Welcome Media Partners

Guam Power Authority's Clean Energy Master Plan Media Roundtable

January 18, 2022

Relative to Legislative Bills
212-36 (COR) & 213-36 (COR)

Moderator

Guam Power Authority

Beatrice P. Limtiaco
Assistant General Manager, Administration

Speaker

Guam Power Authority

John M. Benavente, P.E.
General Manager

Legislation

212-36 (COR)

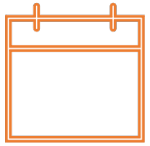
2012A Bond Refunding

- Bill 212-36 will allow GPA to refund its 2012 Series A bonds at a lower interest rate, resulting in ratepayer savings.
- Market interest rates are at historic low levels.
- Upon passage into law, GPA will petition the PUC for approval.
- GPA will work with GEDA, bond underwriters and bond counsel on the refunding project.

213-36 (COR)

Exemption for Reserve Generators

- Bill 213-36 will allow GPA to relocate a new reserve clean-fueled generator at Piti.
- GPA will retire costlier aging legacy power plants resulting in improved power system reliability and cost savings.
- The new power reserve unit will make our power system more reliable as we add more renewables.
- The Piti/Cabras area air quality will be substantially improved.



Virtual legislative public hearings on both bills are scheduled for January 20, 2022.

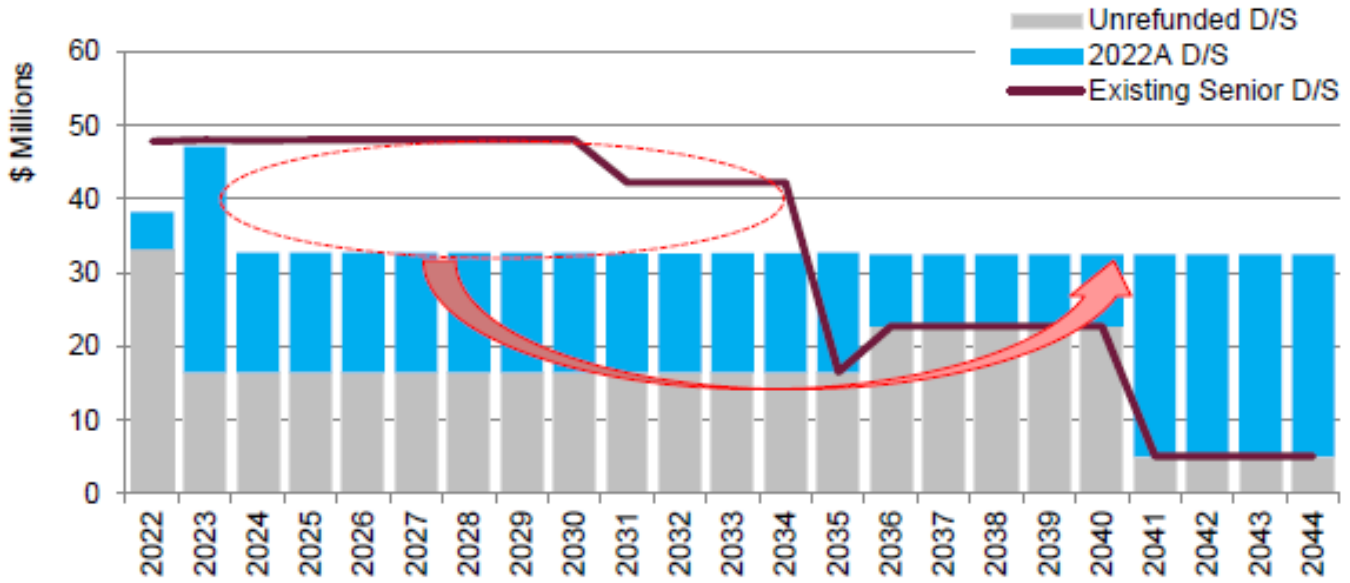
212-36 (COR) *2012A Bond Refunding*

Introduced by Senator Joe S. San Agustin

- Bill 212-36 will allow GPA to refund its 2012 Series A bonds at a lower interest rate, resulting in ratepayer savings.
- Market interest rates are at historic low levels.
- Upon passage into law, GPA will petition the PUC for approval.
- GPA will work with GEDA, bond underwriters and bond counsel on the refunding project.

