

National Grid Corporation of the Philippines

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

In compliance with the Department of Energy's (DOE) Department Circular No. DC 2021-10-0031, "Prescribing the Policy for the transparent and efficient procurement of Ancillary Services by the System Operator" or the Competitive Selection process (CSP) Policy of Ancillary Services (AS), the 2024 – 2033 Ancillary Service Agreement Procurement Plan (ASAPP) Report is hereby created, pursuant to the Section 4 of the said Circular.

This ASAPP outlines the acquisition plan of AS requirements by the System Operator (SO) to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the transmission system.

As prescribed under Section 4 of DC 2021-10-0031, the SO shall develop and submit to the DOE its annual ASAPP not later than 31 March of every year that contains the projected AS requirements for the next ten (10) years, including but not limited to the following: Type of AS to be procured per grid; Timing of AS requirement per grid (month and year); Existing ASPAs (providing the location and expiration); Monthly levels of AS requirement per grid to account seasonality; Typical Hourly level for the past five years of the AS requirement per type per grid; and other information that the DOE may require. The ASAPP shall be posted at the SO website within three (3) days from receipt of the review by the DOE but should not be later than 30 April of every year.

TABLE OF CONTENTS

- I. Table of Contents
- II. Introduction
- III. Existing Ancillary Services Procurement Agreement (ASPA)
- IV. Typical hourly level for the past five (5) years of the AS requirement per type per grid
- V. Ten (10) Year Projected AS Requirement for Luzon, Visayas and Mindanao Grids
- VI. Three (3) Year Hourly Projected AS Requirement for Luzon, Visayas and Mindanao Grids
- VII. One (1) Year Projected AS Capacity to Procure under CSP for Luzon, Visayas and Mindanao Grids

Annexes:

- A. One Year Projected AS Capacity to Procure under CSP for Luzon Grid
- B. One Year Projected AS Capacity to Procure under CSP for Visayas Grid
- C. One Year Projected AS Capacity to Procure under CSP for Mindanao Grid
- D. Three Year Projected Hourly Maximum Levels of AS requirement for Luzon
- E. Three Year Projected Hourly Maximum Levels of AS requirement for Visayas
- F. Three Year Projected Hourly Maximum Levels of AS requirement for Mindanao
- G. Five Year Historical Hourly Levels of AS requirement for Luzon
- H. Five Year Historical Hourly Levels of AS requirement for Visayas
- I. Five Year Historical Hourly Levels of AS requirement for Mindanao
- J. Ten Year Projected Monthly Levels of AS requirement for Luzon
- K. Ten Year Projected Monthly Levels of AS requirement for Visayas
- L. Ten Year Projected Monthly Levels of AS requirement for Mindanao

INTRODUCTION

The Philippine Grid Code defines Ancillary Services as "support services such as Regulating Reserves, Contingency Reserves, Reactive Power Support, and Black Start capability which are necessary to support the transmission capacity and energy that are essential in maintaining the Power Quality, Reliability, and Security of the Grid. The following are the basis of Ancillary Services:

1. Section 8 of Republic Act No. 9136, or the Electric Power Industry Reform Act of 2001 (EPIRA): The National Transmission Corporation (TransCo) shall assume the National Power Corporation's (NPC) authority and responsibility for the planning, construction, and centralized operation and maintenance of its high voltage transmission facilities, including grid interconnections and AS.
2. Philippine Grid Code mandates the System Operator to be responsible in determining, acquiring, and dispatching the capacity needed to supply the required AS of the Grid.
3. 2006 Ancillary Services Procurement Plan (ASPP)
4. 2006 Ancillary Services – Cost Recovery Mechanism: sets the rules on TransCo's recovery of AS contracted and procured under the ASPP
5. Regulatory Reset for the National Grid Corporation of the Philippines (NGCP) for 2011 to 2015 Final Determination - ERC Case No. 2009 – 180RC dated 22 November 2010
6. Republic Act No. 9511 or An Act Granting the National Grid Corporation of the Philippines a franchise to engage in the business of conveying or transmitting electricity through High Voltage Back-Bone System of Interconnected Transmission Lines, Substations and Related Facilities, and for other purposes.

The cited laws, rules, and regulations above were promulgated prior to 2009, which still referred to TransCo as the responsible entity for AS. The roles as Transmission Network Provider, Metering Service Provider, and System Operator, along with it the responsibility on AS, have been turned over to NGCP in 2009.

Types of Ancillary Service to be procured

Based on DOE Department Circular DC2019-12-0018, pending the harmonization of AS-related issuances and review of the relevant provisions of PGC 2016, the classification and required levels of AS shall be in accordance with the following:

I. Classification of Ancillary Services

Regulating Reserve (RR) — Readily available and dispatchable generating capacity that is allocated exclusively to correct deviations from the acceptable nominal frequency caused by unpredicted variations in demand or generation output;

Contingency Reserve (CR) — Synchronized generation capacity from Qualified Generating Units and Qualified Interruptible Loads allocated to cover the loss or failure of a synchronized generating unit or a transmission element or the power import from a circuit interconnection;

Dispatchable Reserve (DR) — Generating capacity that is not scheduled for Regular Energy Supply, Regulating Reserve or Contingency Reserve, or interruptible loads not scheduled for Contingency Reserve, and that are readily available for dispatch in order to replenish the Contingency Reserve Service whenever a generating unit trips or a loss of a single transmission interconnection occurs;

Reactive Power Support AS (RPS) — Capability to supply Reactive Power to, or absorb Reactive Power from, the Grid in order to maintain the bus voltage within five percent ($\pm 5\%$) of its nominal voltage;

Black Start AS (BS) — Ability of a generating unit, without assistance from the Grid or other external power supply, to recover from a shutdown condition to an operating condition in order to energize the Grid and assist other generating units to start.

II. Required Level of Ancillary Services

Regulating Reserve — 4% of the total demand;

Contingency Reserve — Maximum capacity among the following: the largest synchronized generating unit or a transmission element or the power import from a circuit interconnection;

Dispatchable Reserve — Maximum capacity among the following: the second largest synchronized generating unit or a transmission element or the power import from a circuit interconnection;

Reactive Power Support (RPS) — System Operator (SO) to determine day-ahead through load flow simulation;

Further, as prescribed in the DOE Department Circular DC2019-12-0018, prior to the commercial operation of the Reserve Market, the SO shall ensure compliance with its obligation to procure the required level of AS through Firm Contracts only. Upon commercial operation of the Reserve Market, the SO shall procure RR, CR, and DR through firm contracts, and Reserve Market. Provided that the contracted levels are equivalent to 50% of the required levels for RR, CR, and DR. For the RPS and Black Start, they shall be procured through firm contracts only.

Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
LUZON								
1590 ENERGY CORPORATION	Bauang Diesel Power Plant	Km. 255 Payocpoc Sur, Bauang, La Union	-	-	190MW P1.25/kW/hr	-	-	9/26/2017 - 9/25/2022
CIP II POWER CORPORATION	20MW Bunker-Fired Power Plant	Bacnotan, La Union	-	-	20MW P1.25/kW/hr	-	-	8/26/2017 - 8/25/2022
FIRST GEN HYDRO POWER CORP	Pantabangan HEPP	Brgy. Sampaloc, Pantabangan, Nueva Ecija	(NF) 2x45MW P3.00/kW/hr	(NF) 2x45MW P2.25/kW/hr	2X60MW P1.25/kW/hr	√ / P4.00/kVAR/hr	2 Units, as available	3/26/2018 - 3/25/2023
PANASIA ENERGY, INC.	Bataan Combined Cycle Gas Turbine Power Plant	Lima y , Bataan	(F) 1x60MW, 0801H-2100H <u>Mar01-Sept30</u> P2.25/kW/hr (NF) 60/GT Unit P3.00/kW/hr	(NF) Available capacity on top of technical Pmin/GT unit P2.00/kW/hr	(NF) 40MW/GT Unit P1.12/kW/hr	√ / P4.00/kVAR/hr	-	3/26/2018 - 3/25/2023
			(F) 60MW 0801H-2100H Jan to Dec	-	-	-	-	
BULACAN POWER GENERATION CORP (FORMERLY PHINMA POWER GEN CORP)	Bulacan Bunker-Fired Power Plant	Norzagaray, Bulacan	-	-	52MW P1.25/kW/hr	√ / P4.00/kVAR/hr	-	6/26/2018 - 6/25/2023
AC ENERGY CORP (FORMERLY PHINMA)	One Subic Bunker-Fired Power Plant	Subic, Zambales	-	-	120MW P1.25/kW/hr	-	-	6/26/2018 - 6/25/2023

Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
PSALM/NATIONAL POWER CORP.	Kalayaan Pump Storage	Kalayaan, Laguna	(NF) 90MW P1.1805/kW/hr	(NF) 90MW P1.1805/kW/hr	180MW P1.1805/kW/hr	√ / P0.0533/kVAR/hr	√	
PRIME MERIDIAN POWER CORP.	100MW Avion Natural Gas Fired PP	Bolbok, Batangas City	(F) 45MW, 24 hrs P2.25/kW/hr (NF) 45MW, 24 hrs P3.00/kW/hr				√	5/26/2020 - 5/25/2025
SNAP-BENGUET, INC.	Ambuklao HEPP (Units 1, 2 & 3)	Brgy. Tinongdan, Itogon, Benguet				√ / P4.00/kVAR/hr		10/5/2019-25/5/2024
SNAP-BENGUET, INC.	Binga HEPP	Brgy. Tinongdan, Itogon, Benguet	(NF) 30MW P3.00/kW/hr	(NF) 30MW P2.25/kW/hr	35MW P1.25/kW/hr	-	√	9/26/2017 - 9/25/2022
SNAP-BENGUET, INC.	Binga HEPP	Brgy. Tinongdan, Itogon, Benguet				√ / P4.00/kVAR/hr		5/10/2019-5/25/2024
SNAP-MAGAT, INC.	Magat HEPP (Units 1, 2, 3 & 4)	Ramon, Isabela	(F) 95MW, 24 hrs P2.25/kW/hr (NF) 90MW P3.00/kW/hr	(F) 1x60MW, Peak Hours P1.50/kW/hr (NF) P2.25/kW/hr	95MW P1.25/kW/hr		√	2/7/2017 - 2/6/2022
SNAP-MAGAT, INC.	Magat HEPP (Units 1, 2, 3 & 4)	Ramon, Isabela				√ / P4.00/kVAR/hr		5/14/2019 - 5/25/2024
THERMA LUZON, INC.	Pagbilao Coal-Fired Plant 1 & 2	Pagbilao, Quezon	-	(F) 2x30MW, 2200H - 0900H P1.50/kW/hr (NF) 2x30MW for hrs when no Firm capacity is scheduled P2.25/kW/hr	-		-	07/26/2019 - 7/25/2024

Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
THERMA LUZON, INC.	Pagbilao Coal-Fired Plant 1 & 2 (RPS)	Pagbilao, Quezon				√ / P4.00/kVAR/hr		12/26/2020-12/25/2025
THERMA MOBILE, INC	231MW Power Barge (DR)	PFDA Complex, Navotas, MM			(F) 145MW 0100 to 2400H P0.85/kW/hr			1/6/2021 - 1/5/2024
THERMA MOBILE, INC	231MW Power Barge (RPS)	PFDA Complex, Navotas, MM				√ / P4.00/kVAR/hr		12/26/2020-12/25/2023
MASINLOC POWER PARTNERS CO, LTD.	Masinloc Advancion Energy Storage Array	Brgy. Bani, Masinloc, Zambales	(F) 20MW, 24 hrs P2.20/kW/hr					5/26/2018-5/25/2023
AP RENEWABLES, INC.	Makban GPP A	Bay, Laguna	-	-	-	√ / P4.00/kVAR/hr	-	5/26/2020 - 5/25/2025
AP RENEWABLES, INC.	Makban GPP B	Calauan, Laguna	-	-	-	√ / P4.00/kVAR/hr	-	5/26/2020 - 5/25/2025
PAGBILAO ENERGY CORP	420MW Pagbilao 3 Coal Fired Thermal Plant	Pagbilao, Quezon	-	-	-	√ / P4.00/kVAR/hr	-	12/26/2020-12/25/2025
VISAYAS								
PANAY ENERGY DEVELOPMENT CORPORATION	PEDC 1 & 2	Brgy. Ingore, La Paz, Iloilo	-	(F) 1x26MW 1700H - 2200H* 0700h - 2200H** / P1.50/kW/hr (NF) 2x13MW 2300H - 0600H P2.25/kW/hr	-	-	-	4/26/2018 - 4/25/2023

Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
CEBU ENERGY DEVELOPMENT CORPORATION	CEDC	Brgy. Daanglungsod, Toledo City, Cebu	-	(F) 1x30MW 0800H - 2400H / P1.50/kW/hr (NF) 2x10MW 0100H-0700H P2.25/kW/hr	-	-	-	4/26/2018 - 4/25/2023
TOLEDO POWER COMPANY	Carmen Diesel Power Plant	Brgy. Daanglungsod, Toledo City, Cebu	-	-	(F) 4x10MW P0.85/kW/hr	√ / P4.00/kVAR/hr	√	6/26/2019 - 06/25/2024
PANAY POWER CORPORATION	PPC 3 Nabas Diesel Power Plant	Nabas, Aklan	-	-	(F) 2X3.4MW, 24 hrs* P0.85/kW/hr	√ / P4.00/kVAR/hr	-	6/26/2019 - 06/25/2024
MORE POWER BARGE INC.	PB 101 (Units 1, 2, 3 & 4)	Zone 3, Bo. Obrero, Iloilo City	-	-	(F) 32MW P0.85/kW/hr (NF) P1.25/kW/hr	-	-	3/26/2018 - 3/25/2023
SPC ISLAND POWER CORP	Bohol Diesel Power Plant	Brgy. Dampas, Tagbilaran, Bohol	-	-	(F) 16.2MW P0.85/kW/hr	-	√	4/26/2019 - 4/25/2024
SPC ISLAND POWER CORP	Panay Diesel Power Plant 1	Brgy. Tinocuan, Dingle, Iloilo	-	(NF) 30MW P2.00/kW/hr	(NF) 55MW P1.25/kW/hr	√ / P4.00/kVAR/hr		12/26/2013- 12/25/2018
	Panay Diesel Power Plant 3		-					
SPC POWER CORP	PB 104	Ubay, Bohol	-	-	(F) 21MW - P0.85/kW/hr (NF) 7MW - P1.25/kW/hr	-	28MW W/ 200KW EDG	9/26/2019 - 9/25/2024
CENTRAL NEGROS POWER RELIABILITY INC.	Calumangan DPP	Calumangan, Central, Negros Oriental	-	-	(NF) 25.9MW P1.25/kW/hr	√ / P4.00/kVAR/hr	-	8/26/2019 - 8/25/2024
SMCGP PHILS. ENERGY	Kabankalan BESS	Negros Occidental	(F) 40MW P2.20/kW/hr	-	-	-	-	1/26/2022 - 1/25/2027

Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
STORAGE, CO. LTD								
ISABEL ANCILLARY SERVICES CO. LTD.	70 MW Modular Diesel Plant	Lide, Leyte	(F) Bet 8MW to 60MW, 24 hrs P2.25/kW/hr	(F) Bet 10MW to 60MW, 24 hrs P1.50/kW/hr	-	√ / P4.00/kVAR/hr	-	
MINDANAO								
THERMA MARINE, INC.	100MW Mobile 1 Bunker-Fired PB	Maco, Davao del Norte	-	(NF) 2x48MW P2.25/kW/hr	(NF) 2x48MW P1.25/kW/hr	-	-	3/26/2018 - 3/25/2023
THERMA MARINE, INC.	100MW Mobile 2 Bunker-Fired PB	Nasipit, Agusan del Norte	-	(NF) 2x48MW P2.25/kW/hr	(NF) 2x48MW P1.25/kW/hr	-	-	3/26/2018 - 3/25/2023
WESTERN MINDANAO POWER CORP.	100MW Bunker C Fired Thermal Plant	Sitio Malasugat, Sangali, Zamboanga	-	-	(NF) 10x10MW P1.25/kW/hr	√ / P4.00/kVAR/hr	√	4/26/2019 - 4/25/2024
PSALM/NATIONAL POWER CORP.	AGUS 1 HEPP (Units 1 & 2)	Marawi City, LDS	(NF) 30MW P1.13044/kW/hr	(NF) 30MW P1.13044/kW/hr	-	√ / P0.0295/kVAR/hr	-	
	AGUS 2 HEPP (Units 1, 2 & 3)	Saguiaran, LDS	(NF) 30MW	(NF) 30MW	-	√ / P0.0295/kVAR/hr	-	
	AGUS 4 HEPP (Units 1, 2 & 3)	Baloi, LDN	(NF) 40MW	(NF) 30MW	-	√ / P0.0295/kVAR/hr	-	
	AGUS 5 HEPP (Units 1 & 2)	Buru-un, Iligan City	-	(NF) 35MW	-	√ / P0.0295/kVAR/hr	-	
	AGUS 7 HEPP (Units 1 & 2)	Buru-un, Iligan City	-	(NF) 16MW	-	√ / P0.0295/kVAR/hr	-	
	PULANGI 4 HEPP	Maramag, Bukidnon	(NF) 65MW	(NF) 30MW	-	√ / P0.0295/kVAR/hr	√	

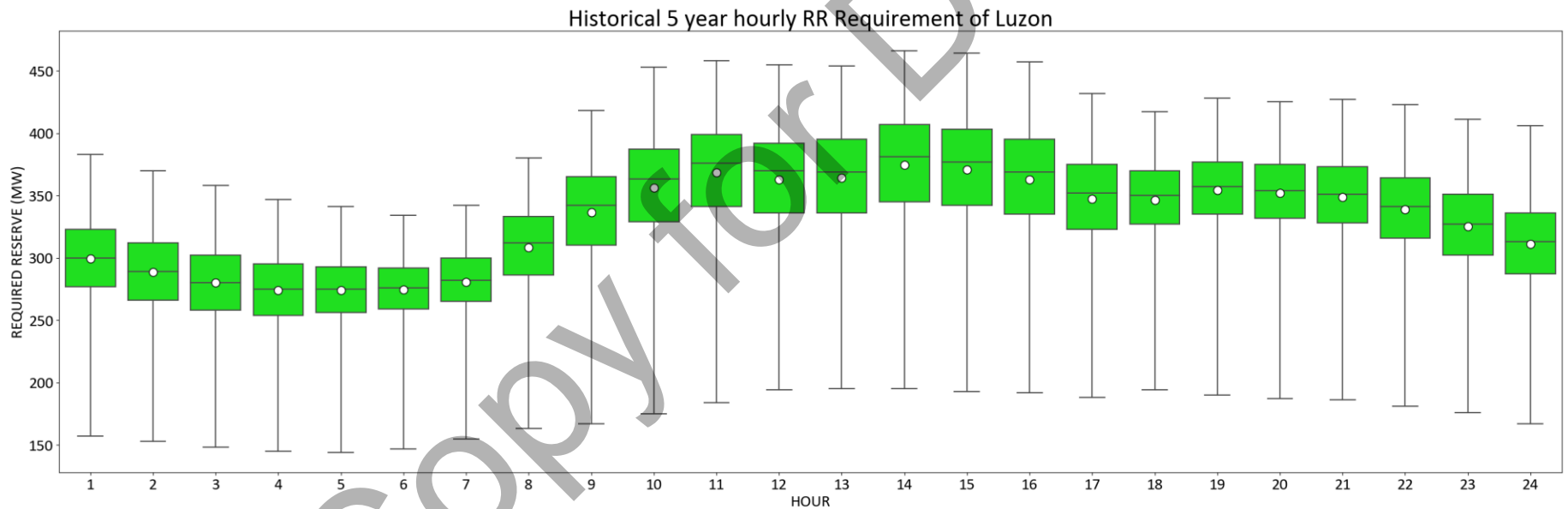
Existing Ancillary Services Procurement Agreements

COMPANY	POWER PLANT/FACILITY	LOCATION	ANCILLARY SERVICES					EFFECTIVITY
			TYPE / CONTRACTED AS (MW) - BASED ON ASPA / RATE					
			RR	CR	DR	RPS	BSS	
	AGUS 6 HEPP (Units 3 & 5)	Ma. Cristina, Iligan, LDN		(NF) 30MW	-	√ / P0.0295/kVAR/hr		
KING ENERGY, INC.	MISAMIS OCCIDENTAL POWER PLANT 2	Brgy. Map-an, Panaon, Mis. Occidental	-	-	(NF)15.6MW P1.25/kW/hr	√ / P4.00/kVAR/hr	-	4/26/2020- 4/25/2025
KING ENERGY, INC.	MISAMIS OCCIDENTAL POWER PLANT 3	Brgy. San Isidro, Jimenez, Mis. Occidental	-	-	(NF) 16.2MW P1.25/kW/hr	√ / P4.00/kVAR/hr	-	3/26/2020- 3/25/2025
KING ENERGY, INC.	SURIGAO DEL SUR POWER PLANT	Tandag, Surigao del Sur	-	-	(F) 7.5 P0.85kw/hr	-	-	3/26/2023- 3/25/2028

Note: √ means the plant has RPS in the ASPA. Some RPS of plants such as SNAP-BI and SNAP-MI have separate APSA from their RR/CR/DR ASPA.

