outages. It notably went on a 162-day forced outage in 2021 due to tripping. Finally, DMCI Holding's seven-year-old SLPGC Coal Power Plant Units 1 & 2 went also on outage every year from 2019-2021 and accounted for a total of 35 forced outages.

I.INTRODUCTION

Amid the scorching El Niño heat of 16 April 2024, the country was surprised by a series of outages that triggered yellow and red alerts across the Luzon and Visayas grids for over a week. Filipinos are now confronted with the country's rising heat index alongside the thinning power supply due to the series of recent outages. Despite the Department of Energy's (DOE) assurances of a steady supply of electricity during the El Niño season[1], it remains unprepared for the recent barrage of outages and the thinning of power supply. This unfortunately does not come as a surprise considering that recurring outages have been an unresolved perennial problem in the country for years.[2] It has even prompted legislative inquiries and investigations on gaming, collusion, and even economic sabotage in the past.

In previous reports, the Center for Energy, Ecology, and Development (CEED) has analyzed this perennial issue of outages, and has concluded that it is the country's continuous development of unreliable fossil fuel-based power generation–a pathway that the Department is still intent on promoting–coupled with inadequate regulatory penalties that are at the root of this issue.[3]

In recent years, the perennial problem of the country's insufficient power manifested its worst in the first half of 2019 when the number of yellow and red alerts in the Luzon grid far surpassed 2017 and 2018 records.[4] In response, the Energy Committees in the Senate and the House of Representatives

1 Philippine Star, "DOE assures public: 'No power crisis amid El Nino", accessed from: https://www.philstar.com/business/2024/04/11/2346726/doe-assures-public-no-power-crisis-amid-el-nio#:~:text=The%20DOE%20official%20said%20the,a%20low%20supply%20of%20energy.

2 See Center for Energy, Ecology, and Development, "Billed for Annual Power Shortages 10 Solutions to Protect Consumer from the Power Crisis", April 2022; Center for Energy, Ecology, and Development, "Switching on Transformative Energy", pp. 45-51.

3 *Id*.

4 *Id. See also* Viola, H., "Commentary: The real deal behind Philippines' power crisis", Philstar, accessed from: https://www.philstar.com/news-commentary/2019/04/13/1909737/commentary-real-deal-behind-philippines-power-crisis

launched their respective probes to investigate possible collusion between power companies.[5] The issue also prompted the Energy Regulatory Commission (ERC) and the Philippine Competition Commission (PCC) to sign a Memorandum of Agreement (MOA) in 2019 to "foster competition in the energy industry in response to concerns about power outages and corresponding increases in prices of electricity".[6] The MOA outlines the working relationship between the two government agencies in terms of information sharing, coordination and cooperation, and capacity building.

In 2020, the ERC issued new rules on allowable power outages that provide for an ERC-determined benchmark for allowable planned and unplanned outages which is not provided for in the prior outage rules. The ERC said that it issued the said rules "to promote power plant operators' accountability in the event of a power outage."[7] In 2021, already applying the new rules, the ERC reported to the House of Representatives Committee on Energy that 17 generation companies exceeded their allowable outage allowances from January to April of the said year resulting in consecutive yellow and red alerts in the Luzon grid which triggered massive rotating brownouts.[8] Consequently, Malacañang ordered the ERC, alongside the PCC and Department of Justice (DOJ), to aid the DOE in investigating alleged acts of "economic sabotage and other violations of energy policies" committed by the 17 generation companies.[9] In 2022, simultaneous power outages yet again occurred, however this time outside the usual summer season, occurring in the middle of September. This, again, resulted in another ERC probe.[10] In 2023 and January 2024, Iloilo and Panay islands were rocked by power outages resulting in billion-peso losses.[11]

In April 2024, amid the scorching El Niño heat, the country is being hammered by consecutive thinning of power supply as power plants, mainly fossil fuels, went on simultaneous forced outages. Four years since the 2019 outages incident, the same persists, exposing Filipino electricity consumers to economic loss, high prices of electricity, and energy insecurity as the country's dependence on coal and fossil gas continues to grow with no clear end in sight.

This report builds on CEED's previous analyses on the performance of power plant facilities in terms of their scheduled and forced power outage, this time focusing on the last five years from 2019 until the most recent power outages during the strong El Niño season in April 2024. It concludes by reiterating long overdue policy and regulatory recommendations, and offering new solutions based on the evolving policy and legal landscape and climate imperatives.

5 Philstar, Calls mount for investigation, accountability on power crisis", accessed from: https://www.philstar.com/business/2019/04/15/1910044/calls-mount-investigation-accountability-power-crisis

6 Manila Bulletin, "ERC, PCC stepping up 'police power' versus market collusion in power industry Creation of a new task force pushed", accessed from: https://mb.com.ph/2024/2/22/erc-pcc-stepping-up-police-power-versus-market-collusion-in-power-industry

7 Philstar, "ERC issues new rules on plant outages", accessed from: https://www.philstar.com/business/2020/12/20/2064993/erc-issues-new-rules-plant-outages

8 Power Philippines. "ERC demands explanation from gencos for unplanned outages ". Accessed from: https://powerphilippines.com/erc-demands-explanation-from-gencos-for-unplanned-outages/

9 Power Philippines. "Palace orders ERC, DOJ, PCC to help DOE probe gencos". Accessed from: https://powerphilippines.com/palace-orders-erc-doj-pcc-to-help-doe-probe-gencos/

10 Inquirer, "ERC to probe power outages", accessed from: https://newsinfo.inquirer.net/1663686/erc-to-probe-power-outages

11 Inquirer.net, "Iloilo lost P3B during 3-day power outage", accessed from: https://newsinfo.inquirer.net/1888595/iloilo-lost-p3-7b-during-3-day-power-outage

II. OUTAGES AND POWER INTERRUPTIONS

As defined under ERC Resolution No. 10, Series of 2020 or the Rules for the Interim Reliability Performance Indices and Equivalent Outage Days Per Year of Generating Units (2020 Outage Rules), an outage is the state of a unit and/or component when it is not available to perform its intended function due to some event directly associated with that unit and/or component. An outage may or may not cause an interruption of service to customers.[12]

By regulation, an outage has two categories: planned, and unplanned or forced outages. A planned outage, as the name implies, is the state in which a Unit is unavailable due to inspection, testing, preventive maintenance or overhaul. A planned outage is scheduled with a predetermined duration and is coordinated with the system operator. Meanwhile, an unplanned outage is the "state in which a unit is unavailable but is not in the planned outage state. A subtype of unplanned outages are maintenance outages, which occur when there is no immediate need to remove a unit from an in-service state.

Plant outages result in a power outage or power interruption when they trigger a yellow or red alert in the transmission grid. A yellow alert is issued when the operating margin is insufficient to meet the transmission grid's contingency requirement. A red alert status is issued when the power supply is insufficient to meet consumer demand and the transmission grid's regulating requirement.

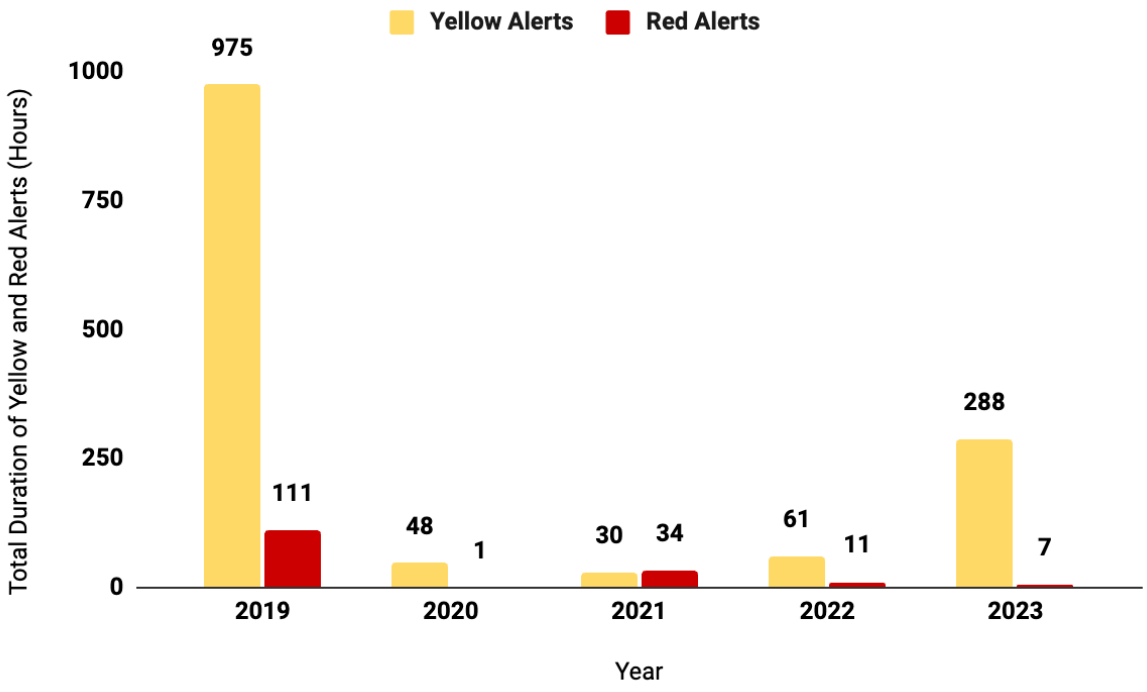
12 ERC Resolution No. 10, Series of 2020 or the "Rules for the Interim Reliability Performance Indices and Equivalent Outage Days Per Year of Generating Units."