Refunding of 2012 Series A Bonds

- $305.74M outstanding principal at 5.00% interest rate
  - $265.08M callable beginning October 1, 2022
- Today's interest rates on revenue bonds are at historic lows, and market appetite for triple tax-exempt bonds is strong.
- Refunding the 2012A bonds at a projected 3.2% interest may result in $15.4M NPV savings, thus levelizing GPA's debt service through 2044.
- Bond refinancing is one of several approaches to increase ratepayer savings and lower power bills by 2025. The plan minimizes the impact of any future erratic fuel price increases on ratepayer power bills



COST REDUCTION STRATEGY FROM NEW GENERATION

- Decreased Fuel Cost
- Retirement of Older, Costlier Generation Units
- Commissioning of Utility-Scale PV Projects
- Debt Service Restructuring
- Potential LNG Use

213-36 (COR) *Exemption for Reserve Generators*

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- GPA will retire costlier aging legacy power plants resulting in improved power system reliability and cost savings.
- The new power reserve unit will make our power system more reliable as we add more renewables.
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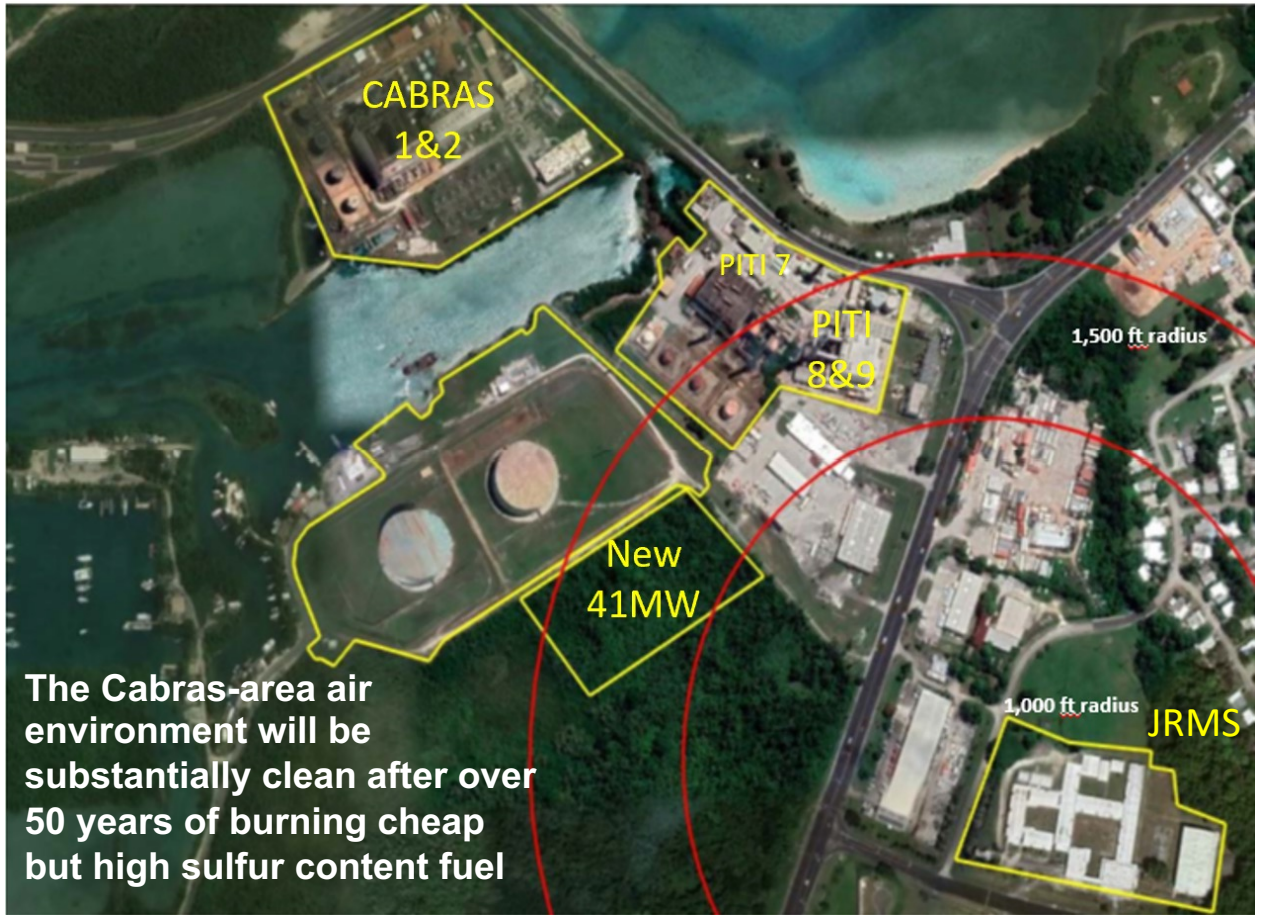
STAKEHOLDER DISCUSSIONS

Piti Village & MPC	November 16, 2021
Port Authority of Guam	December 7, 2021
Jose Rios Middle School PTO & GDOE	December 9, 2021

Bill 213-36 (COR) Exemption to Site New Reserve Units at GPA-Owned Cabras Property



GPA proposes siting the 41MW reserve units (a part of the new Ukudu power plant) adjacent to other existing power generating facilities to allow the main Ukudu power generators to operate under a minor source air permit, thus meeting the Consent Decree deadlines.