Typical Hourly Level for The Past Five Years Of The AS Requirement Per Type Per Grid

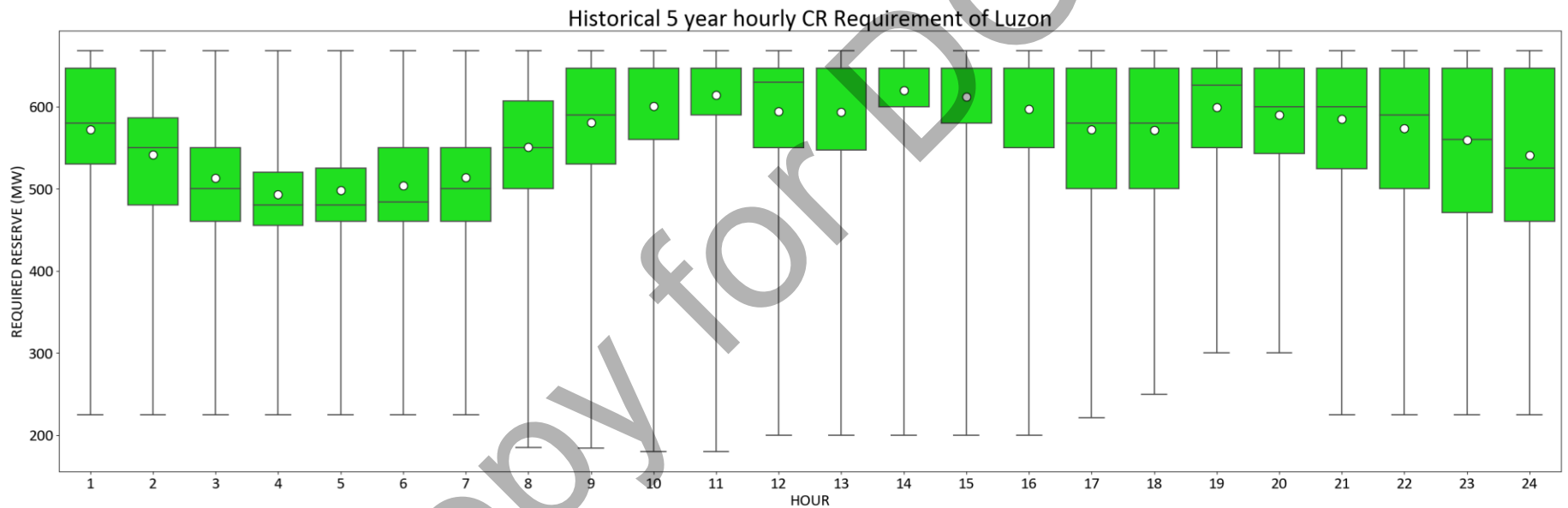
Historical 5-year Hourly RR Requirement of Luzon																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	157	153	148	145	144	147	155	163	167	175	184	194	195	195	193	192	188	194	190	187	186	181	176	167
25th percentile	277	266	258	254	256	259	265	286	310	329	341	336	336	345	342	335	323	327	335	332	328	316	302	287
50th percentile	300	289	280	275	275	276	282	312	342	363	376	370	369	381	377	369	352	350	357	354	351	341	327	313
Average	299	289	280	274	274	275	281	308	337	356	369	363	364	374	371	363	347	346	354	352	349	339	325	311
75th percentile	323	312	302	295	293	292	300	333	365	387	399	392	395	407	403	395	375	370	377	375	373	364	351	336
Maximum	383	370	358	347	341	334	342	380	418	453	458	455	454	466	464	457	432	417	428	425	427	423	411	406



As shown in the Boxplots above, the minimum RR level in Luzon ranges from 144 MW to 195 MW. While the Maximum RR level ranges from 334 MW to 466 MW. It's also noteworthy that the Maximum, 75th percentile, 50th percentile, and 25th percentile is low from Hour 1 to Hour 7; then increases at Hour 8 to Hour 19; and decreases at Hour 19 to Hour 24.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

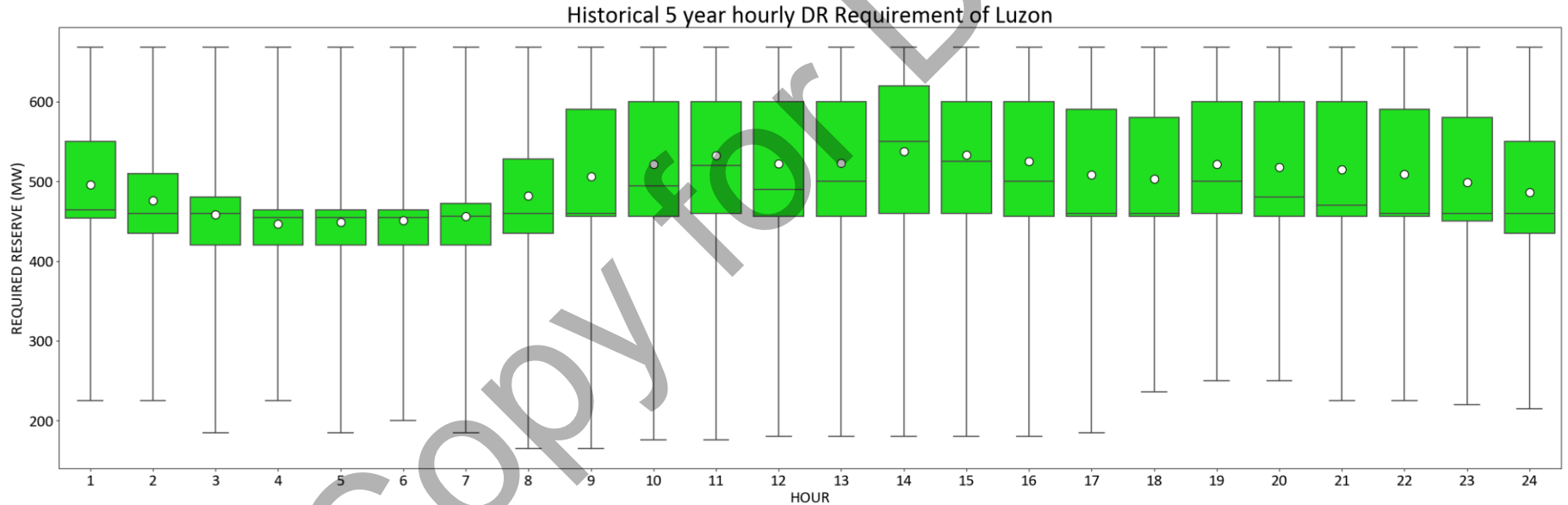
Historical 5-year Hourly CR Requirement of Luzon																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	225	225	225	225	225	225	225	185	184	180	180	200	200	200	200	200	221	250	300	300	225	225	225	225
25th percentile	530	480	460	455	460	460	460	500	530	560	590	550	547	600	580	550	500	500	550	543	524	500	471	460
50th percentile	580	550	500	480	480	484	500	550	590	647	647	630	647	647	647	647	580	580	626	600	600	590	560	525
Average	572	541	513	493	498	504	513	550	581	600	614	594	593	619	612	597	572	571	599	590	585	573	559	541
75th percentile	647	586	550	520	525	550	550	607	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647	647
Maximum	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668



For the CR levels in Luzon, the Minimum CR level ranges from 180 MW to 300 MW, while the Maximum level is fixed at 668MW. It's also noteworthy that the 50th and 75th percentile is closer to the maximum level at Hour 8 to Hour 24.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

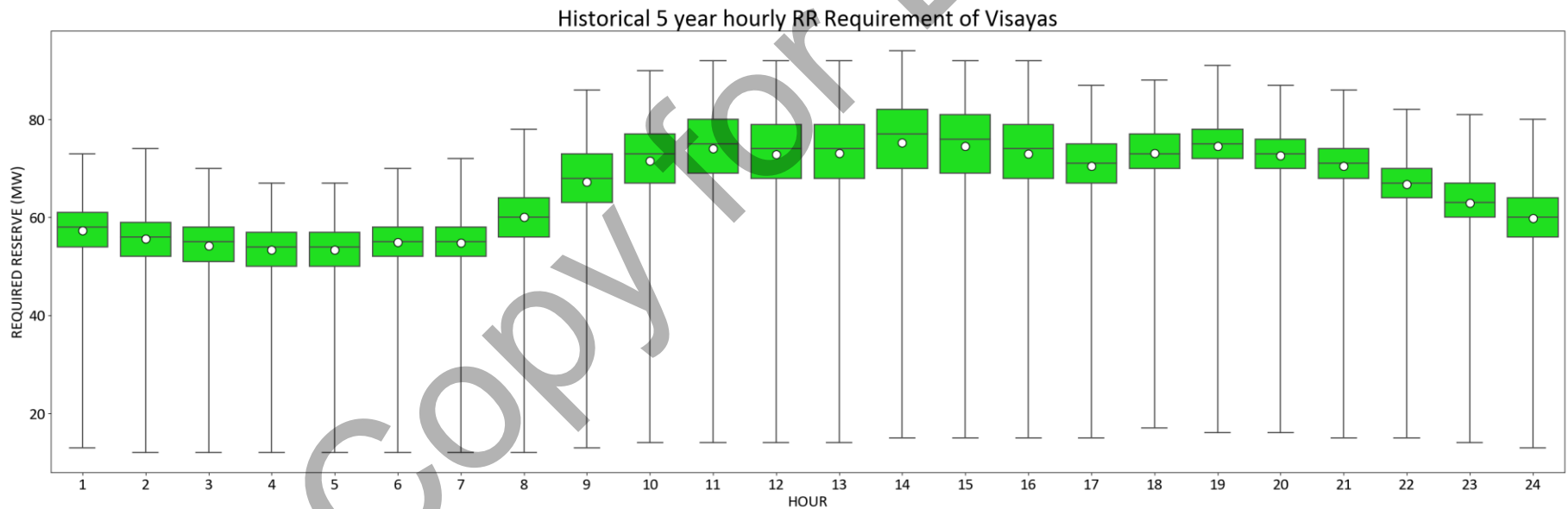
Historical 5-year Hourly DR Requirement of Luzon																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	225	225	185	225	185	200	185	165	165	176	176	180	180	180	180	180	185	236	250	250	225	225	220	215
25th percentile	454	435	420	420	420	420	420	435	456	456	460	456	456	460	460	456	456	456	460	456	456	456	450	435
50th percentile	464	460	460	455	455	455	456	460	460	494	520	490	500	550	525	500	460	460	500	480	470	460	460	460
Average	496	476	458	446	449	451	456	482	506	522	532	522	523	537	533	525	509	503	521	518	515	509	499	486
75th percentile	550	510	480	464	464	464	472	528	590	600	600	600	600	620	600	600	590	580	600	600	600	590	580	550
Maximum	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668	668



For DR levels in Luzon, the Minimum DR level ranges from 165MW to 250MW, while the Maximum level is fixed at 668MW. It's also noteworthy that the 75th percentile is closer to the maximum level at Hour 9 to Hour 23.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

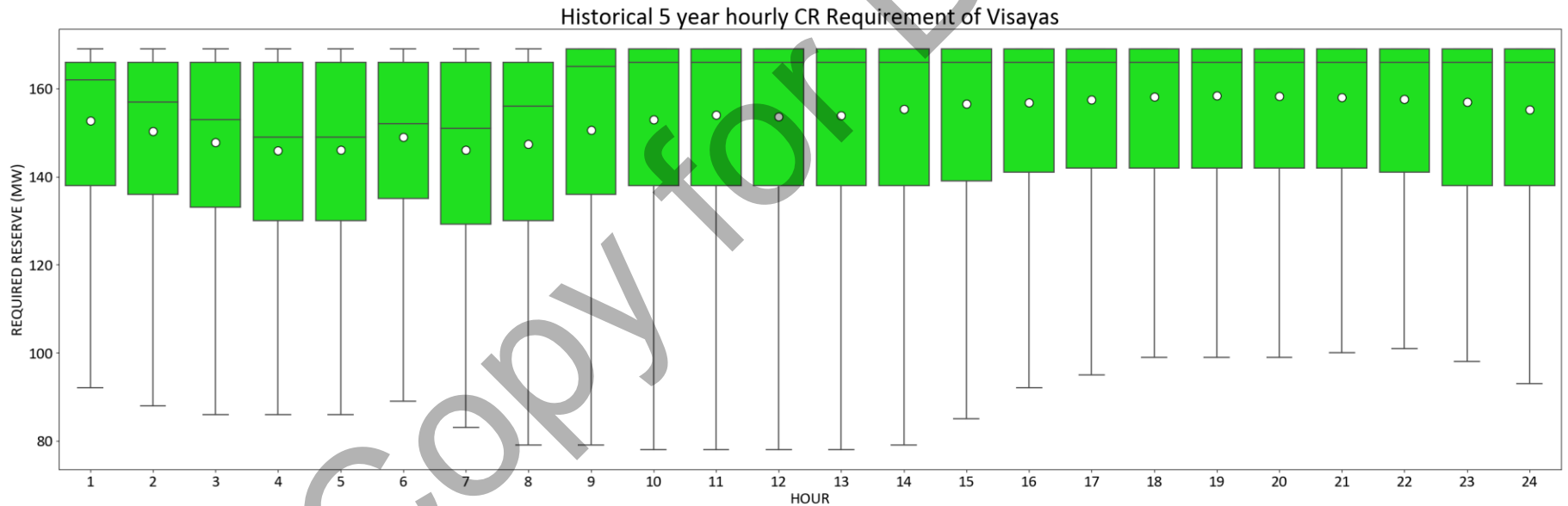
Historical 5-year Hourly RR Requirement of Visayas																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	13	12	12	12	12	12	12	12	13	14	14	14	14	15	15	15	15	17	16	16	15	15	14	13
25th percentile	54	52	51	50	50	52	52	56	63	67	69	68	68	70	69	68	67	70	72	70	68	64	60	56
50th percentile	58	56	55	54	54	55	55	60	68	73	75	74	74	77	76	74	71	73	75	73	71	67	63	60
Average	57	56	54	53	53	55	55	60	67	72	74	73	73	75	74	73	70	73	75	73	70	67	63	60
75th percentile	61	59	58	57	57	58	58	64	73	77	80	79	79	82	81	79	75	77	78	76	74	70	67	64
Maximum	73	74	70	67	67	70	72	78	86	90	92	92	92	94	92	92	87	88	91	87	86	82	81	80