In short, under a yellow alert, there is a likely risk of, but manageable, power interruption; while under a red alert, there is a high risk, or even expected, power interruption.[13] Still, an announcement of yellow and red alerts does not directly translate to power interruptions, if properly managed, but they are clear indicators of power supply deficiency at a particular time.

According to data gathered from the ERC, in 2019, yellow alerts were declared 282 times while red alerts were declared 30 times. In 2020, yellow alerts were declared eight times with only a single red alert declaration. In 2021-2023, yellow alerts were declared 47 times while red alerts were declared 12 times.

The data shown in Figure 1 below suggests that in 2019, or before the COVID-19 pandemic hit the Philippines, the duration of yellow and red alerts surpassed 100 hours, even almost reaching 1,000 hours of yellow alert duration. During the height of the pandemic in 2020, it was noticeable that yellow and red alerts drastically sank to less than 50 hours. A possible factor is the drop in electricity demand amid the COVID-19 pandemic. This is due to the reduced output or total stop in the output of the country's businesses, industries, commercial sector, and other major end users apart from the residential sector. According to the latest DOE power statistics, total electricity consumption and system demand abruptly dropped in 2020 after a decade of steady growth.[14] As the country slowly recuperates from the pandemic, the electricity demand steadily rises, parallel to the upward trend of yellow alerts from 2021 to 2023. The duration of red alerts, on the other hand, significantly rose in 2021 but dwindled in 2023.

Figure 1. Yellow and Red Alerts Total Duration, 2019-2023



Source: FOI request to the ERC

Figure 1 shows an upward trend of yellow alerts post-pandemic, with the total yellow alert hours in 2023 being more than quadruple the yellow alert hours from the previous year. This is a concerning development that necessitates further investigation and immediate action.

13 Philippine News Agency, "Longer red alert in Luzon grid on Friday", accessed from: https://www.pna.gov.ph/articles/1222981.

14 Department of Energy, "2022 Annual Power Statistics", accessed from: https://www.doe.gov.ph/sites/default/files/pdf/energy_statistics/2022_power_statistics_01_summary.pdf

III. PRIMARY CAUSES OF OUTAGES

According to a discussion paper on power interruptions in 2015-2021 published by the Philippine Institute for Development Studies (PIDS), the top three causes of long power interruptions are: 1) insufficient power supply, 2) major storm disaster, and 3) scheduled power interruption.[15]

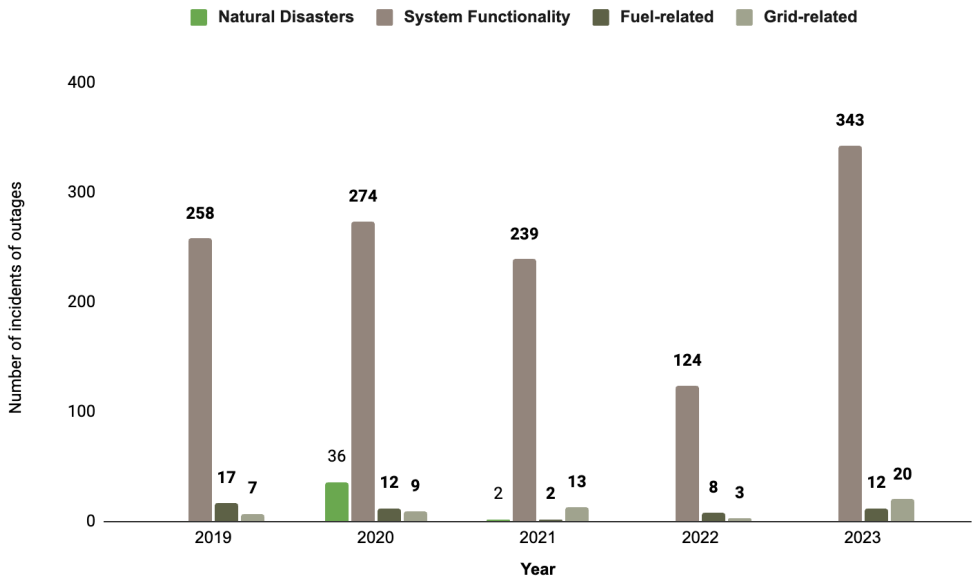
After examining the reported causes of plant outages in the past five years, the often cited causes range between impacts of typhoons, parts malfunctioning, fuel supply issues, and tripping of transmission lines among others. The figure[16] below shows the typical issues confronted by coal, fossil gas, and oil power plants which have resulted in numerous plant outages in recent years.[17] These have been categorized accordingly: 1) natural disaster-related issues, 2) system functionality issues, 3) fuel-related issues, and 4) grid-related issues. Natural disaster-related issues observance of natural disasters like typhoons. System functionality issues on the other hand pertain to occurrence of system-related tests and maintenance, boiler issues, fuel feeder issues, compressor issues, furnace temperature and pressure issues, turbine issues, water leaks, and a host of other issues throughout the power plant's facilities and processes. Fuel-related issues refer to fuel supply restrictions. Lastly, grid-related issues are attributed to transmission lines problems and grid instability.

15 Fransisco, K., "Electricity Supply Interruptions in the Philippines: Characteristics, Trends, Causes", Philippine Institute for Development Studies, December 2022.

16 Data of outages from 2019-2023 gathered from PEMC and compiled by CEED is accessible here: https://www.wesm.ph/market-outcomes/market-watch

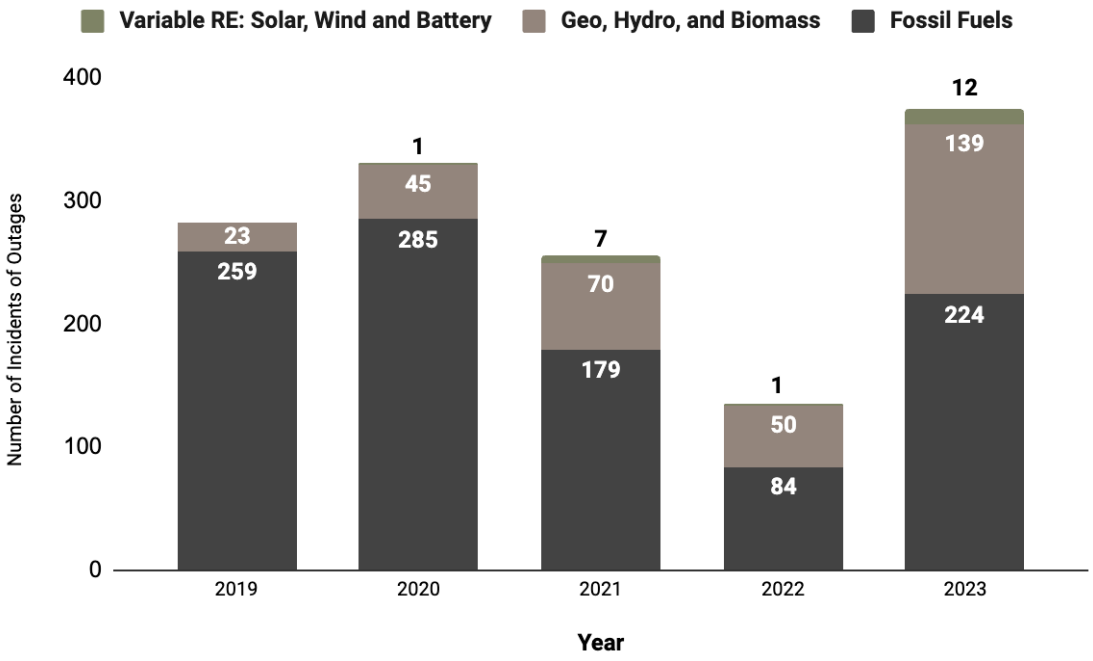
17 Philippine Electricity Market Corporation, "Monthly Market Assessment Highlights", accessed from: https://www.wesm.ph/market-outcomes/market-assessment-reports/monthly-market-assessment-report

Figure 2. Top Causes of Outages from All Power Plants, 2019-2023



Source: PEMC Monthly Market Assessment Highlights

Figure 3. Number of Outages Attributed to Energy Sources



Source: PEMC Monthly Market Assessment Highlights

Findings show that between 2019 to 2023, the majority of power plants that went on outage were afflicted by system functionality issues. The observance of natural disasters like typhoons as a cause of outages shows the vulnerability of these power plants and the country's power supply, considering the Philippines has been experiencing stronger typhoons in recent times.[18] On the other hand, observance of fuel-related causes, particularly gas supply restrictions, highlights the importance of improving our energy security by relying on indigenous renewable energy resources, as opposed to promoting more imported fossil fuels.