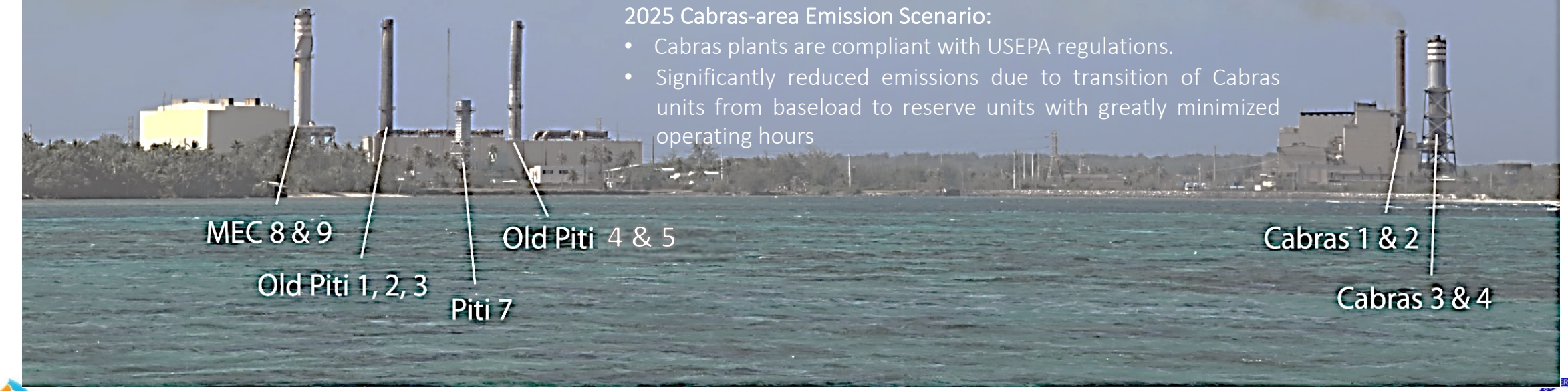
- The availability of existing fuel sources, major transmission lines and other power infrastructure makes this an ideal location for the reserve units.

- **Guam Ukudu Power lenders are concerned and may not finance the new power plant project due to a perceived legal issue:**
  - Jose Rios Middle School is approximately 1,000 feet from proposed 41MW Reserve Project causing concern about PL 22-23's 1,500-foot restriction
  - Department of Land Management has opined that the Cabras site was transferred to GPA and is unzoned Federal property turned over for power plant use by GPA. However, GUP is concerned that the conflict between special use designation and PL 22-23 may jeopardize the project financing
  - GUP requires GPA to remedy
- GUP lenders require assurance that no cost lease of GPA land to GUP for purpose of construction Ukudu and Cabras Reserve Diesel is authorized by law and is requiring that legislation to address PL 22-23 include specific authorization
- **PL 22-23 which restricts construction and operation of any fossil fuel generators over 1MW within 1,500 feet of a school.**
- **The subject lots are within 1,500 feet of Jose Rios Middle School, as are existing baseload plants Piti 8&9.**
  - **The school's potential impact from plant emissions occurred less than 3% of plant operations over the past 5 years (2016-2020).**
  - **The 41MW reserve units will burn ULSD and fuel consumption will be less than 10% of the existing Piti plants' consumption.**
  - **The plant will be permitted by GEPA and USEPA ensuring compliance with current and future ambient air standards.**

Cabras 41MW Reserve Units Siting at Cabras

Cabras area properties transferred to GPA from Navy for power generation and related facilities

Scenario	CABRAS 1&2	PITI 8&9	PITI 7	NEW RESERVE UNITS
Current	HSRFO & LSRFO ~1M bbls/yr	HSRFO & LSRFO ~960k bbls/yr	ULSD	-
Consent Decree Compliance	Transition to 0.2% LSRFO by 31-Dec-2022 Retire late 2024	Transition to 0.0015% ULSD by 31-Jul-2022	*Compliant*	Constructed as Ukudu Plant reserve units, burning clean 0.0015% ULSD
2025	Retired	Reserve Unit ULSD	Reserve Unit ULSD	Reserve Unit ULSD