The minimum RR level in Visayas ranges from 12 MW to 17 MW. While the Maximum RR level ranges from 67 MW to 94 MW. It's also noteworthy that the Maximum, 75th percentile, 50th percentile, and 25th percentile is low from Hour 1 to Hour 7; then increases at Hour 8 to Hour 19; and decreases at Hour 20 to Hour 24.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

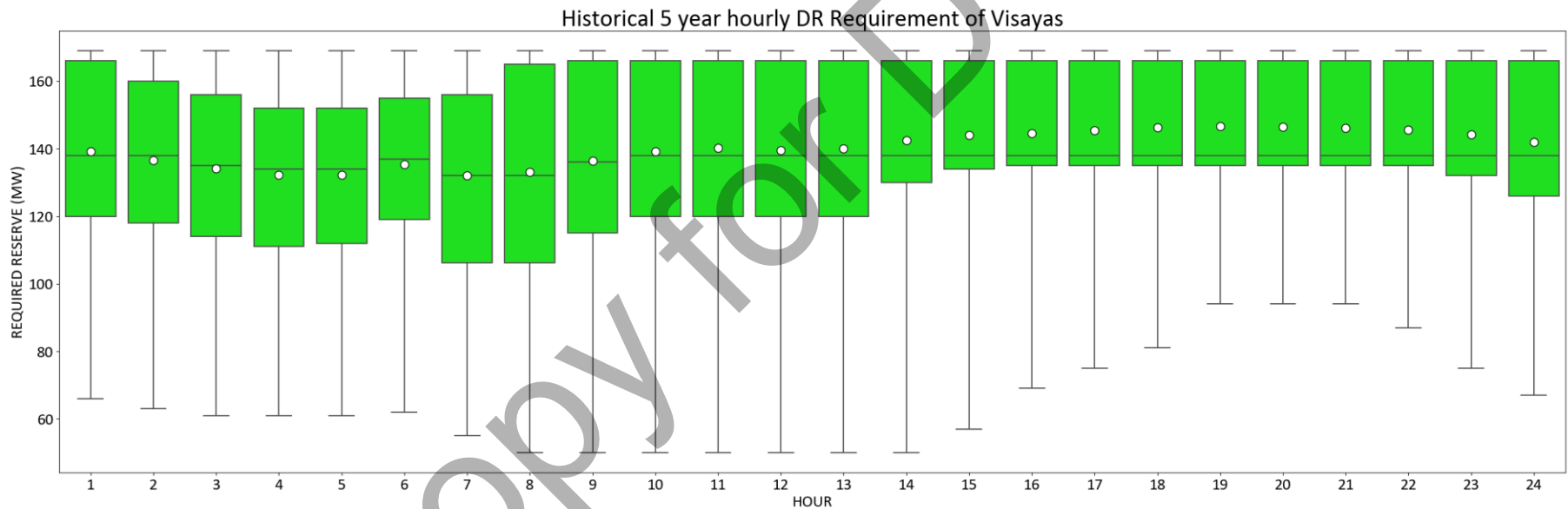
Historical 5-year Hourly CR Requirement of Visayas																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	92	88	86	86	86	89	83	79	79	78	78	78	78	79	85	92	95	99	99	99	100	101	98	93
25th percentile	138	136	133	130	130	135	129	130	136	138	138	138	138	138	139	141	142	142	142	142	142	141	138	138
50th percentile	162	157	153	149	149	152	151	156	165	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
Average	153	150	148	146	146	149	146	147	151	153	154	154	154	155	157	157	157	158	158	158	158	158	157	155
75th percentile	166	166	166	166	166	166	166	166	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
Maximum	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169



For the CR levels in Visayas, the Minimum CR level ranges from 78 MW to 101 MW, while the Maximum level is fixed at 169MW. It's also noteworthy that the 75th percentile is closer to the maximum at Hour 9 to Hour 24.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

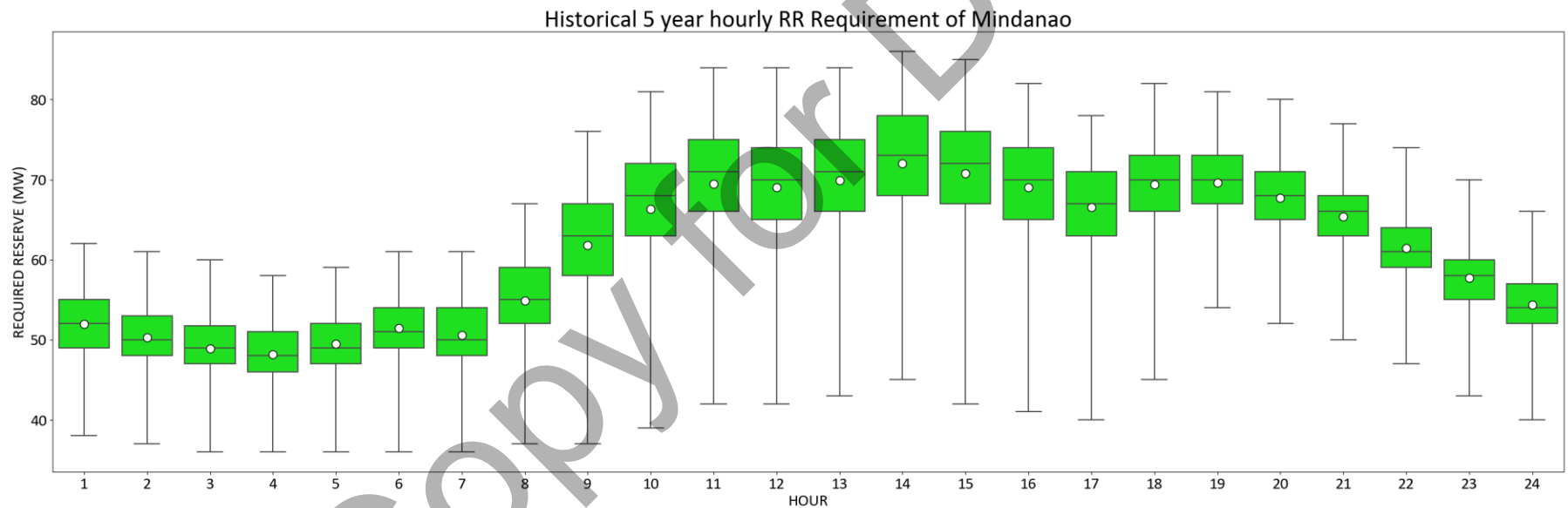
Historical 5-year Hourly DR Requirement of Visayas																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	66	63	61	61	61	62	55	50	50	50	50	50	50	50	57	69	75	81	94	94	94	87	75	67
25th percentile	120	118	114	111	112	119	106	106	115	120	120	120	120	130	134	135	135	135	135	135	135	135	132	126
50th percentile	138	138	135	134	134	137	132	132	136	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138
Average	139	137	134	132	132	135	132	133	136	139	140	140	140	142	144	145	145	146	147	146	146	146	144	142
75th percentile	166	160	156	152	152	155	156	165	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
Maximum	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169



For Required DR levels in Visayas, the Minimum DR level ranges from 50 MW to 94 MW, while the Maximum level is fixed at 169 MW.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

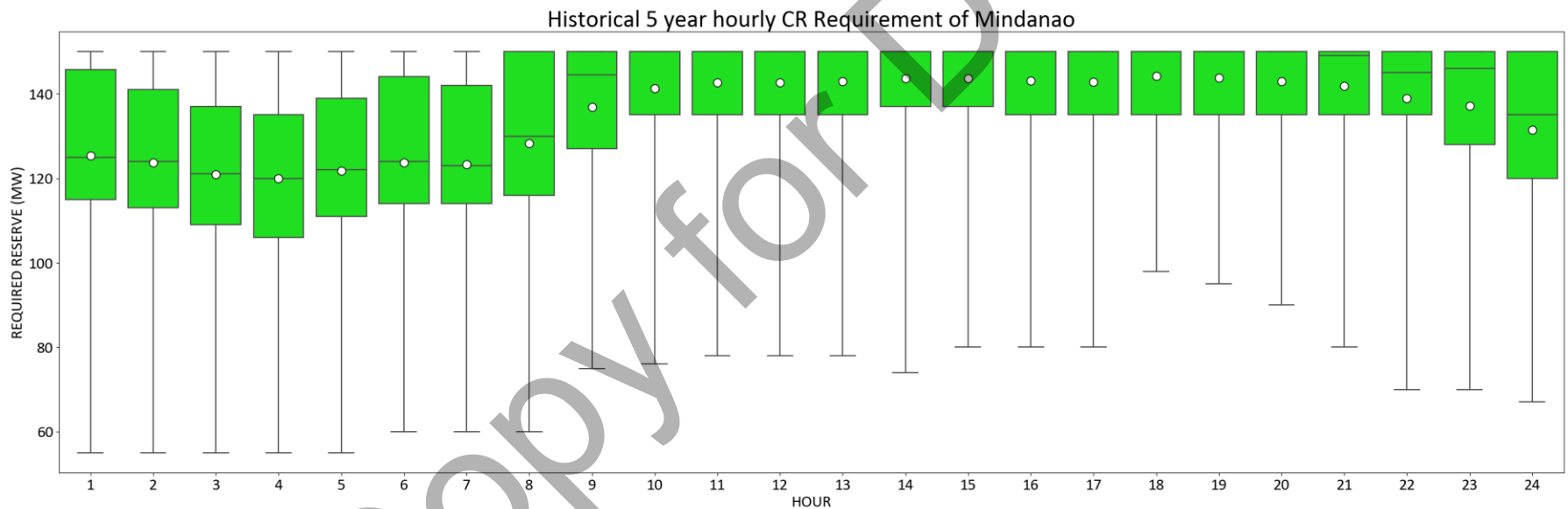
Historical 5-year Hourly RR Requirement of Mindanao																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	38	37	36	36	36	36	36	37	37	39	42	42	43	45	42	41	40	45	54	52	50	47	43	40
25th percentile	49	48	47	46	47	49	48	52	58	63	66	65	66	68	67	65	63	66	67	65	63	59	55	52
50th percentile	52	50	49	48	49	51	50	55	63	68	71	70	71	73	72	70	67	70	70	68	66	61	58	54
Average	52	50	49	48	49	51	51	55	62	66	69	69	70	72	71	69	67	69	70	68	65	61	58	54
75th percentile	55	53	52	51	52	54	54	59	67	72	75	74	75	78	76	74	71	73	73	71	68	64	60	57
Maximum	62	61	60	58	59	61	61	67	76	81	84	84	84	86	85	82	78	82	81	80	77	74	70	66