18 Sapigao, Harvey L., "More intense typhoons to come this century, UP study warns", University of the Philippines Diliman College of Science, December 2023.

IV. FOSSIL FUELS: THE USUAL SUSPECTS IN FORCED OUTAGES

"Reliability" is defined under ERC Resolution No. 21, Series of 2016 entitled "Revised rules and procedures to govern the monitoring of reliability performance of generating units and transmission system" (2016 Outages Rules) as the "performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply."[19] Thus, a reliable electric system has sufficient supply to cater to customers in the amount desired based on demand and an unreliable electric system is one that has frequent and long supply deficiency that causes power interruptions.

As discussed earlier, supply deficiency in the grid can have different causes: it can be caused by tripping of transmission, preventive maintenance of power plants leading to a planned outage or forced outage, which usually develops into a power interruption that is sudden and has the worst consequences in power supply.

As shown in Table 1 below, the number of incidents of forced outages is significantly greater than maintenance and planned outages. The data suggests that forced outages are the primary reason behind yellow and red alert triggers from 2019 to 2023 that mostly lead to power interruptions.

19 ERC Resolution No. 21, Series of 2016, "Revised rules and procedures to govern the monitoring of reliability performance of generating units and transmission system".

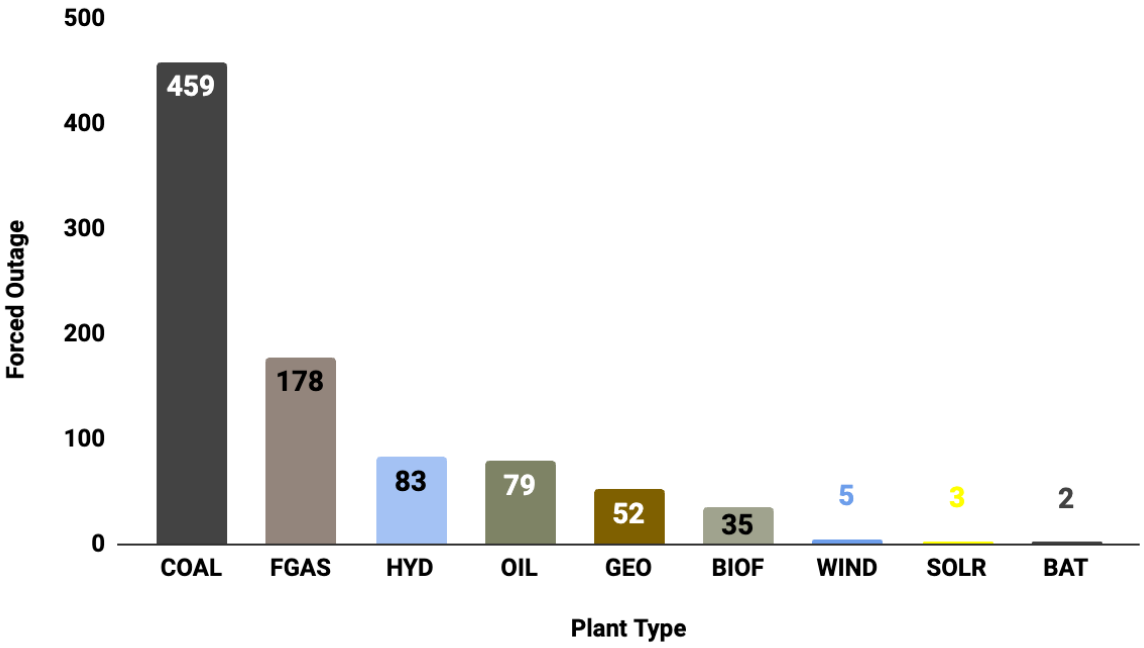
Table 1. Number of Power Plant Outages Incidents by Type, 2019-2023[20]

Type of Outage	2019	2020	2021	2022	2023
Forced Outage*	187	273	175	73	188
Maintenance Outage	31	27	49	13	75
Planned Outage	64	31	38	49	112

In its special report in 2022, the Independent Electricity Market Operator (IEMOP) identified three reasons behind the country's issue with electricity supply reliability and security: 1) impending depletion of the Malampaya gas field, which refers to increasing incidents of de-rations; 2) issues on transmission and infrastructure; and 3) aging power plants, emphasizing that 55.6% of the current installed capacity in the country was built in 2003 or earlier.[21]

How do fossil fuel power plants perform in terms of incidents of forced outages? Unsurprisingly, coal, fossil gas, and oil-based power plants topped the list with the highest incidents of forced outages from 2019 to 2023 as shown in Figure 4 below.

Figure 4. Number of Incidents of Forced Outages From 2019 to 2023, by Power Plant Type



Source: PEMC Monthly Market Assessment Highlights

As shown in Figure 4, for the past 5 years, 51.23% of incidents of forced outages were attributed to coal power plants, and 19.87% and 9.26% were attributed to fossil gas and hydro energy, respectively. During 2019-2023, forced outages concerning Hydroelectric power plants (HEPP) were recorded only in Luzon and Visayas, with Luzon having 93.9% of recorded HEPP outages. Plenty of HEPP outages recorded in Luzon are attributable to impounding HEPPs which are multifunctional, designed not only for power generation but also for purposes like irrigation and water supply, contributing to the intricate balance of their operational roles.[22]

20 Data of outages from 2019-2023 gathered from PEMC and compiled by CEED is accessible here: https://www.wesm.ph/market-outcomes/market-watch

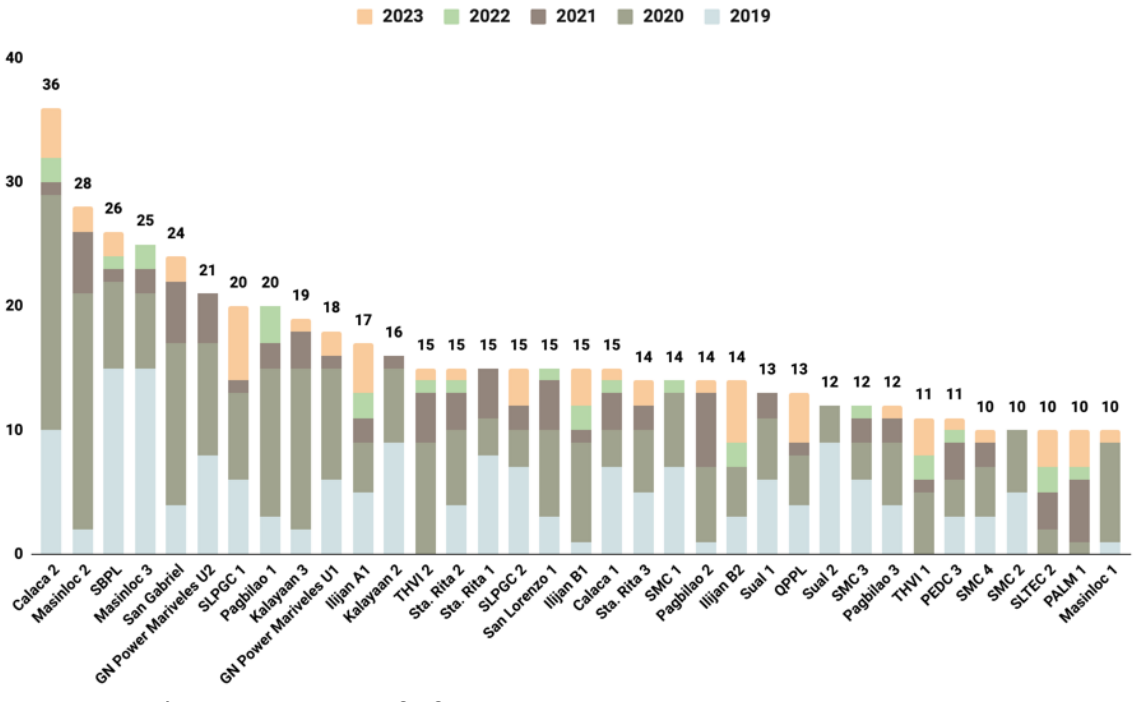
21 *Ibid,* at pages 8-9.

22 Independent Electricity Market Operator Philipppines, "Philippine Electric Power Industry Assessment 2023", p. 21.

According to a policy brief about annual power shortages published by CEED,[23] incidents of forced outages and de-rating are not isolated to only aging power plants - relatively new power plants such as units of GN Power Mariveles Coal Power Plant, SLTEC Coal Power Plant, and SLPGC Coal Power Plant have been attributed with a consistent share of forced outages as well from the period of 2016 to March 2022.[24]

Based on the data from Figure 5 below, units of 1) Sem Calaca Coal Power Plant, 2) San Buenaventura Power Plant, 3) KEPCO Ilijan Gas Power Plant, 4) MPPCL Coal Power Plant, 5.) Sta. Rita Gas Power Plant, 6) SMC Limay Coal Power Plant, 7) Panay Energy Development Corporation Coal Power Plant, and 8) TLI Pagbilao Coal Power Plant have been consistently undergoing forced outages since 2019 with at least 10 incidents of forced outages each. It is noteworthy that the units of SMC Limay Coal Power Plant and Panay Energy Development Corporation Coal Power Plant were relatively new, having been in commercial operations between 2016-2019.