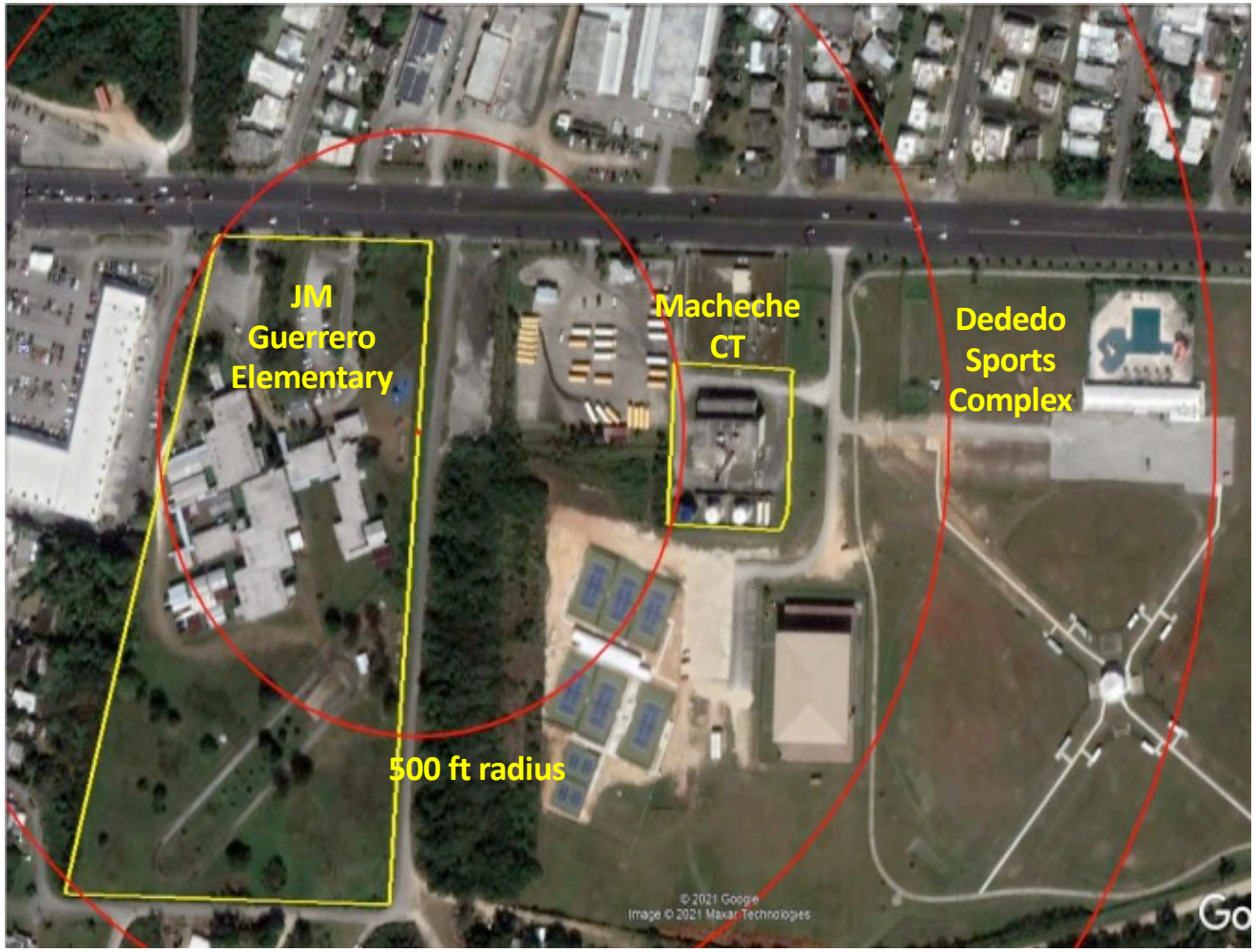


2025 Cabras-area Emission Scenario:

- Cabras plants are compliant with USEPA regulations.
- Significantly reduced emissions due to transition of Cabras units from baseload to reserve units with greatly minimized operating hours

PL 22-23 Promulgated to Address Macheche CT/JM Guerrero Radius

- Macheche CT constructed within 500 feet of JM Guerrero Elementary School in Harmon in 1993.
- Plant initially burned 0.6%S diesel. Complaints were filed. Issue addressed by raising stack. No issues since then.
- Additionally, GPA changed fuel from 0.5%S to 0.0015%S ULSD in 2011, improving the area air quality by 99%.
- Macheche operates regularly to support intermittency and spinning reserve.
- Basis for PL 22-23 limitation of 1,500 feet not found. It appears there is no scientific basis for limitation.
- Macheche is permitted by GEPA and has been operating on clean ULSD for years without any issues.



1992 Oct	1993 Mar	1993 Jun	1993 Oct	1997 Sep	2010 Dec	2011 Sep
• Air permit issued at 0.6% S fuel	• Plant commissioned	• PL 22-23 passed	• Stack extended to 145’	• Air permit issued at 0.5%S fuel	• Dededo Sports Complex opens	• Switched to 0.0015%S ULSD

Improved Air Quality

Juan M. Guerrero Elementary School

Macheche Power Plant

- Within 500 feet of JGES
- Within 500 feet of Dededo Sports complex
- Consistent, usual operations
- Uses 0.0015%S ultra-low sulfur diesel (ULSD)

No adverse air quality issues

Jose Rios Middle School

Piti Units 8 & 9

- Within 1,500 feet of JRMS
- Consistent, usual operations
- Uses 2.0%S residual fuel oil (RFO)
  - **July 2022: to use 0.0015%S ULSD**