The minimum RR level in Mindanao ranges from 36 MW to 54 MW. While the Maximum RR level ranges from 58 MW to 86 MW. It's also noteworthy that the Maximum, 75th percentile, 50th percentile, and 25th percentile is low from Hour 1 to Hour 7; then increases at Hour 8 to Hour 18; and decreases at Hour 19 to Hour 24.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

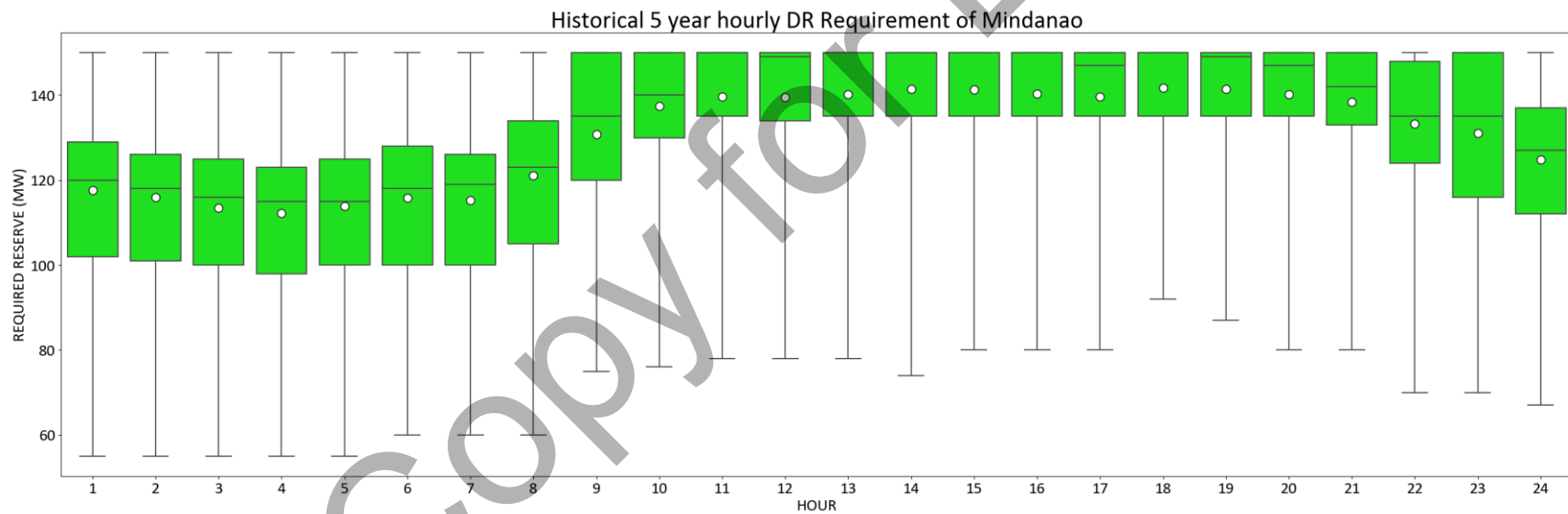
Historical 5-year Hourly CR Requirement of Mindanao																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	55	55	55	55	55	60	60	60	75	76	78	78	78	74	80	80	80	98	95	90	80	70	70	67
25th percentile	115	113	109	106	111	114	114	116	127	135	135	135	135	137	137	135	135	135	135	135	135	135	128	120
50th percentile	125	124	121	120	122	124	123	130	144	150	150	150	150	150	150	150	150	150	150	150	149	145	146	135
Average	125	124	121	120	122	124	123	128	137	141	143	143	143	144	144	143	143	144	144	143	142	139	137	131
75th percentile	146	141	137	135	139	144	142	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Maximum	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150



For Required CR levels in Mindanao, the Minimum CR level ranges from 55 MW to 98 MW, while the Maximum level is fixed at 150MW. It's also noteworthy that the 25th, 50th and 75th percentile is closer to the maximum value during Hour 8 to Hour 22.

2024 – 2033 ANCILLARY SERVICE AGREEMENT PROCUREMENT PLAN

Historical 5-year Hourly DR Requirement of Mindanao																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Minimum	55	55	55	55	55	60	60	60	75	76	78	78	78	74	80	80	80	92	87	80	80	70	70	67
25th percentile	102	101	100	98	100	100	100	105	120	130	135	134	135	135	135	135	135	135	135	135	133	124	116	112
50th percentile	120	118	116	115	115	118	119	123	135	140	150	149	150	150	150	150	147	150	149	147	142	135	135	127
Average	118	116	114	112	114	116	115	121	131	137	140	139	140	141	141	140	140	142	141	140	138	133	131	125
75th percentile	129	126	125	123	125	128	126	134	150	150	150	150	150	150	150	150	150	150	150	150	150	148	150	137
Maximum	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150



For Required DR levels in Mindanao, the Minimum DR level ranges from 55 MW to 92 MW, while the Maximum level is fixed at 150 MW. It's also noteworthy that the 50th and 75th percentile is closer to the maximum value during Hour 9 to Hour 21.

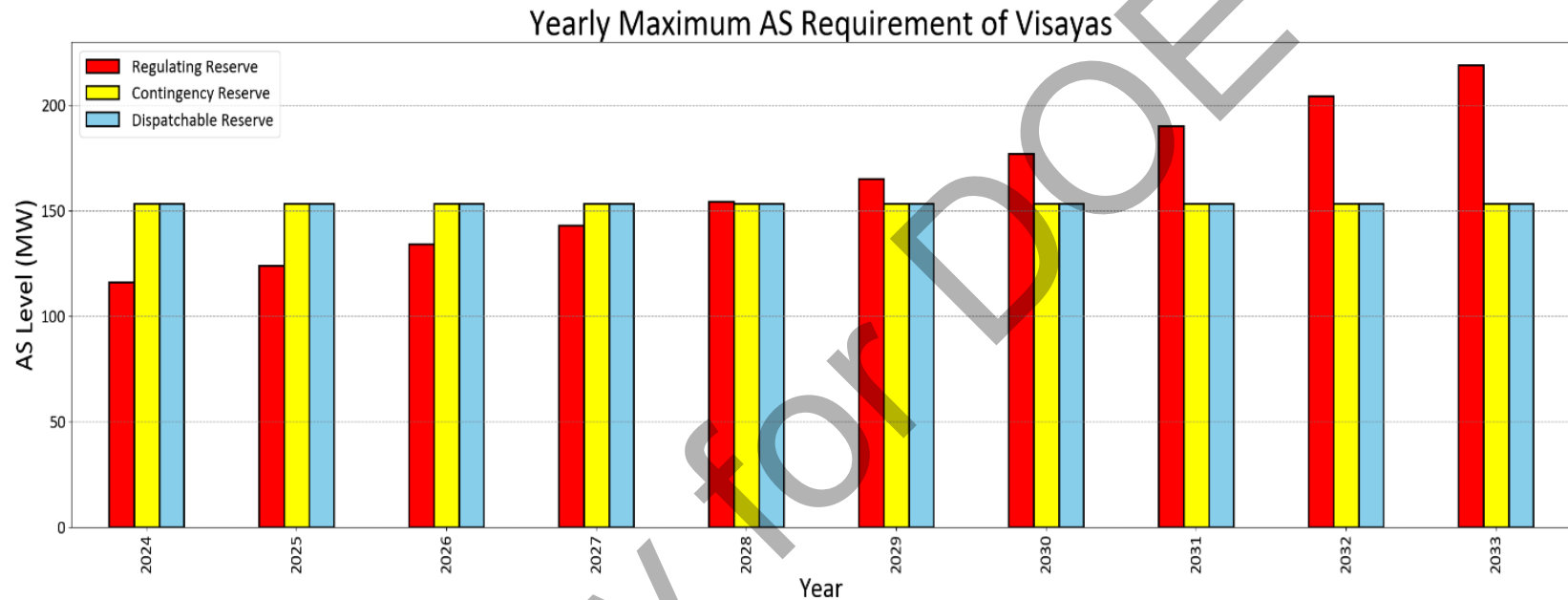
TEN-YEAR FORECASTED AS REQUIREMENT FOR LUZON GRID



Reserve Type	Maximum AS Requirement of Luzon									
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Regulating Reserve	557	591	627	667	709	754	803	854	908	964
Contingency Reserve	668	668	668	668	668	668	668	668	668	668
Dispatchable Reserve	668	668	668	668	668	668	668	668	668	668

Note: RR Requirement is equivalent to 4% of Demand projection based on DOE's 2020-2040 Annual Peak Demand Forecast for Luzon, Visayas, and Mindanao Grid dated August 24, 2020. While CR and DR are based on Gross Capacity of highest generating unit for the succeeding years, taking into consideration the DOE list of private sector initiated power projects (committed and indicative) and the capacity limits for prospective power generating plants per ERC Resolution No. 18 Series of 2017.

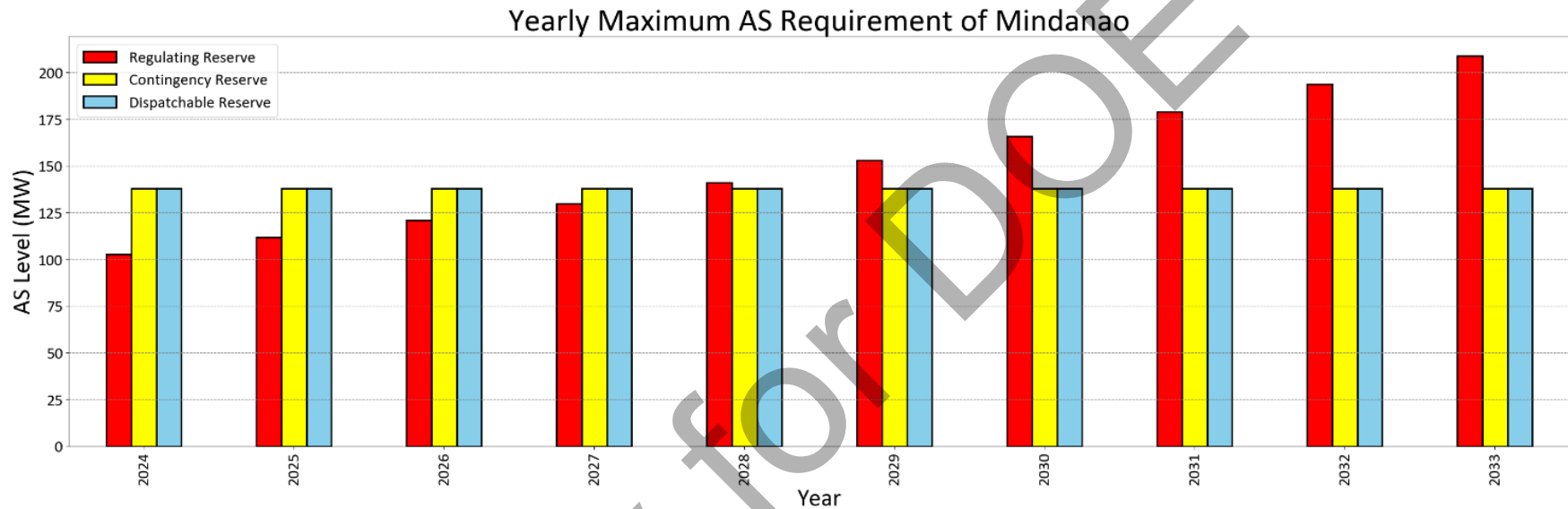
TEN-YEAR FORECASTED AS REQUIREMENT FOR VISAYAS GRID



Reserve Type	Maximum AS Requirement of Visayas									
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Regulating Reserve	116	124	134	143	154	165	177	190	204	219
Contingency Reserve	153	153	153	153	153	153	153	153	153	153
Dispatchable Reserve	153	153	153	153	153	153	153	153	153	153

Note: RR Requirement is equivalent to 4% of Demand projection based on DOE's 2020-2040 Annual Peak Demand Forecast for Luzon, Visayas, and Mindanao Grid dated August 24, 2020. While CR and DR are based on Gross Capacity of highest generating unit for the succeeding years, taking into consideration the DOE list of private sector initiated power projects (committed and indicative) and the capacity limits for prospective power generating plants per ERC Resolution No. 18 Series of 2017.