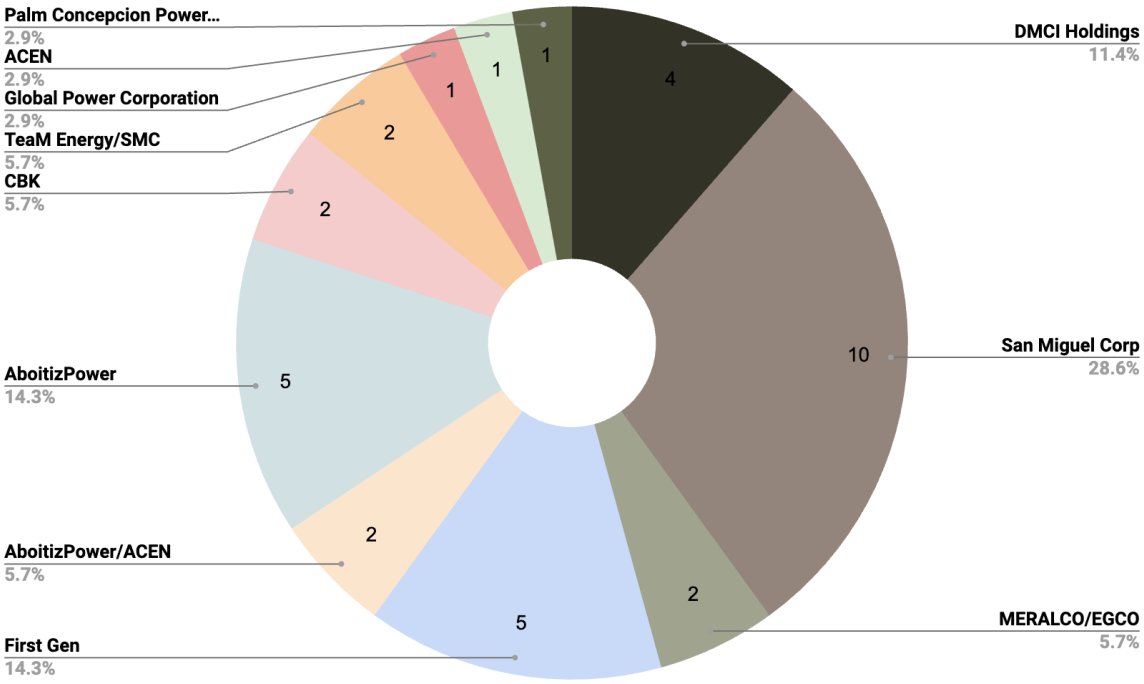
Figure 5. Power Plant Units With at Least 10 Incidents of Forced Outages from 2019-2023



23 Center for Energy, Ecology, and Development, "Billed for Annual Power Shortages 10 Solutions to Protect Consumer from the Power Crisis", April 2022.

24 *Id.*

Figure 6. Power Plant Units with 10 or more outage incidents, By Parent Holding Company



Source: PEMC Monthly Market Assessment Highlights

Figure 5 suggests that fossil fuels are the usual suspects when it comes to forced outages, particularly those eight power plants mentioned above that frequently went on forced outages in the past five years. From 2019 to 2023, eight power plants have gone on forced outage for an average duration of 12.44 days with an average of 275.96 MW unavailable capacity.

In June 2021, during the House Committee on Energy hearing, the ERC submitted a report identifying power plant units that caused consecutive red alerts in May 2021 that triggered rotational brownouts in Metro Manila and other parts of Luzon. In its report, the ERC identified AboitizPower, San Miguel Corporation, TeaM Energy, and DMCI Holdings as major power firms that were behind the thinning supply. The mentioned firms were also among the 17 companies that were probed by the Government for possible collusion and market abuse.[25] Figure 6 suggests that these same power generation firms operate power plant units that consistently went on numerous forced outages from 2019-2023.[26]

Furthermore, Sem-Calaca Coal Power Plant and TLI Coal Power Plant are also among the power plants involved in annual outages from 2016-2022 along with Sual Coal Power Plant and GNPower Mariveles which are operated by the same power firms mentioned above.[27]

Among the 8 power plants mentioned above, units of KEPCO Ilijan Gas Power Plant and MPPCL Coal Power Plant, both owned by San Miguel Corporation and SLPGC Power Plant and Sem Calaca Coal Power Plant, both owned by DMCI Holdings, went on forced outages that lasted beyond 100 days.[28] Moreover, it is also noteworthy that emergency repairs of aging power plants such as Sem Calaca Coal Power Plant,[29] the oldest coal power plant in the country, took more than a hundred days to be repaired. Aging power plants are considered to have substantial forced outage incidents as provided in Figure 5. What is even more concerning is that it takes a hundred days to repair a relatively new coal

25 GMA News Online, "ERC computing penalties vs. gencos probed in May 31-June 3 power outages", accessed from: https://www.gmanetwork.com/news/money/companies/801859/erc-computing-penalties-vs-gencos-probed-in-may-31-june-3-power-outages/story/.

26 See power firms who own power units that went on forced outage 10 times or more during 2019-2023 period in Annex A

27 CEED, "Switching on Transformative Energy", pp. 45-51.

28 *See* Annex B.

29 Commissioned/started commercial operation in September 1984.

power plant such as the Panay Energy Development Corporation Coal Power Plant, which just started its commercial operations in 2016.

Clearly, in the country's experience, age does not matter in the performance reliability of fossil fuel power plants as relatively new coal power plants that have been operating for less than a decade contribute significantly to the country's energy supply woes. Unit 3 of San Miguel Power Corp's MPPCL Coal Power Plant already went on a 118-day forced outage due to repairs[30]. MPPCL Unit 3 is merely three years old. Not only that, but the same power plant also accounts for 25 of the annual Forced outages from 2019-2022.[31] On the other hand, MERALCO's four-year-old San Buenaventura Coal Power Plant is not any better. It consistently went on forced outages every year from 2019-2023 and accounts for 26 recorded forced outages[32].

Table 2. 10-year-old and below Power Plant Units With at Least 10 Incidents of Forced Outages from 2019-2023

Plant/ Unit Name	Plant Type	Grand Total	Parent Company	Plant Age
SBPL	COAL	26	MERALCO/EGCO	4
Masinloc 3	COAL	25	San Miguel Corp	4
San Gabriel	FGAS	24	First Gen	7
GN Power Mariveles U2	COAL	21	AboitizPower/ACEN	10
SLPGC 1	COAL	20	DMCI Holdings	8
GN Power Mariveles U1	COAL	18	AboitizPower/ACEN	10
THVI 2	COAL	15	AboitizPower	6
SLPGC 2	COAL	15	DMCI Holdings	8
SMC 1	COAL	14	San Miguel Corp	7
SMC 3	COAL	12	San Miguel Corp	6
Pagbilao 3	COAL	12	AboitizPower	6
THVI 1	COAL	11	AboitizPower	4
PEDC 3	COAL	11	Global Power Corporation	7
SMC 4	COAL	10	San Miguel Corp	5
SMC 2	COAL	10	San Miguel Corp	6
SLTEC 2	COAL	10	ACEN	7
PALM 1	COAL	10	Palm Concepcion Power Corp	7

Source: PEMC Monthly Market Assessment Highlights

The usual power firms such as AboitizPower, First Gen, and DMCI Holdings have their own fair share of young power plants that consistently go on forced outages. AboitizPower's four-year-old Therma Visayas Coal Power Plant Units 1 & 2 went on outage every year from 2020-2023 and accounted for a total of 26 forced outages. First Gen's seven-year-old San Gabriel Gas Power Plant went on outage every year from 2010-2021 and accounted for 24 forced outages. It notably went on a 162-day forced outage in 2021 due to tripping[33]. Finally, DMCI Holding's seven-year-old SLPGC Coal Power Plant Units 1 & 2 went also on outage every year from 2019-2021 and accounted for a total of 35 forced outages.[34]

30 *see* Annex B.

31 *see* Figure 5.

32 *see* Figure 5.

33 *see* Annex B.

34 *see* Figure 5.