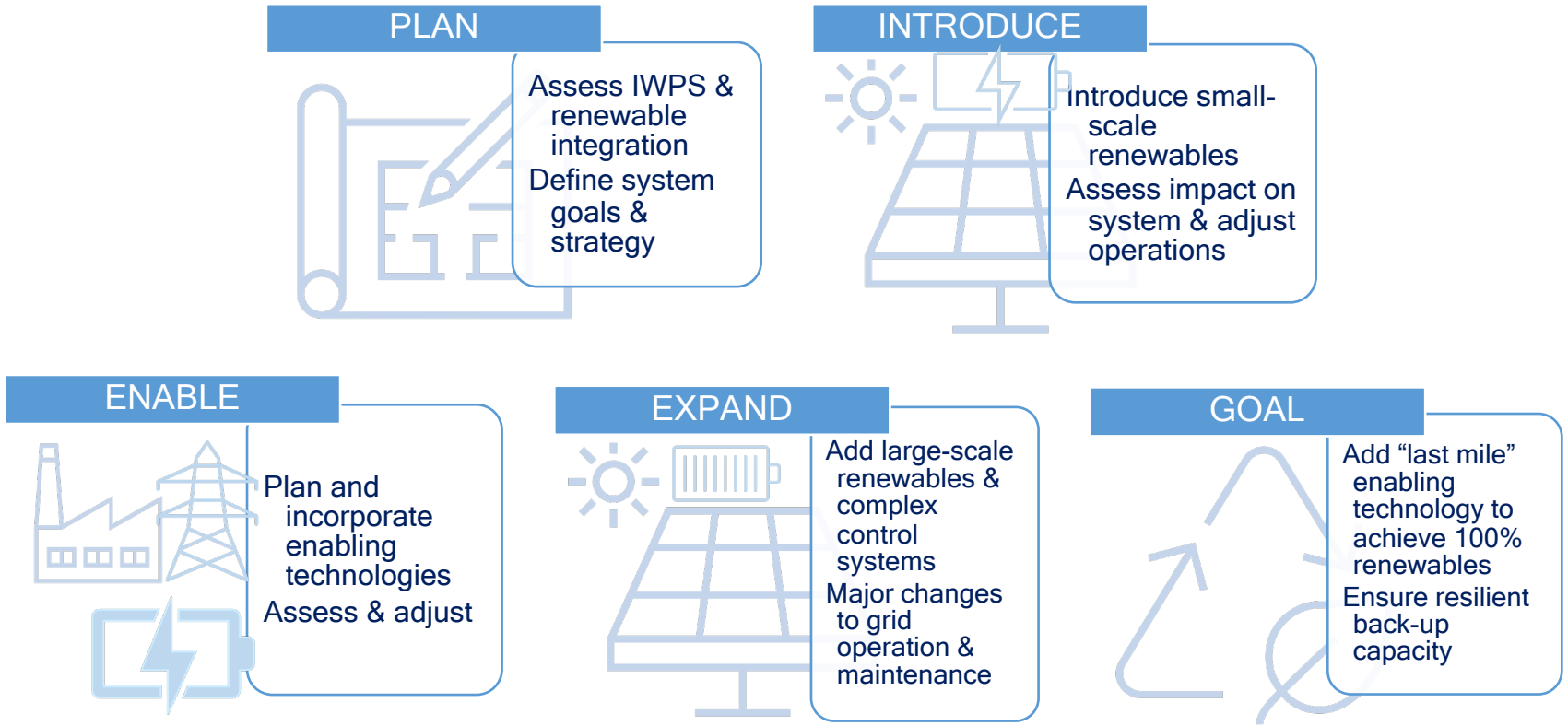
New Cabras Reserve Units

- Within 1,500 feet of JRMS
- Reserve operations
- Will use ULSD

Photo: Guam Pacific Daily News, July 28, 2021

Guam's Sustainable and Affordable Energy Future

Guam's Roadmap to Clean, Reliable, Resilient, Affordable Energy

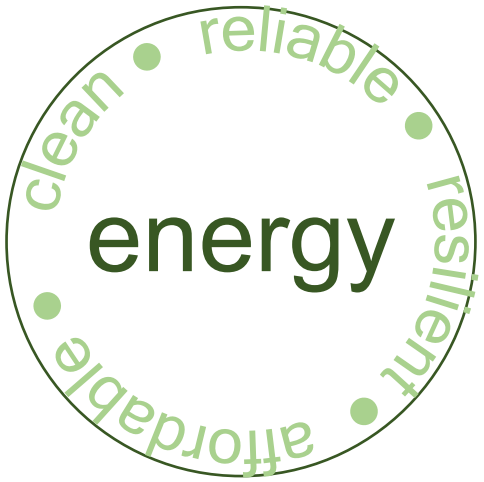


Transitioning to higher penetration of renewable energy the power system requires confidence that the renewables can provide **energy security**, **self-sufficiency**, and **system stability**.

Matching renewable technologies with the right enabling technologies at the right time needs **detailed planning**.