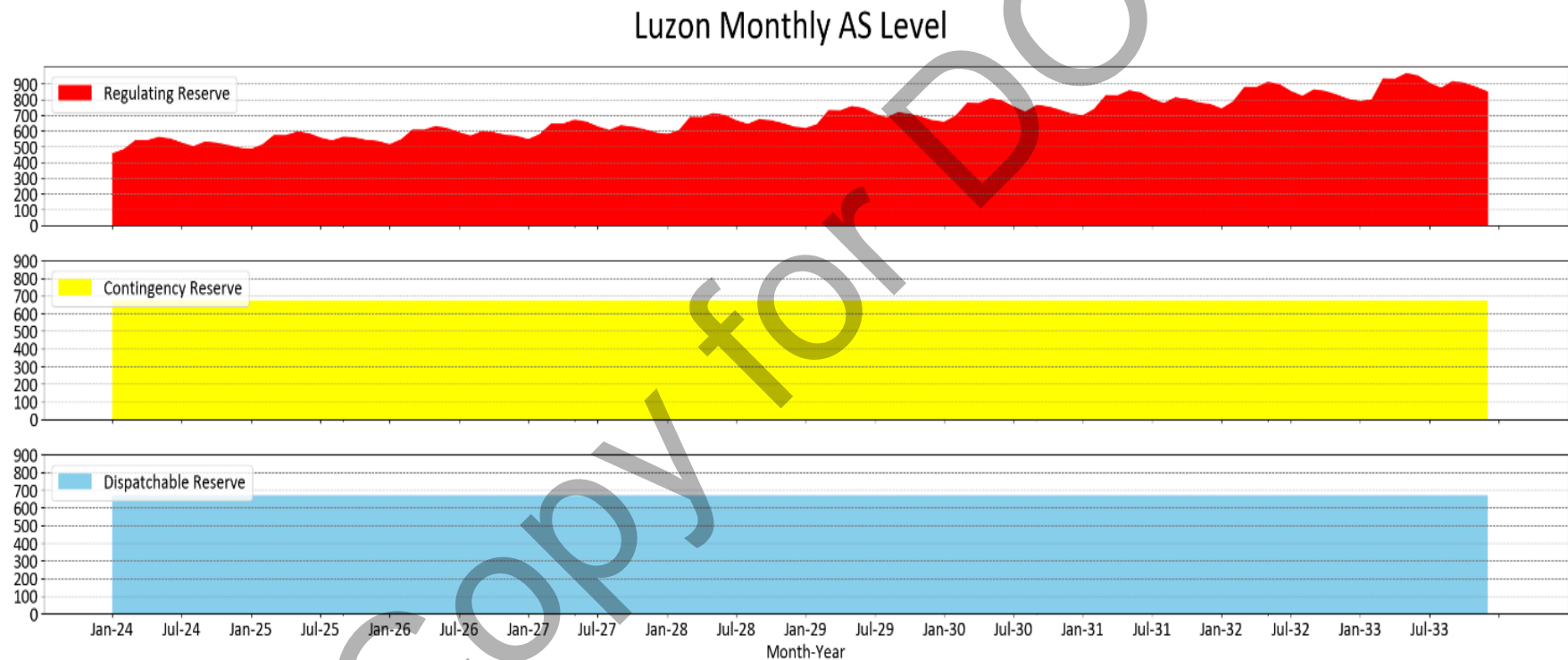
TEN-YEAR FORECASTED AS REQUIREMENT FOR MINDANAO GRID



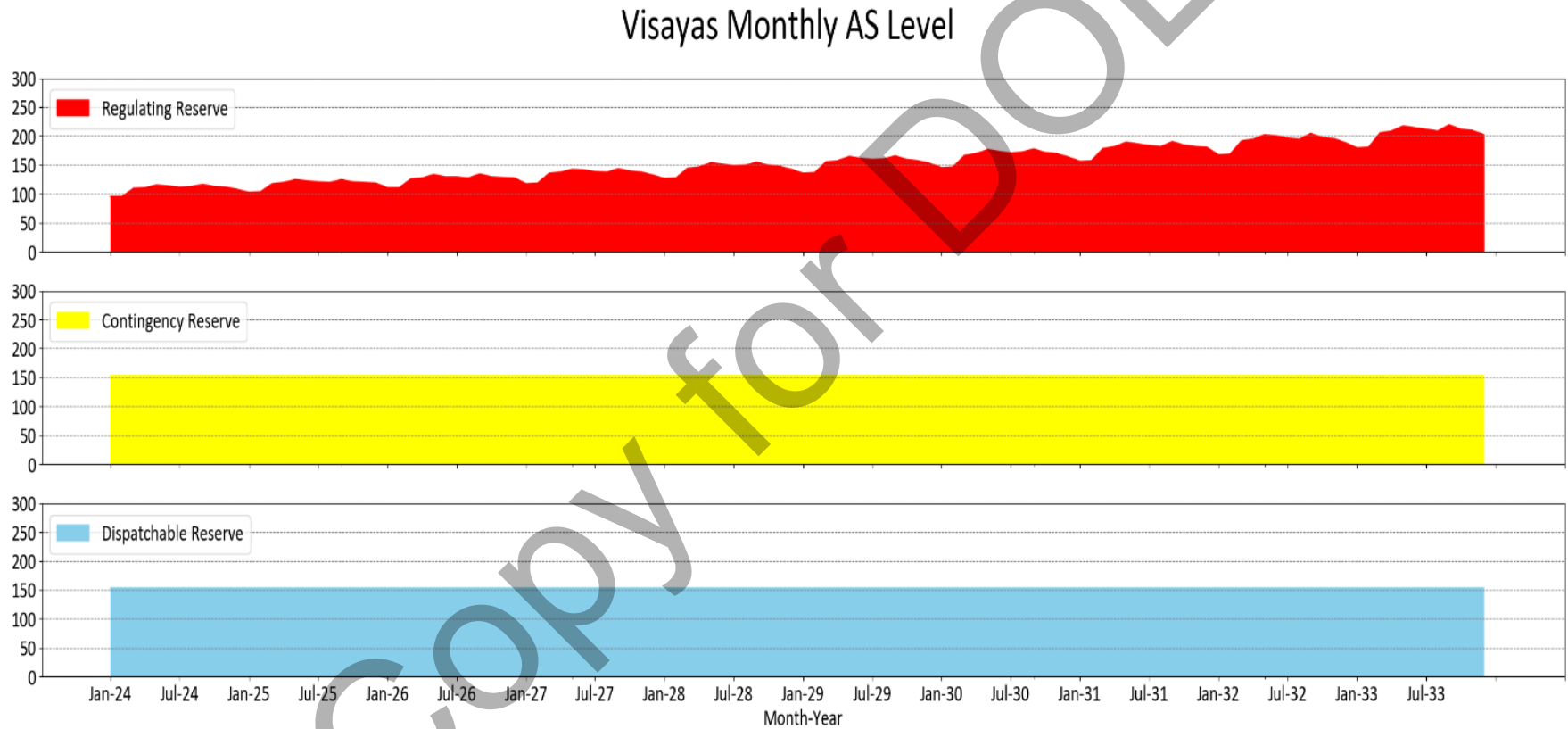
Reserve Type	Maximum AS Requirement of Mindanao									
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Regulating Reserve	103	112	121	130	141	153	166	179	194	209
Contingency Reserve	138	138	138	138	138	138	138	138	138	138
Dispatchable Reserve	138	138	138	138	138	138	138	138	138	138

Note: RR Requirement is equivalent to 4% of Demand projection based on DOE's 2020-2040 Annual Peak Demand Forecast for Luzon, Visayas, and Mindanao Grid dated August 24, 2020. While CR and DR are based on Gross Capacity of highest generating unit for the succeeding years, taking into consideration the DOE list of private sector initiated power projects (committed and indicative) and the capacity limits for prospective power generating plants per ERC Resolution No. 18 Series of 2017.