V. THE APRIL 2024 SERIES OF OUTAGES

In the middle of extreme El Niño in April 2024, Luzon, Visayas, and Mindanao were rocked by simultaneous forced outages that triggered yellow and red alerts and subsequently caused power interruptions across the country. According to the ERC, in Luzon, the first wave of forced outages began prior to 16 April 2024 when 27 units were already on planned and unplanned outages. Out of 27 units, 23 units were on forced outage. On 16 April 2024, 13 additional units went on forced outage, leaving a total of 3.2 GW of unavailable capacity in the grid. In Visayas, prior to 16 April 2024, 12 units were already on forced outage. On 16 April 2024, an additional 11 units went on forced outage, leaving a total of 890 MW of unavailable capacity in the grid.[35]

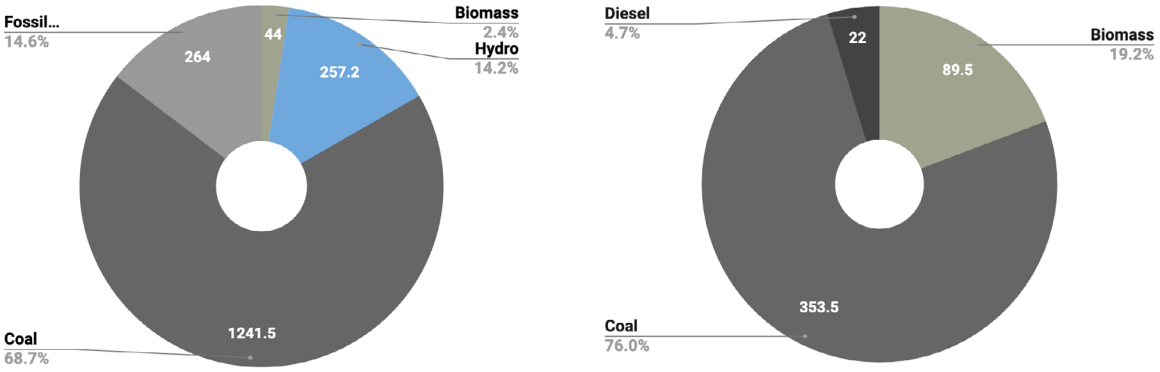
35 Energy Regulatory Commision, "ERC STATEMENT ON THE RED, YELLOW ALERTS IN LUZON, VISAYAS GRIDS", accessed from: https://www.erc.gov.ph/Press-Singular/83665

Table 3. Units That Went on Forced Outages/de-ration on 16 April 2024

Island	Units on Forced Outage/ De-rated	Capacity (MW)	Fuel type
Luzon	BT2020	38	Biomass
Luzon	Irisan	3.8	Hydro
Luzon	NMH		
Luzon	Bineng	19.8	Hydro
Luzon	VSGPC	6	Biomass
Luzon	NIA 6MW	6	Hydro
Luzon	Bakun 1	37	Hydro
Luzon	MASINLOC U1	344	Coal
Luzon	SLPGC U2	133.5	Coal
Luzon	Maris 1	4.3	Hydro
Luzon	Maris 2	4.3	Hydro
Luzon	Bakun 2	37	Hydro
Luzon	Ambuklao 1	37.5	Hydro
Luzon	Ambuklao 2	37.5	Hydro
Luzon	Binga 1	35	Hydro
Luzon	Binga 4	35	Hydro
Luzon	Sta. Rita 40	265	Fossil Gas
Luzon	Pagbilao U2	382	Coal
Luzon	Pagbilao U1	382	Coal
Luzon	SLTEC U1	No information on derated capacity	Coal
Luzon	SLTEC U2	No information on derated capacity	Coal
Luzon	Ilijan Block A	No information on derated capacity	Fossil Gas
Visayas	San Carlos	18	Biomass
Visayas	HPC	17.7	Biomass
Visayas	Victorias Milling Plant	20	Biomass
Visayas	PCPC	121.5	Coal
Visayas	Power Barge 101 Unit 2	6	Diesel
Visayas	Power Barge 101 Unit 3	6	Diesel
Visayas	South Negros BioPower Plant	22.4	Biomass
Visayas	TVI U2	169	Coal
Visayas	First Farmers Holding Corp Plant	11.4	Biomass
Visayas	Panay Diesel Power Plant U3	50	Diesel
Visayas	Cebu Energy Development Corp U3	82	Coal
Visayas	Leyte A geothermal	No information on derated capacity	Geo
Visayas	Palinpinon geothermal	No information on derated capacity	Geo
Visayas	CEDC U3	No information on derated capacity	Coal
Visayas	Tongonan Geothermal	No information on derated capacity	Geo
Visayas	Panay Diesel	No information on derated capacity	Diesel

Source: ERC, news reports

Figure 7. Energy sources that went on a forced outage on 16 April 2024, by Capacity (MW)



Luzon Grid **Visayas Grid**

Due to the El Niño heat, hydroelectric power plants in Luzon are expected to go on at least 70% deration;[36] due to the extreme case of El Niño that scorched the middle of April, several hydroelectric power plants in Luzon have gone on forced outage. However, fossil fuel power plants such as units of MPPCL Coal Power Plant, SLPGC Coal Power Plant, TLI Pagbilao Coal Power Plant, KEPCO Ilijan Gas Power Plant, and Sta. Rita Gas Power Plant was again included in power plants under forced outage. As explained above, unlike fossil fuel power plants, hydroelectric power plants are designed for power generation and purposes like irrigation and water supply, contributing to the intricate balance of their operational role. Fossil fuel power plants, however, are designed to operate purely for power generation and are given ample time for maintenance and planned outages as the ERC provides.

After the forced outages on 16 April 2024, several power interruptions were recorded almost every day as power reserves in the grid were not able to cater to the surging demand due to the simultaneous outages of power plants. The electricity reserves were so low that on 25 April 2024, for the first time, all three of the country's major grids, Luzon, Visayas, and Mindanao, were subjected to yellow and red alerts.[37]

After the 16 April series of forced outages, MERALCO, the country's largest distribution utility, announced almost 12 emergency localized power interruptions in several of its captive markets in Luzon mainly due to emergency line trouble that may be associated with the thinning supply of electricity in the grid and the surge of electricity demand.

Moreover, in an Order dated 30 April 2024, the ERC ordered to suspend the operations of the Wholesale Electricity Spot Market (WESM) during red alerts and implement an "administered price" to control electricity retail prices in the WESM during outages.[38] When a power plant goes on outage, distribution utilities purchase electricity from the WESM which usually offers higher prices as dictated by commercial and market forces.[39] Hence, the ERC made a welcome move to assert its regulatory powers to shield electricity consumers from exposure to the high prices of WESM.

Interestingly, information from the Weekly Market Watch Report of the Philippine Electricity Market Corporation (PEMC) for 15 to 21 April 2024 suggests that despite being subject to a forced outage, Sta. Rita Gas Power Plant continued to contribute to injecting supply into the WESM, thereby profiting at most likely a higher price since power supplies were thin during the 15 to 21 April 2024 outage period.

36 ICSC, "Philippine Power Outlook: Reviewing the Adequacy of Power Supply for April to June 2024", April 2024, p.8

37 Businessworld Online, "Philippines' main grids placed under red and yellow alerts", accessed from: https://www.bworldonline.com/editors-picks/2024/04/25/590702/philippines-main-grids-placed-under-red-yellow-alerts/

38 ERC Case No. 2024-017 MC.

39 Power Philippines, "IEMOP: Market prices surge due to power outages", accessed from: https://powerphilippines.com/iemop-market-prices-surge-due-to-power-outages/

Table 4. Companies Behind the 15 to 21 April 2024 Outages and WESM Price Spikes

Parent Holding Company	Unit under repeated forced outage and/or de-rating	Unit contributing to WESM supply
SMC Global Power Holdings Corp.	MPPCL Coal Power Plant Unit 1	
	KEPCO Ilijan Gas Power Plant Block A	
		Sual Coal Power Plant
Aboitiz Power	TLI Pagbilao Coal Power Plant Units 1 and 2	
	TVI Coal Power Plant Unit 1	
		GN Power Dinginin Coal Power Plant
		GN Power Mariveles Coal Power Plant
First Gen	Sta. Rita Gas Power Plant 40	Sta. Rita Gas Power Plant
		San Lorenzo Gas Power Plant

Source: PEMC Weekly Market Watch report

Table 4 shows that separate units of Sta. Rita Gas Power Plant was either on forced outage or injecting supply into the WESM. While there were power plant units that went on a forced outage and were not injecting supply in the WESM, they are still owned by a single power firm that may ultimately profit in any circumstances. These power firms that may still have profited during the 15 to 21 April 2024 are SMC Global Holdings Power Corp, the power arm of San Miguel Corporation, Aboitiz Power, and First Gen.

As discussed in CEED's 2022 policy brief, due to the high concentration of ownership and operation over power plants by big power holdings, the energy industry is vulnerable to pricing play or market collusion as a power plant can go on repeated outages and/or de-rating, causing the thinning of power supply and increasing the retail prices of electricity, while their affiliated power generation companies supply electricity in the WESM in an inflated price during the thin power supply period.[40]

Moreover, in the said policy brief, CEED identified almost the same power firms such as AboitizPower, First Gen, and San Miguel Corporation that own power plant units that went on outage and/or de-rating in the entire year of 2021 but at the same time supplies energy into the WESM, as shown in Table 5.[41]

40 Center for Energy, Ecology, and Development, "Billed for Annual Power Shortages 10 Solutions to Protect Consumer from the Power Crisis", April 2022, p.7.

41 *Id,* p.8.