Planning is critical to ensuring Guam's energy infrastructure has the capacity, flexibility, resilience, and capability to adapt and deliver

Guam's Roadmap to Clean, Reliable, Resilient, Affordable Energy



Renewables with ESS
Utility-Scale Solar
Customer Solar
Other Renewables

Utility-Scale Energy Storage Batteries
Upgrade T&D Lines

New Efficient Baseload Units
Ukudu Plant
Ukudu Reserve Units
Low Cost Reliable Reserves

Clean Fuel
Ultra Low-Sulfur Fuel
Explore LNG

2025 PROJECTED ACHIEVEMENTS

25.30%
Renewable Energy Generation

(49,152,752) million
gallons reduced oil imports

COMPLIANCE
Consent Decree
USEPA Air Quality Standards

1,859x IMPROVEMENT
SO2 emissions

↓1 million
gallons reduced wastewater outfall

LOWER BILLS
Est. $0.1162 LEAC gives ratepayers sustainable, affordable rates

Guam's Roadmap to Clean, Reliable, Resilient, Affordable Energy

The Ukudu plant is the cornerstone

- to achieve more renewable energy
- ensure resilience and energy security
- improve reliability
- comply with the stipulated Consent Decree milestones

…to progress forward

We must work to keep the plan on track and deliver to our ratepayers.

PUC gives final approval to new Dededo power plant

Pacific Daily News
Steve Limtiaco, Pacific Daily News USA TODAY Network
Oct 31, 2019

PUC Chief Administrative Law Judge Frederick Horecky gave a lengthy report to commissioners and recommended the commission approve the deal, stating there would be very serious long-term consequences if it wasn't approved. The PUC must authorize government utility contracts worth $1 million or more.

Horecky reviewed the contract and said it is adequate to protect GPA and Guam ratepayers. The contract is well-written, with detailed requirements, he said, including a requirement that Korea Electric, during the 21st year of the contract, invest $15 million in the power plant so it will be in good condition when it is turned over to GPA after the 25th year.

Solar power on Guam?

Sen. Clynt Ridgell, chairman of the legislative power committee, is opposed to the contract and in October told the commission in written testimony that GPA should instead use more solar power, including micro-grids involving solar panels on tens of thousands of rooftops islandwide.

"You can't have a system based on only renewables" because renewable power sources aren't yet reliable enough to supply consistent baseload power, Horecky said.

"There was not a single solar proposal to GPA," because a solar system would be unable to provide the 96 percent reliability required by GPA, Horecky said.

GPA Clean Energy Roadmap Ensures Compliance with Consent Decree

Unjustified delays in achieving the stipulated order subjects GPA & its ratepayers to substantial penalties and jeopardizes GPA's ability to provide adequate energy to Guam

PENALTY

COMPLETED

$400,000 civil penalty paid, avoiding hundreds of millions in potential fines

DECOMMISSION

COMPLETED

Tanguisson 1&2, and Cabras 3&4 are permanently decommissioned

ENERGY STORAGE SYSTEM

COMPLETED

Install and operate 40MW ESS

IN PROGRESS

FUEL DELIVERY SYSTEM

Contract Issued

Dec 2021 1st COD

Convert RFO to ULSD at Piti 8&9

Refurbish main fuel storage tanks

Construct new pipeline

Transition from three fuels to five fuels to finally one fuel 0.0015%S ULSD

PITI 8 & 9 FUEL

Contract Issued

Jul 2022 COD

Convert Piti 8&9 to 0.0015%S ULSD to comply with ambient air standards of 2023

CABRAS 1 & 2 FUEL

Contract Issued

Dec 2022 COD

Use only 0.2%S LSRFO at Cabras 1&2 to comply with EPA ambient air standards of April 2023

UTILITY-SCALE SOLAR

Contracts Issued

Dec 2023 COD

Build additional 100MW solar PV

NEW BASELOAD PLANT

Contract Issued

Apr 2024

Build & operate new 198MW power plant using ULSD and capable of burning LNG

CABRAS 1 & 2

Oct 2024

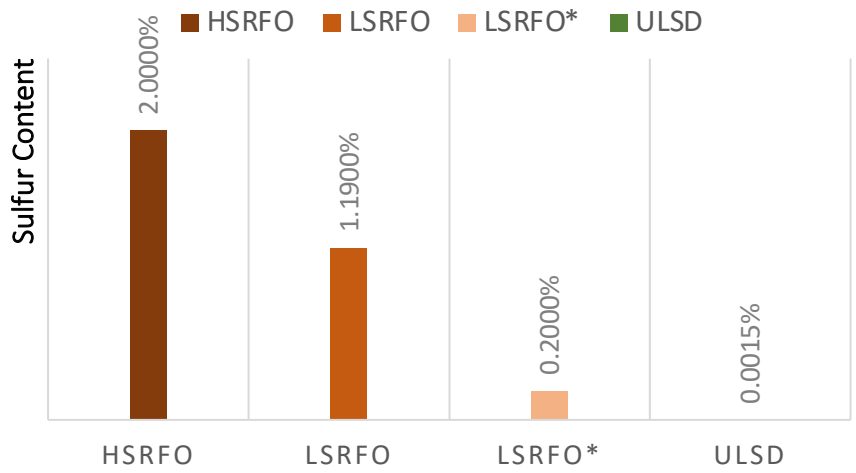
Retire Cabras 1&2

Transition to Clean Fuel Challenge:

Fuel	2022												2023												2024											
BASELOAD	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Cabras 1&2	HSRFO (2.0% S) / LSRFO (1.19% S)						LSRFO Special (0.2% S)																												end		
Piti 8&9	HSRFO (2.0% S) / LSRFO (1.19% S)						ULSD (0.0015% S) / ULSD Special (0.0015% S)																														>>>
Ukudu							ULSD Special (0.0015% S)																														>>>
Non-Baseload	*ULSD (0.0015% S)*																																		*ULSD Sp >*	

- 3 types of fuel are currently used
- 2 additional fuel types with lower sulfur content will be incorporated, resulting in up to 5 different fuels as the heavy oil is phased out
- The transition to cleaner, low-sulfur is underway: tank preparation; plants modification, fuel orders placed
- Lower sulfur oil may be used earlier than indicated

All plants will use a single fuel source beginning October 2024



CLEAN FUEL

Ultra-Low Sulfur Diesel

Explore LNG

RENEWABLE ENERGY

185MW Utility-Scale (160MW w/batteries)

26MW Customer

BATTERIES

40+ MW Energy Storage Batteries

Projected Annual Energy Fuel-Related Costs CY 2023 - CY 2026

LSRFO $/BBL		$100			$100		$100		$100	
ULSD $/BBL		$100			$100		$100		$100	
LNG ($/BBL Equivalent)							$60		$75	
CALENDAR YEAR		2023			2024		2025		2026	
Fuel Type		LSRFO/ULSD/Solar PV			ULSD/Solar PV		ULSD/Solar PV		ULSD/Solar PV/LNG	
		Net Production	% Production	Annual Cost	Net Production	Annual Cost	Net Production	Annual Cost	Net Production	Annual Cost
GPA Conventional										
Ukudu New 180 MW					602,900,134	$71,773,825	1,206,789,331	$150,093,968	1,297,863,518	$115,880,671
Cabras 1&2 0.2% LSRFO		644,466,000	35.8%	$109,603,061	312,816,000	$37,240,000	-	-	-	-
Piti 8&9 ULSD		625,632,000	34.8%	$96,103,226	312,816,000	$48,051,613	20,000,000	$3,072,197	20,000,000	$3,072,197
Total Baseload		**1,270,098,000**		**$205,706,287**	**1,228,532,134**	**$157,065,438**	**1,280,789,331**	**$153,166,165**	**1,317,863,518**	**$118,952,868**
Total Non-Baseload Units		**333,463,600**	**18.5%**	**$72,178,268**	**166,731,800**	**$36,089,134**	**10,000,000**	**$1,984,127**	**30,000,000**	**$1,984,127**
GPA Renewables										
GlidePath PV	$0.215/kWh	54,000,000		$11,610,000	54,000,000	$11,610,000	54,000,000	$11,610,000	54,000,000	$11,610,000
Hanwha PV	$0.079/kWh				141,912,000	$11,211,048	141,912,000	$11,423,916	141,912,000	$11,423,916
KEPCO PV	$0.085/kWh	141,912,000		$12,062,520	141,912,000	$12,183,145	141,912,000	$12,303,770	141,912,000	$12,303,770
Engie PV	$0.11/kWh				84,096,000	$9,250,560	84,096,000	$9,435,571	84,096,000	$9,435,571
Ph IV-A 60 MW	$0.11/kWh						141,000,000	$15,510,000	141,000,000	$15,510,000
Ph IV-B 60 MW	$0.12/kWh									
Ph IV-C 120 MW	$0.12/kWh									
Total GPA Renewables		**195,912,000**	**10.9%**	**$23,672,520**	**421,920,000**	**$44,254,753**	**562,920,000**	**$60,283,258**	**562,920,000**	**$60,283,258**
Total Conventional		**1,603,561,600**		**$277,884,555**	**1,395,263,934**	**$193,154,573**	**1,290,789,331**	**$155,150,292**	**1,327,863,518**	**$120,936,995**
System Production Cost				**$301,557,075**		**$237,409,326**		**$215,433,549**		**$181,220,252**
System $/kWh				$0.1676		$0.1306		$0.1162		$0.0958
Total Net kWh		**1,799,473,600**			**1,817,183,934**		**1,853,709,331**		**1,890,783,518**	
ULSD @ $85/BBL								*$0.104*		
LNG @ $65/BBL										*$0.088*

25% Energy from Renewable Sources by 2024; 38% by 2026

Status of Utility-Scale Solar PV Milestones

Utility-Scale Solar PV Projects

UTILITY-SCALE SOLAR

Contracts Issued

Dec 2023 COD

Build additional 100MW solar PV

60MW + ESS (Sasayan)

- KEPCO Mangilao Solar PV
- Settlement reached with private landowners
- 96% complete. All PV panels have been installed. Pending testing and commissioning.
- ECD April 2022

60MW + ESS (Dandan)

- Hanwha
- ECD December 2023

40MW “Solar After Dark” (Navy)

- Engie
- In Superior Court. OPA upheld GPA Award.