MONTHLY LEVELS OF AS REQUIREMENT PER GRID TO ACCOUNT SEASONALITY

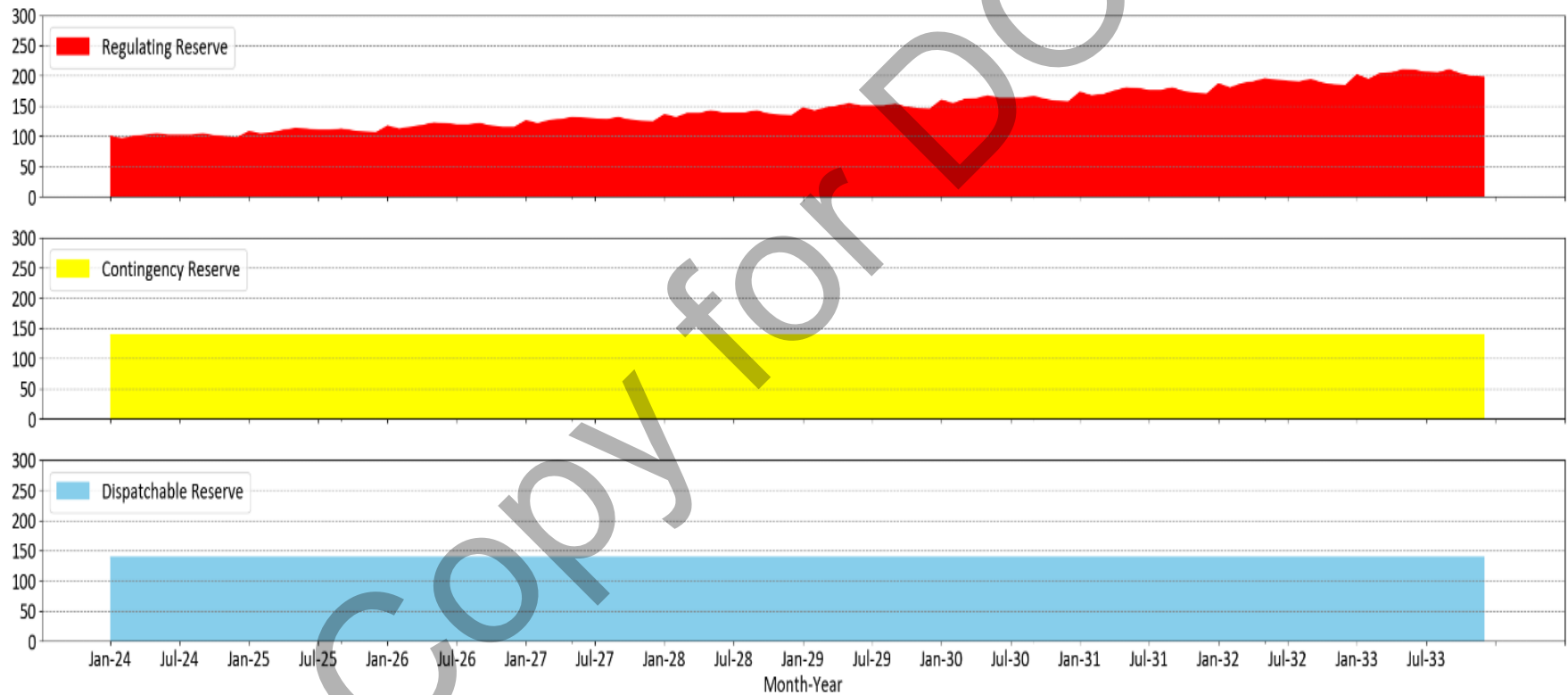


MONTHLY LEVELS OF AS REQUIREMENT PER GRID TO ACCOUNT SEASONALITY

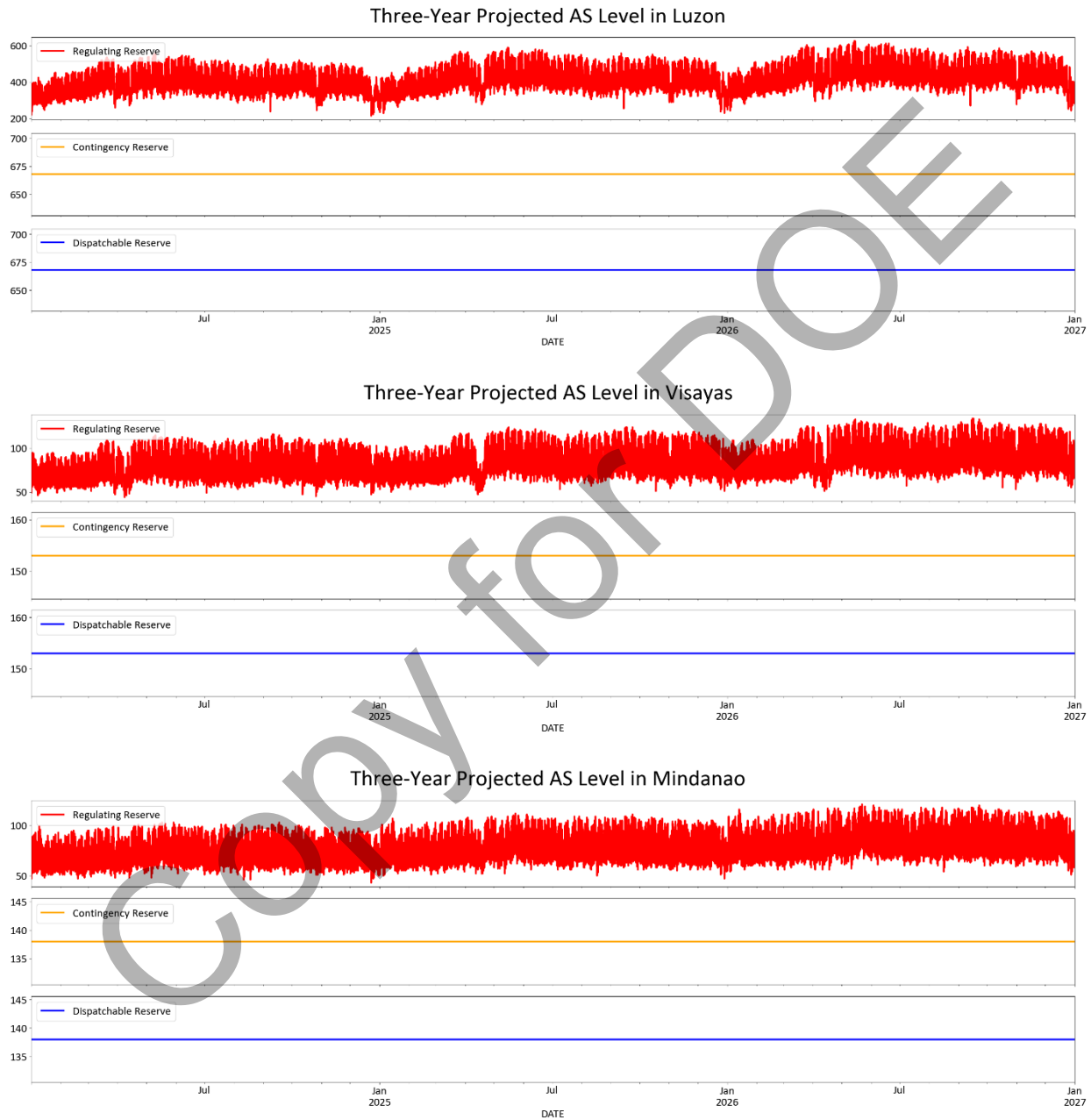


MONTHLY LEVELS OF AS REQUIREMENT PER GRID TO ACCOUNT SEASONALITY

Mindanao Monthly AS Level

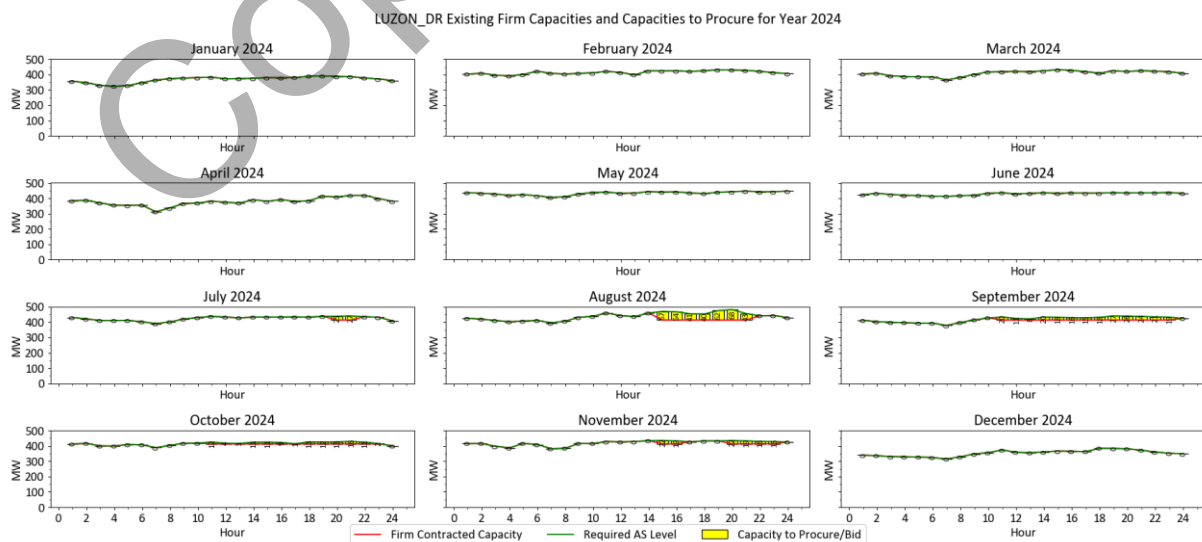
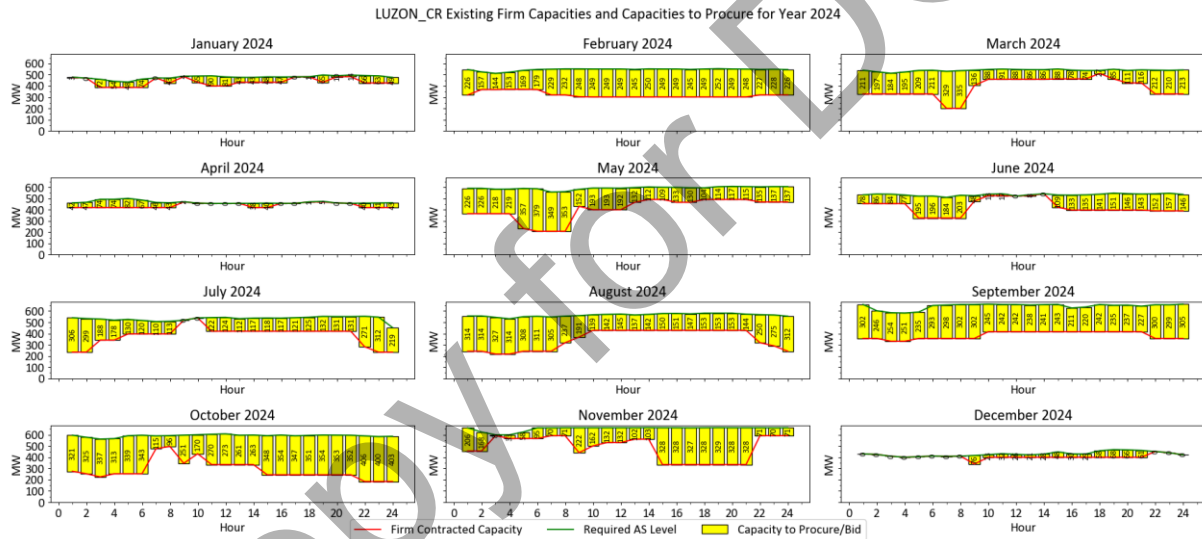
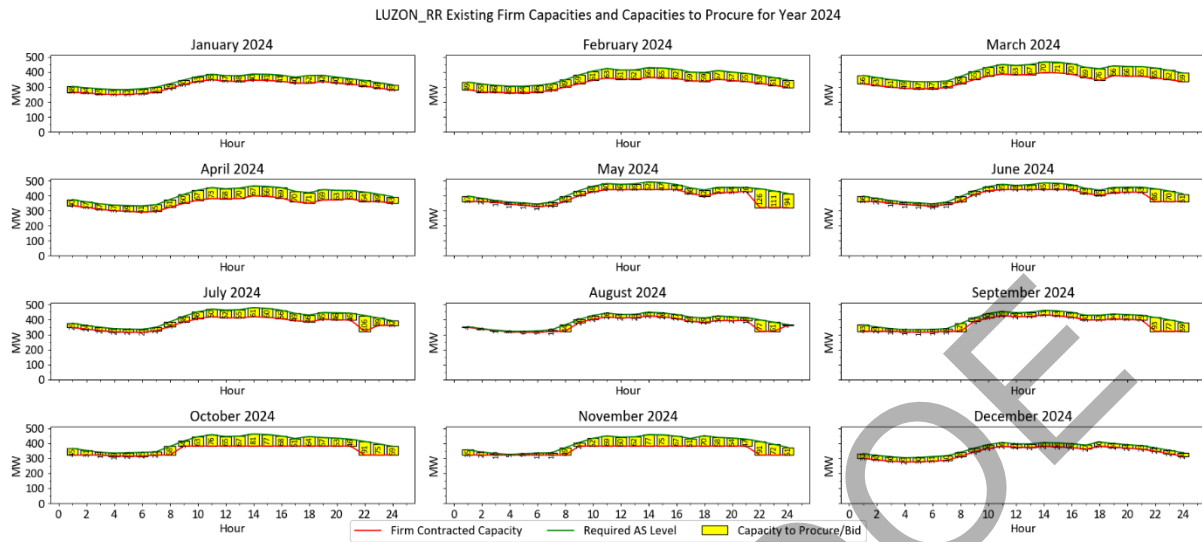


THREE YEARS HOURLY FORECASTED AS REQUIREMENT FOR LUZON, VISAYAS AND MINDANAO GRIDS



Since the CSP of ASPs covers firm contracts only but based on the historical and projected required AS levels, the reserve requirements are dynamic; NGCP recommends that there should be flexibility in day-ahead scheduling of AS providers to lower the total AS costs.