Table 5. Parent Holding Companies behind the 2021 Yellow and Red Alerts and WESM Price Spikes

Parent Holding Company	Facility going on repeated outages and/or de-rating causing yellow and/ or red alerts	Facilities contributing to the effective supply of WESM during yellow and/or red alerts	Yellow and/ or Red Alert Period
First Gen	Sta. Rita Gas Power Plant	Sta. Rita Gas Power Plant	May 3-9
AboitizPower	TLI Pagbilao Coal Power Plant	TLI Pagbilao Coal Power Plant	May 3-9
San Miguel Corporation/TeaM Energy	Sual Coal Power Plant	Sual Coal Power Plant	May 31-Jun 6
AboitizPower/ACEN	GNPower Mariveles Coal Power Plant		Oct 18-24
AboitizPower		TLI Pagbilao Coal Power Plant	
ACEN	SLTEC Coal Power Plant		
San Miguel Corporation	Kepco Ilijan Gas Power Plant	• KEPCO Ilijan Gas Power Plant • SMC Limay Coal Power Plant • MPPCL Coal Power Plant	May 21-Jun 6
	Kepco Ilijan Gas Power Plant	• KEPCO Ilijan Gas Power Plant • SMC Limay Coal Power Plant • MPPCL Coal Power Plant	July 12-18
	SMC Limay Coal Power Plant	• KEPCO Ilijan Gas Power Plant • SMC Limay Coal Power Plant • MPPCL Coal Power Plant	Oct 18-24

Source: PEMC Weekly Market Watch report

Information from Tables 4 and 5 suggests that Aboitiz Power, San Miguel Global Power Holdings, and First Gen still profit amid the shutdown of some of their power plants as they have affiliate power plants that can supply to the WESM. This potential collusion has been pending investigation in both the legislative and executive bodies since 2019. However, after five years, there are still no updates or any news related to the progress of such an investigation. The most recent mention of market collusion related to outages was Energy Secretary Raphael Lotilla's assurance to the public that power plants are under the watchful eyes of the DOE for any collusion through the Department's "AI" and "data analytics technology."[42]

According to the ERC, it has imposed approximately PhP 60 million in penalties against generation companies for violations of the per reliability index.[43] However, the lack of appropriate penalties for generation companies that have exceeded the allowable outages is glaring considering the costs that electricity consumers shoulder due to unplanned outages. A Senate Committee on Energy investigation on the red alert last 31 May - 3 June 2021 revealed that the cost of then outages to Meralco residential customers alone amounted to more than Php 116 million.[44]

42 Daily Tribune, "No room for collusion: DOE allays fear oer power rate spike", accessed from: https://tribune.net.ph/2024/04/19/no-room-for-collusion-doe-allays-fear-over-power-rate-spike

43 Business World, "Power generators asked to explain high level of unscheduled outages", 24 January 2024, accessed from: https://www.bworldonline.com/economy/2024/01/24/571100/power-generators-asked-to-explain-high-level-of-unscheduled-outages

44 Senate Committee on Energy Hearing on 10 June 2021

VI. PIPPA'S ATTEMPT TO SUSPEND PROTECTIVE RULES

An outage can lead to two things: 1) power interruptions or 2) electricity price spike due to distribution utilities' purchase of replacement electricity in the spot market. To regulate such instances, the ERC imposed rules for both issues to control and mitigate their effects. As mentioned above, the ERC regulates outages through the 2020 Outage Rules. Electricity spike caused by an outage, on the other hand, is regulated through a price mitigating mechanism called Secondary Price Cap (SPC) which is governed by the 2021 SPC rules[45] as supplemented by the 2014 SPC Rules[46].

The SPC is a price mitigation measure in the WESM to shield consumers from the sustained skyrocketing prices of electricity. The measure sets a threshold electricity price called the Cumulative Price Threshold (CPT), which, if breached over a sustained, predetermined period, triggers the SPC. The market clearing price for the immediate trading interval following the breach will be set at the price of the cap and stay there until the Generator Weighted Average Price (GWAP) rolling average falls below the CPT. However, should there be intervals where the market clearing price is lower than the price cap while the cap is in effect, the lower market clearing price will be applied for settlement purposes.[47]

Amid these positive regulations, in 2023, the Philippine Independent Power Producers Association Inc. (PIPPA) audaciously filed rule-making petitions before the ERC to scrap all these rules altogether as they claim that such regulations discourage power plant investments in the country.[48]

45 ERC Resolution No.7, series of 2021.

46 ERC Resolution No. 20, series of 2014.

47 Center for Energy, Ecology, and Development, "Billed for Annual Power Shortages 10 Solutions to Protect Consumer from the Power Crisis", April 2022, pp.10-11.

48 ERC Case Nos. 2023-008 RM and 2023-001 RM.

In lieu of suspension, PIPPA proposed that the 2020 Outage Rules should merely be recommendatory as the said rule failed to take into account the "specific inherent characteristics of power plant technologies"[49]and the " economic realities faced by the generation sector."[50]

Under current ERC interim rules, pulverized coal plants are allowed for combined planned and unplanned outage-days of 44.7; circulating fluidized bed (CFB) coal, 32.3 days; combined cycle gas plants, 20.2 days; gas turbine, 29.2 days; diesel, 19 days; geothermal, 19.7 days; hydro, 29.9 days; oil-fired thermal, 58.6 days; and biomass plants, 39.7 days.

However, PIPPA's proposal to the ERC is to make changes only for forced outages or maintenance outages to 95.9 days for pulverized coal, 61.5 days for CFB coal, 47.93 days for fossil gas, 72.6 days for diesel, 138.8 days for geothermal, 29.3 days for hydroelectric power plants and 33.1 days for pump hydro projects.

On the other hand, instead of suspension, PIPPA proposed that the SPC values be adjusted to a higher cap from the current PhP 6.245/kWh to as high as PhP 10-15 kWh to be in tune with the "needs of investors for prudent costs recoveries."[51]

PIPPA is composed of 28 power firm members which operate an aggregated 13,549.40 MW of energy.[52] It is noteworthy that the top power firms such as San Miguel Corporation, AboitizPower, DMCI Holdings, and First Gen, among others, are members of the said group.

49 Macapagal, J.,"PIPPA seeks amendments to plant outage rule", Malaya, accessed from: https://malaya.com.ph/news_business/pippa-seeks-amendments-to-plant-outage-rule/.

50 Flores, A.,"PIPPA asks ERC to suspend generator's reliability and outage rules", Manilastandard, accessed from: https://manilastandard.net/?p=314315849.

51 Velasco, M.,"Gencos seek scrapping of WESM secondary price cap", Manila Bulletin, accessed from: https://mb.com.ph/2024/3/3/gen-cos-seek-scrapping-of-wesm-secondary-price-cap#google_vignette.

52 Philippine Independent Power Producers Association, "About Us", accessed from: https://beta.pippaonline.org/.

VII. CONCLUSION AND RECOMMENDATIONS

Due to the country's heavy reliance on large-capacity fossil fuels, the forced Outage of just two or three coal or fossil gas-fired power plants can adversely affect the grid. Without prioritizing readily available, cheap, and reliable energy, the Philippines is certain to follow the same pattern every year since the country remains dependent on unreliable and intermittent fossil fuel power plants that have a track record of going on unexpected and prolonged forced outages. Unfortunately, even though regulatory measures are in place to manage planned and sanctioned outages and promote efficiency, reliability, and maintenance of power plants, these have not compelled generation companies to maintain their facilities up-to-standards, especially during peak season and critical periods like during an El Niño.

Absent an urgent and just transition away from fossil fuels and the imposition of even more stringent, the players behind these eight power plants, namely: 1) Sem Calaca Coal Power Plant, 2) San Buenaventura Power Plant, 3) KEPCO Ilijan Gas Power Plant, 4) MPPCL Coal Power Plant, 5) Sta. Rita Gas Power Plant, 6) SMC Limay Coal Power Plant, 7) Panay Energy Development Corporation Coal Power Plant, and 8) TLI Pagbilao Coal Power Plant, would continue to go on annual outages at the consumers' expense.

This report echoes recommendations from previous CEED reports on how to adequately solve the looming power crisis, which remains relevant today.[53]

53 *Id,* pp.10-12.

Emergency solutions

Impose more stringent price cap regulations, to safeguard consumers from abusive and anti-competitive behaviors. Price caps seek to protect consumers exactly from these extreme and sustained increases of electricity prices in the WESM. Under these extraordinary circumstances, the ERC should instead consider shortening the rolling period even further from 72 hours to 24 hours, and examine the possibility of lowering the price cap further. The matter being imbued with public interest, the protection of consumers should be prioritized over business interests.

Sanction generation companies that breached the maximum allowable outages with higher fines and penalties, including parent power holding companies and affiliate companies that have been proven to engage in economic sabotage or pricing play. The fines and penalties currently imposed by the ERC thus far cannot serve their intent to deter future protracted forced outages if these are dwarfed by the profit that the parent holding companies are earning from WESM transactions through their other subsidiary generation companies.The need to amend the penalty framework is recognized by ERC Chairperson Monalisa Dimalanta who calls for the amendment of the EPIRA to allow the application of penalties imposed on erring power firms as refunds to consumers inconvenienced by the power outages.[54] Increasing sanctions will force erring companies to maintain their power plants in good condition, train and hire local experts that can quickly respond to unplanned outages, and immediately have their plants up and running in just a matter of days. It is imperative to conclude the investigation on the alleged economic sabotage or pricing play from the red alert investigated in 2021 and impose the appropriate sanctions to prevent a repeat moving forward.