How will the accomplishments of this plan benefit Guam & the ratepayers?

Sustainable Path to Achieve Reliable Power, Clean Environment & Low Energy Costs

CALENDAR YEAR	2019		2022	2023	2024	2025	
GPA Conventional Units	kWh Production	Bbls Fuel	Bbls Fuel	Bbls Fuel	Bbls Fuel	Bbls Fuel	
Cabras 1&2 – 2% HSRFO	644,466,000	1,136,624	1,136,624				
Cabras 1&2 – 0.2% LSRFO				*1,136,624*	*551,704*		*As of Jan 2023*
Piti 8&9 – RFO	625,632,000	836,854	418,427				
Piti 8&9 – ULSD			*480,516*	*961,032*	*480,516*	*30,722*	*As of Jul 2022*
Total Baseload	**1,270,098,000**	**1,973,478**	**2,035,567**	**2,097,657**	**1,032,220**		
Total Non-Baseload (ULSD)	**333,463,600**	**756,153**	**543,001**	**436,425**	**116,698**	**11,338**	*Production Offset by Renewables*
Total System Conventional	**1,603,561,600**	**2,729,632**	**2,578,568**	**2,534,082**	**1,148,917**		
GPA Solar PV			kWh Production				
GlidePath PV 25MW	54,000,000		54,000,000	54,000,000	54,000,000	54,000,000	
KEPCO Mangilao PV 60MW			94,000,000	141,000,000	141,000,000	141,000,000	
Hanwha PV 60MW					141,000,000	141,000,000	
Engie PV w/ESS 40MW						84,096,000	
Total Solar PV	**54,000,000**		**148,000,000**	**195,000,000**	**336,000,000**	**420,096,000**	
Total kWh Production	**1,657,561,600**						
% Renewables	**3.3%**		**8.9%**	**11.8%**	**20.3%**	**25.3%**	
Total Fuel Consumption (Bbls)		**2,729,632**	**2,578,568**	**2,534,082**	**1,866,656**	**1,552,523**	
Annual SO2 Emissions (tons)		**13,016**	**10,259**	**756**	**370**	**7**	
Emission Multifold Improvement			**0.3**	**17**	**35**	**1,859**	
Projected Fuel at $100/bbl. ($/kWh)				**$0.1676**	**$0.1306**	**$0.1162**	
Projected Fuel at $85/bbl. ($/kWh)						**$0.1040**	

CY2025 Projection	
Renewable Energy Generation	**25.30%**
Annual Fuel Consumption (Bbls)	**- 1,177,108**
Emissions Multifold Improvement	**1,859 x**
Reduced, Affordable Fuel Cost	**$0.1162**

What would happen if we are unsuccessful in achieving our 2025 goal?

AVOID: Federal Court Receivership, Rotating Blackouts, Higher Rates and Uninterested Investors!

Plant	Nameplate MW	CY 2022 Derated MW Capacity	CY 2025 with Ukudu
Cabras 1	**66**	**50**	-
Cabras 2	**66**	**50**	-
Piti 8	**44**	**42**	**42**
Piti 9	**44**	**42**	**42**
Piti 7	40	33	33
Macheche CT	20	20	20
Yigo CT	20	20	20
Dededo CT1	20	20	20
Dededo CT2	20	20	20
Yigo Diesels	40	33	35
Tenjo Diesels	24	12	0
Talofofo Diesels	8	8	8
Pulantat Diesels	8	8	8
Ukudu Combined Cycle			**198**
Ukudu Reserve Diesels			41
TOTAL	**420**	**358**	**487**
CY 2021 Peak MW Demand:		**257**	**278**
Current Reserve		101	209
MINIMUM RESERVE REQUIREMENT			
Largest Baseload on Overhaul		*-50*	*-63*
Reserve Balance (subtotal):		**51**	**146**
2nd Largest Baseload on Forced Outage		*-50*	*-63*
Reserve Balance:		**1**	**83**

The New Ukudu Power Plant is Critical:

- ✓ **Comply with USEPA Regulations enforceable by Federal Government and by Federal court under the 2020 Consent Decree.**
- ✓ **To facilitate adding more renewables into the system and achieving 100% renewable energy by 2045.**
  - Plant provides low-cost reserve including during natural disasters and rainy days
- ✓ **To meet load growth including the military buildup and all ancillary civilian loads. Load growth is occurring including low-cost housing programs.**
  - If Ukudu plant does not proceed, a moratorium will be placed on future building projects
- ✓ **To retire aged conventional generation which are now 25 to 47 years old. 100% Renewables by 2045 is 23 years away.**

It takes many years to commission a power plant facility:

- Planning for new plant began in 2012.
- PUC approval obtained in 2016.
- Contract signed in 2019.
- Commissioning delayed until 2024.
- Investors not seeing Guam as good investment center

Put fåbot ayuda para I minaolek todu giya Guam!

si yu'us ma'åse'

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