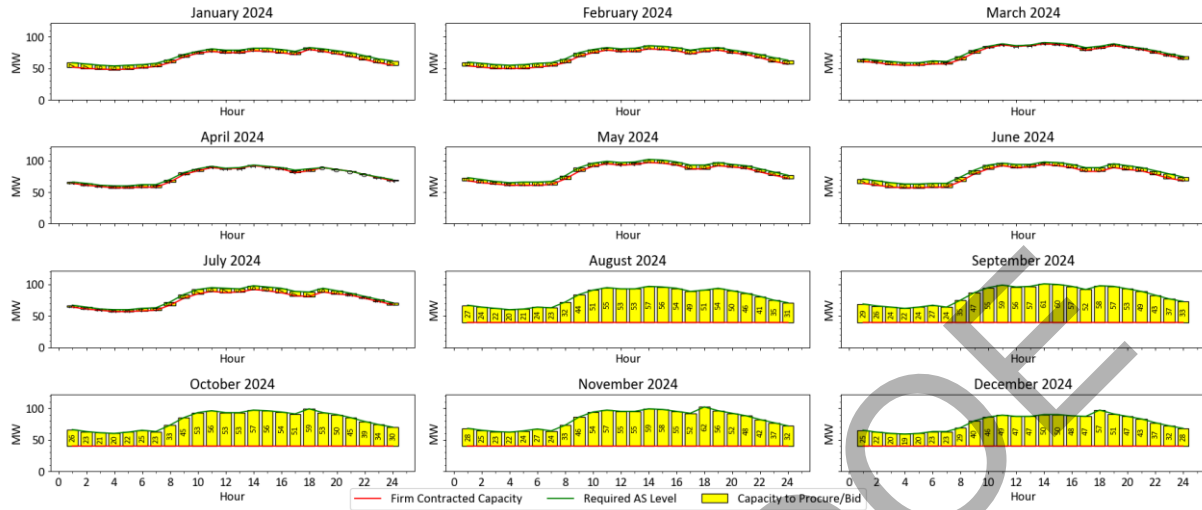
Projected AS Capacity to Procure under CSP for Luzon



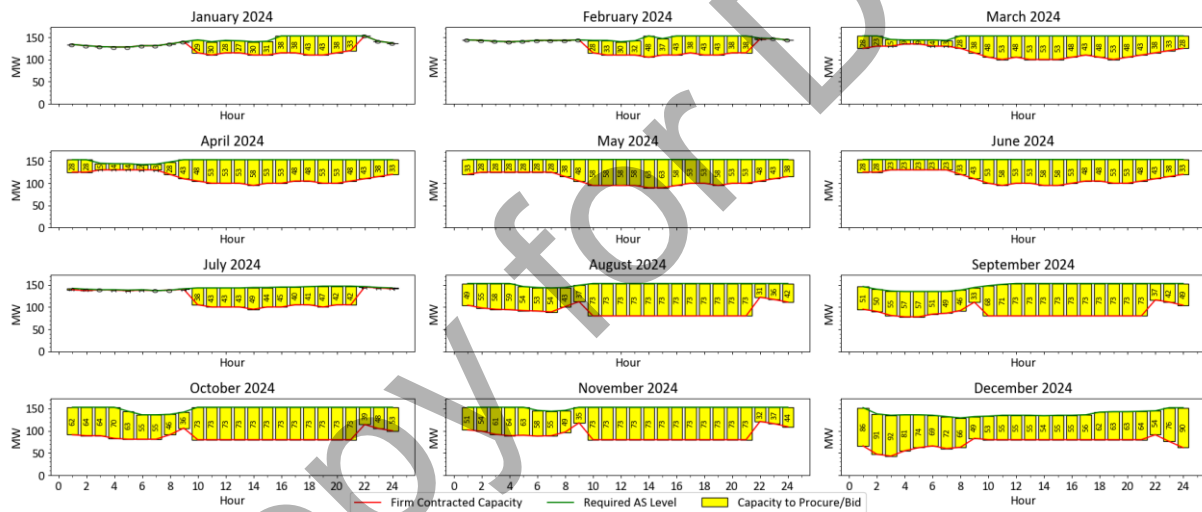
Note: These simulations include the capacities of winning bidders that will be contracted for the 1st 2023 CSP. Further, these simulations consider the AS Contracts which are proposed to be extended. Required levels might change upon conclusion of the Ancillary Services – Competitive Selection Process and contracts.

Projected AS Capacity to Procure under CSP for Visayas

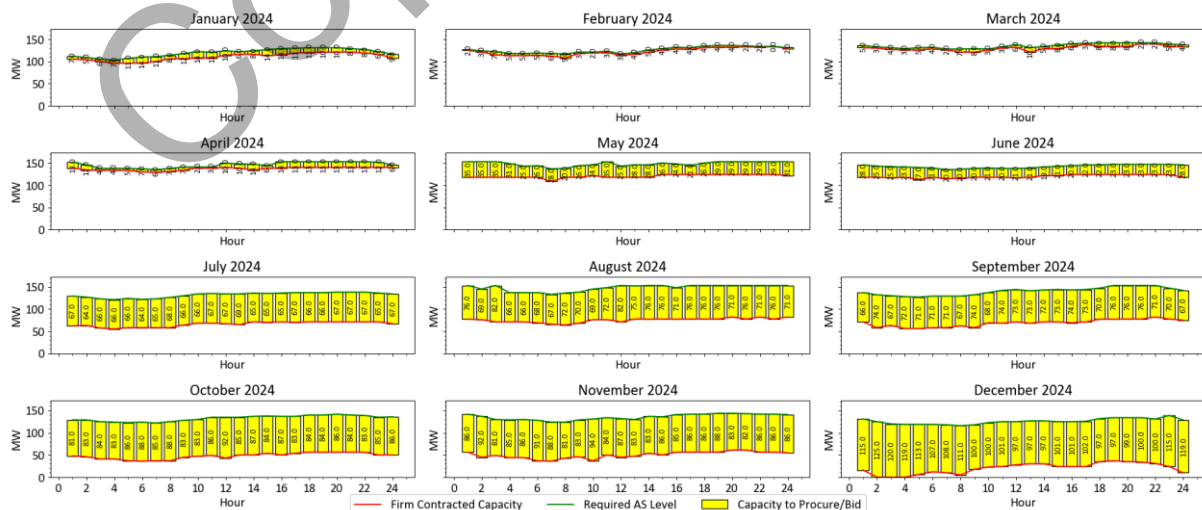
VISAYAS_RR Existing Firm Capacities and Capacities to Procure for Year 2024



VISAYAS_CR Existing Firm Capacities and Capacities to Procure for Year 2024

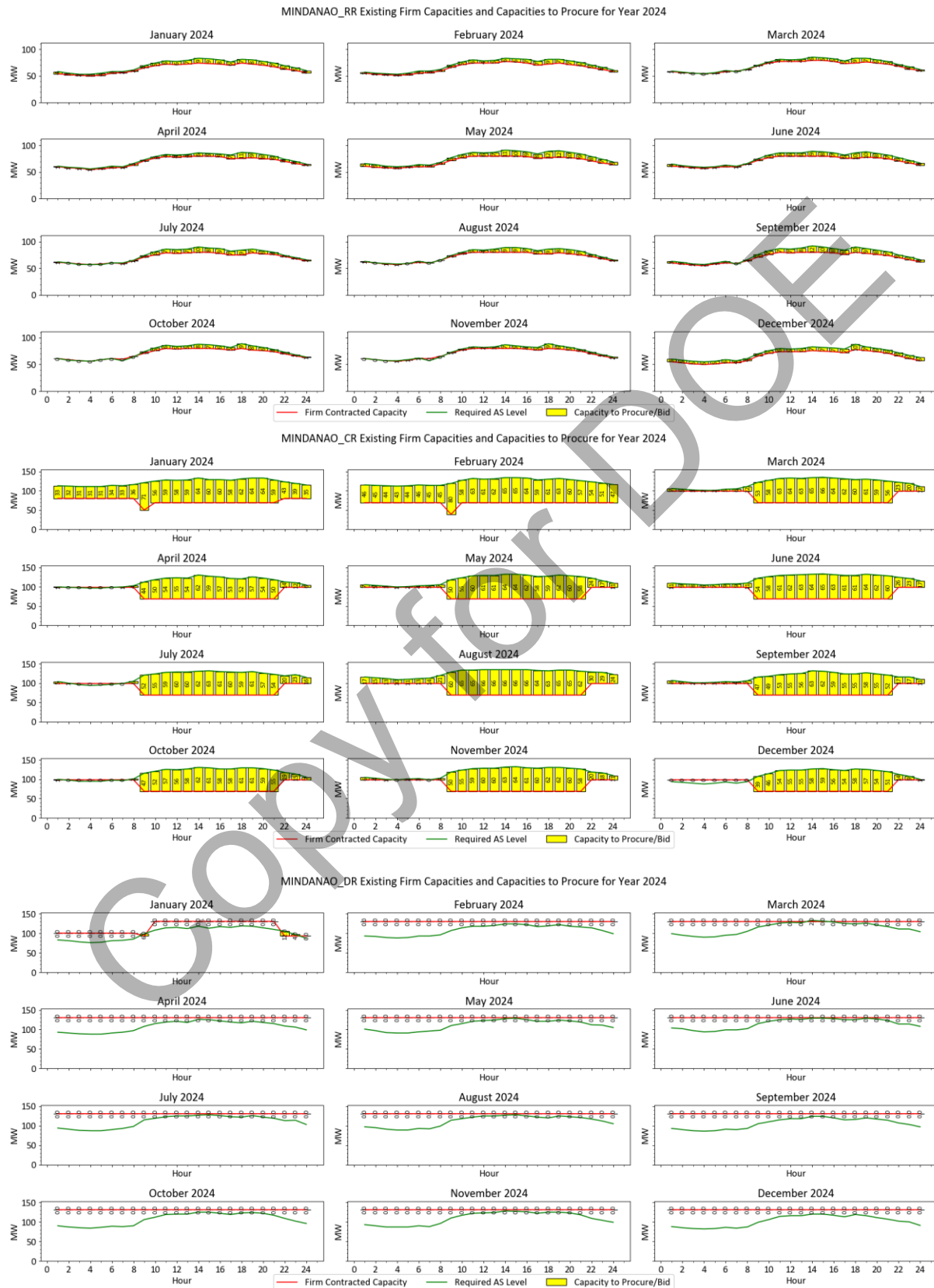


VISAYAS_DR Existing Firm Capacities and Capacities to Procure for Year 2024



Note: These simulations include the capacities of winning bidders that will be contracted for the 1st 2023 CSP, and the capacities under the negotiated ASPA of IASCO (projected until July 2024). Further, these simulations consider the AS Contracts which are proposed to be extended. Required levels might change upon conclusion of the Ancillary Services – Competitive Selection Process and contracts.

Projected AS Capacity to Procure under CSP for Mindanao



Note: These simulations include the capacities of winning bidders that will be contracted for the 1st 2023 CSP. Further, these simulations consider the AS Contracts which are proposed to be extended. Required levels might change upon conclusion of the Ancillary Services – Competitive Selection Process and contracts.