Bar and/or penalize preventive maintenance during peak season. During peak seasons such as the dry season and rainy season, the availability of power should be the top priority; indeed, preventive maintenance is crucial for the operation of power plants, however, should there be any major maintenance, it should be done during neutral season where supply far outweighs the peak demand. As experienced during the outages in the middle of April 2024, such a situation proved that simultaneously planned outages due to preventive maintenance yield negative effects on the grid as forced outages are also frequent during peak season.

Hasten implementation of energy efficiency and conservation programs and other demand-side management programs to reduce overall demand and shave off peaking demand. Through massive and effective implementation of energy efficiency and conservation and demand-side management programs, we can immediately reduce overall demand while still performing the productive tasks. These programs can also help change electricity consumption behaviors and shave off peaking demand as needed.

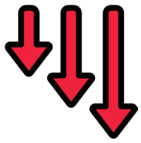
Medium-term solutions

Publish all Performance Audits and the corresponding Final Recommendations, and sanction DOE and ERC for being remiss in curbing the annual power outages. Pursuant to DOE DC 2017-12-0016, performance assessments and audits of all power generation, transmission, and distribution systems and facilities should be conducted annually. These assessments and audits as well as the corresponding final recommendations of the DOE should be published so that all Filipino consumers can be apprised of the findings of the real status of the power plants that have been undergoing repeated and protracted outages and de-rating. This should also inform consumers whether DOE and ERC are diligently performing their mandates to ensure the quality, reliability, security, and affordability of the supply of electricity.

54 Energy Regulatory Commission, "ERC Continues Close Monitoring of Genco's Compliance to Reliability Index", 24 January 2024, accessed from: https://www.erc.gov.ph/Press-Singular/83512

Incentivize the relevant government bodies to expedite the permitting process for renewable energy systems and distributed energy sources that can pick-up the slack from unreliable and obsolete coal plants, and incentivize financial institutions that extend financing to these renewable energy systems. Considering the impact on power rates of requiring 100% firm ancillary service requirement from NGCP or resorting to baseload coal for peaking demand, the true saving grace in this time is renewable energy peaking plants such as solar PV, which is faster and easier to construct and utilizes flexible, dispatchable, and renewable resource. In Vietnam's experience, as much as 9 GW of solar PV potential can be tapped through solar PV rooftop systems in a matter of a few months. The ERC, DOE and other relevant government bodies should prioritize the development of renewable energy by expediting the permitting process.

Long-term solutions



Reduce dependence on imported fossil fuels and prevent fossil gas lock-in. Reducing dependence on imported fossil fuels will not only help the country meet transition and climate goals, it will also protect consumers from expensive and volatile costs of imported fossil fuels. Despite the country's brimming renewable energy potential, the DOE has declared another fossil fuel as the new preferred energy source—fossil gas. Without a clear fossil gas exit strategy, fossil gas may crowd-out renewables through diverted investments and result in a carbon lock-in or continued dependence on imported fossil fuels that delays transition further.

Allow the government to engage in the generation of power in order to provide additional capacity in times of shortages and construct renewable energy plants needed to meet transition targets. By allowing the government to engage in power generation again, it can prioritize the construction of renewable energy plants that can provide needed demand in times of shortage, and can expedite the country's energy transition.

Impose more stringent limits on concentration of ownership, operation, or control of installed generating capacity among private companies to deoligarchize and democratize the generation sector, and prohibit cross-ownership between companies involved in the generation and supply, transmission, and distribution sectors. Considering the allegations of pricing play and economic sabotage, the limits to the concentration of ownership and cross-ownership should be made more stringent. The power industry should not be controlled by only a handful of corporations, whose income continues to soar while consumers are burdened with power shortages and expensive electricity bills.

REFERENCES

Business World, “Power generators asked to explain high level of unscheduled outages", 24 January 2024, accessed from: https://www.bworldonline.com/economy/2024/01/24/571100/power-generators-asked-to-explain-high-level-of-unscheduled-outages

Businessworld Online, “Philippines' main grids placed under red and yellow alerts", accessed from: https://www.bworldonline.com/editors-picks/2024/04/25/590702/philippines-main-grids-placed-under-red-yellow-alerts/

Center for Energy, Ecology, and Development, “Billed for Annual Power Shortages 10 Solutions to Protect Consumer from the Power Crisis", April 2022.

Center for Energy, Ecology, and Development, “Switching on Transformative Energy", 2022.

Creation of a new task force pushed", accessed from: https://mb.com.ph/2024/2/22/erc-pcc-stepping-up-police-power-versus-market-collusion-in-power-industry

Daily Tribune, “No room for collusion: DOE allays fear oer power rate spike", accessed from: https://tribune.net.ph/2024/04/19/no-room-for-collusion-doe-allays-fear-over-power-rate-spike

Department of Energy, “2022 Annual Power Statistics", accessed from: https://www.doe.gov.ph/sites/default/files/pdf/energy_statistics/2022_power_statistics_01_summary.pdf

Energy Regulatory Commision, “ERC STATEMENT ON THE RED, YELLOW ALERTS IN LUZON, VISAYAS GRIDS", accessed from: https://www.erc.gov.ph/Press-Singular/83665.

Energy Regulatory Commission, “ERC Continues Close Monitoring of Genco's Compliance to Reliability Index", 24 January 2024, accessed from: https://www.erc.gov.ph/Press-Singular/83512.

ERC Resolution No. 10, Series of 2020 or the “Rules for the Interim Reliability Performance Indices and Equivalent Outage Days Per Year of Generating Units."

ERC Resolution No. 21, Series of 2016, “Revised rules and procedures to govern the monitoring of reliability performance of generating units and transmission system".

Flores, A.,"PIPPA asks ERC to suspend generator's reliability and outage rules", Manilastandard, accessed from: https://manilastandard.net/?p=314315849.

Fransisco, K., “Electricity Supply Interruptions in the Philippines: Characteristics, Trends, Causes", Philippine Institute for Development Studies, December 2022.

GMA News Online, “ERC computing penalties vs. gencos probed in May 31-June 3 power outages", accessed from: https://www.gmanetwork.com/news/money/companies/801859/erc-computing-penalties-vs-gencos-probed-in-may-31-june-3-power-outages/story/.

ICSC, “Philippine Power Outlook: Reviewing the Adequacy of Power Supply for April to June 2024", April 2024

Independent Electricity Market Operator Philipppines, “Philippine Electric Power Industry Assessment 2023", p. 21.

Inquirer, “ERC to probe power outages", accessed from: https://newsinfo.inquirer.net/1663686/erc-to-probe-power-outages

Inquirer.net, “Iloilo lost P3B during 3-day power outage", accessed from: https://newsinfo.inquirer.net/1888595/iloilo-lost-p3-7b-during-3-day-power-outage

Macapagal, J.,"PIPPA seeks amendments to plant outage rule", Malaya, accessed from: https://malaya.com.ph/news_business/pippa-seeks-amendments-to-plant-outage-rule/.

Manila Bulletin, “ERC, PCC stepping up ‘police power’ versus market collusion in power industry

Philippine Electricity Market Corporation, “Monthly Market Assessment Highlights", accessed from: https://www.wesm.ph/market-outcomes/market-assessment-reports/monthly-market-assessment-report

Philippine Independent Power Producers Association, “About Us", accessed from: https://beta.pippaonline.org/.

Philippine News Agency, "Longer red alert in Luzon grid on Friday", accessed from: https://www.pna.gov.ph/articles/1222981.

Philippine Star, "DOE assures public: 'No power crisis amid El Nino", accessed from: https://www.philstar.com/business/2024/04/11/2346726/doe-assures-public-no-power-crisis-amid-el-nio#:~:text=The%20DOE%20official%20said%20the,a%20low%20supply%20of%20energy.

Philstar, Calls mount for investigation, accountability on power crisis", accessed from: https://www.philstar.com/business/2019/04/15/1910044/calls-mount-investigation-accountability-power-crisis

Philstar, "ERC issues new rules on plant outages", accessed from: https://www.philstar.com/business/2020/12/20/2064993/erc-issues-new-rules-plant-outages

Power Philippines, "IEMOP: Market prices surge due to power outages", accessed from: https://powerphilippines.com/iemop-market-prices-surge-due-to-power-outages/

Power Philippines. "ERC demands explanation from gencos for unplanned outages ". Accessed from: https://powerphilippines.com/erc-demands-explanation-from-gencos-for-unplanned-outages/

Power Philippines. "Palace orders ERC, DOJ, PCC to help DOE probe gencos". Accessed from: https://powerphilippines.com/palace-orders-erc-doj-pcc-to-help-doe-probe-gencos/

Sapigao, Harvey L., "More intense typhoons to come this century, UP study warns", University of the Philippines Diliman College of Science, December 2023.

Velasco, M.,"Gencos seek scrapping of WESM secondary price cap", Manila Bulletin, accessed from: https://mb.com.ph/2024/3/3/gen-cos-seek-scrapping-of-wesm-secondary-price-cap#google_vignette.

Viola, H., "Commentary: The real deal behind Philippines' power crisis", Philstar, accessed from: https://www.philstar.com/news-commentary/2019/04/13/1909737/commentary-real-deal-behind-philippines-power-crisis

ANNEXES

Annex A. Power units that went on Forced Outage 10 times or more from 2019-2023 with their respective parent holding companies

Plant/ Unit Name	Plant Type	Total Incidents of Forced Outage	Parent Company
Calaca 2	COAL	36	DMCI Holdings
Masinloc 2	COAL	28	San Miguel Corp
SBPL	COAL	26	MERALCO/EGCO
Masinloc 3	COAL	25	San Miguel Corp
San Gabriel	FGAS	24	First Gen
GN Power Mariveles U2	COAL	21	AboitizPower/ACEN
SLPGC 1	COAL	20	DMCI Holdings
Pagbilao 1	COAL	20	AboitizPower
Kalayaan 3	HYD	19	CBK
GN Power Mariveles U1	COAL	18	AboitizPower/ACEN
Ilijan A1	FGAS	17	San Miguel Corp
Kalayaan 2	HYD	16	CBK
THVI 2	COAL	15	AboitizPower
Sta. Rita 2	FGAS	15	First Gen
Sta. Rita 1	FGAS	15	First Gen
SLPGC 2	COAL	15	DMCI Holdings
San Lorenzo 1	FGAS	15	First Gen
Ilijan B1	FGAS	15	San Miguel Corp
Calaca 1	COAL	15	DMCI Holdings
Sta. Rita 3	FGAS	14	First Gen
SMC 1	COAL	14	San Miguel Corp
Pagbilao 2	COAL	14	AboitizPower
Ilijan B2	FGAS	14	San Miguel Corp
Sual 1	COAL	13	TeaM Energy/SMC
QPPL	COAL	13	MERALCO/EGCO
Sual 2	COAL	12	TeaM Energy/SMC
SMC 3	COAL	12	San Miguel Corp
Pagbilao 3	COAL	12	AboitizPower
THVI 1	COAL	11	AboitizPower
PEDC 3	COAL	3	Global Power Corporation
SMC 4	COAL	10	San Miguel Corp
SMC 2	COAL	10	San Miguel Corp
SLTEC 2	COAL	10	ACEN
PALM 1	COAL	10	Palm Concepcion Power Corp
Masinloc 1	COAL	10	San Miguel Corp

Annex B. List of Power Plants/Units with Outage Duration of 100 Days or More

Island	Plant Type	Plant/ Unit Name	Years of outage	Average duration of outage (day)	Aggregated duration of outage per unit (day)	Parent Holding Company	Reason for the longest outage duration within 2019-2023 period
LUZON	HYD	Angat Hydro Plant	2021 and 2022	204.685	409.37	Korea Water Resources Corp	Went on 364-day outage in 2021 due to the draw-out of Main Unit 3 generator breaker.
LUZON	COAL	BT2020 2	2021	159.86	159.86		The only recorded outage since 2019, the outage was due to the tripping of a co-generation power plant
LUZON	COAL	Sem-Calaca Coal Power Plant	2019-2023	12.48	624.35	DMCI Holdings	Went on 246-day outage in 2021 due to tripping caused by generator stator ground fault.
VISAYAS	COAL	CEDC power plant	2021-2023	18.59	167.36	MERALCO	Went on 50-day outage in 2022 due to the low air pressure of one of its instrument afffected by the trpping of CEDC unit 1
LUZON	COAL	GN Power Mariveles	2019-2023	3.895	148.01	AboitizPower	Went on 34-day outage in 2019 due to the Loss of power supply of coal feeder
LUZON	FGAS	Kepco Ilijan Power Plant	2019-2023	36.622	2563.54	San Miguel Corp.	All of its units went on a year of outage in 2022 due to the end of the power plant's cooperation period. It went online in 2023 and it is notable that it went on 88 day forced outage due to its tripping caused by the Generator earth fault protection
LUZON	BIOF	IPower Biomass	2023	24.2	121	SJC iPower	Went on 89-day outage in 2023 due to ash system problem.
LUZON	HYD	Kalayaan Hydro	2019-2020-2021-2023	5.16	286.46	CBK Power	Went on 115-day outage in 2023 due to Excessive Oil Leak at Pothead conductors.
LUZON	OIL	Limay CCGT power plant	2021-2023	18.03	360.73	Millenium Energy	Unit 5 went on 319-day outage in 2023 due to Due to fuel system problem.
LUZON	HYD	Magat Hydro	2020-2023	103.43	1,344.68	AboitizPower	All of its units went on almost a year (339 day) of outage beginning December 2021 and January 2022 due Criitical high water level of Maris dam.
VISAYAS	GEO		2022-2023	57.158	258.79	EDC	Went on 150-day outage in 2022 due to tripping and Replacement of Transformer Differential Relay
LUZON	GEO	Makban Geothermal	2021-2023	26.07	260.17	AP Renewables	Went on 100-day outage in 2022 due to tripping
LUZON	OIL	Malaya Diesel Power Plant	2019 and 2023	94.45	373.83	Fort Pilar Energy	Declared unavailable in the entire 2019 due to motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08MAL
VISAYAS	GEO	Malitbog Geothermal	2020-2023	14.6	160.84	EDC	Went on 50-day outage in 2022 due to tripping

LUZON	COAL	MPPCL Coal Power Plant	2019-2023	6.49	402.61	San Miguel Corp.	Unit 3 went on 118-day outage in 2020 to facilitate repair on HP heater and Induced draft fan. On commissioning test
LUZON	OIL	MGTPP Diesel Power Plant	2021	364	364	Millenium Energy	Tripped from 14MW due to turbine bearing shaft vibration. IEMOP deregistration, effective December 25 2021.
LUZON	COAL	TLI Pagbilao Coal Power Plant	2019-2023	2.97	136.87	AboitizPower/ TeaM Energy	Went on 14-day outage in 2019 due to Boiler slagging
VISAYAS	COAL	PCPC Coal Power Plant	2020-2023	11.9	107.16	Palm Concepcion Power Corp.	Went on 69-day outage in 2023 due to a grid disturbance
VISAYAS	COAL	PEDC Coal Power Plant	2019-2023	12.58	259.01	Global Business Power Corp	Went on 101-day outage in 2021 due to autotripping
VISAYAS	BIOF	San Carlos Biomass	2022	54.17	162.51	ThomasLloyd Group	Went on 127-day outage in 2021 due to poor fuel quality
LUZON	FGAS	San Gabriel Gas Power Plant	2019-2023	7.83	187.92	First Gen	Went on 162-day outage in 2021 due to tripping
LUZON	FGAS	San Lorenzo Gas Power Plant	2019-2022	13.8	317.55	First Gen	Unit 1 went on 198-day outage due to tripping
VISAYAS	BIOF	SCBE Biomass Power Plant	2023	54.4	272	San Carlos Biopower	Went on 252-day outage in 2022 due to internal problem
LUZON	COAL	SLPGC Coal Power Plant	2019-2023	43.32	1991.6	DMCI Holdings	Unit 3 went unavailable for 306 days due to detection of turbine lube oil sump metal chips
VISAYAS	WIND	SLWind	2021 and 2022	28.29	113.17	ACEN	Went on 81 day outage in 2021 due to tripping
LUZON	COAL	Mariveles Coal Power Plant	2019-2023	5.98	269.32	San Miguel Corp.	Unit 4 went on 58-day outage in 2020 due to transformer repair
VISAYAS	BIOF	South Negros Biomass Power Plant	2022-2023	48.705	292.23	South Negros Biopower Inc	Went on 190-day outage in 2022 due to unavailabilty of bagasse
LUZON	COAL	Sual Coal Power Plant	2019-2021	11.478	286.95	San Miguel Corp/ TeaM Energy	Unit 2 went on 237-day outage in 2020 due to tripping caused by high turbine vibration
LUZON	GEO	Tiwi Geothermal	2020-2021-2023	42.61	511.42	AP Renewables	Unit 1 went offline for a year (359 day) starting november 2021 due to the diversion of steam supply to unit 2.
VISAYAS	COAL	THVI 2	2020-2023	8.96	224.02	AboitizPower	Unit 2 went on 49-day outage due to tripping caused by induced draft fan vibration
VISAYAS	COAL	TPC Sangi 1	2019-2021-2022-2023	50.295	502.95	Global Business Power Corp	Unit 1 went on 402-day outage due to generator trip
VISAYAS	OIL	TPVI 5	2022-2023	29.55	266	AboitizPower	Unit 2 went on 121-day in 2022 outage due to erratic main bearing no. 7 high temperature indication

CEED
CENTER FOR ENERGY, ECOLOGY,
AND DEVELOPMENT