



On the Horizon Programs & Projects

STAKEHOLDER MEETING #1
GPA INTEGRATED RESOURCE PLAN 2021

January 2021



Stakeholder Meeting #1

- Introduction to Integrated Resource Planning and the Stakeholder Process
- GPA Strategic Issues
- Assumptions & Inputs
- Existing Supply Side Resources & Services
- **On the Horizon Programs & Projects**
- Next Steps & How You Can Contribute
- Q&A / Open Discussion



What's on our Plate:

- Renewables
- Smart Grid
- Energy Storage
- Demand Side Management / Utility Energy Services/BEST Schools Program
- Liquefied Natural Gas (LNG)



Renewables

The Renewable Portfolio Standard (RPS) was created with PL 2962 (4/9/2008).

GPA adopted a 50% RPS goal in April 2019 through CCU Resolution No, 2019-05 in support of Bill 80-35.

The RPS was updated by PL 35-46 (11/12/2019) with the following new RPS goals:

- 5% of its net electricity sales by 12/31/2015
- 50% of its net electricity sales by 12/31/2035
- 100% of its net electricity sales by 12/31/2045



Renewables on the Grid

Phase I Renewable Contract

- First GPA utility scale Solar PV contract (26MW)
- Located in Dandan
- Commissioned in 2015

Net Metering Customers (as of Dec 2020)

- More than 25.6 MW of installed net metering capacity (2156 customers)

100% Federally Funded Wind Turbine

- 275 KW Vergnet Wind Turbine at Cotal
- Cantilevered down before storms
- Provides power throughout the day and night



Phase II, III, IV, ...

Phase II – Customer sited and owned solar PV projects located in Mangilao and Dandan/Malojloj.

- KEPCO Mangilao Project – January 2022 COD, 2 x 30MW Contracts
- Hanwha/174PG Malojloj Project – December 2023 COD, 2 x 30MW Contracts
- Initial install of about 180 MW of Solar PV.

Phase III – Solar PV projects with BESS for shifted energy

- Bid under protest

Phase IV –Additional renewable with shifting requirements

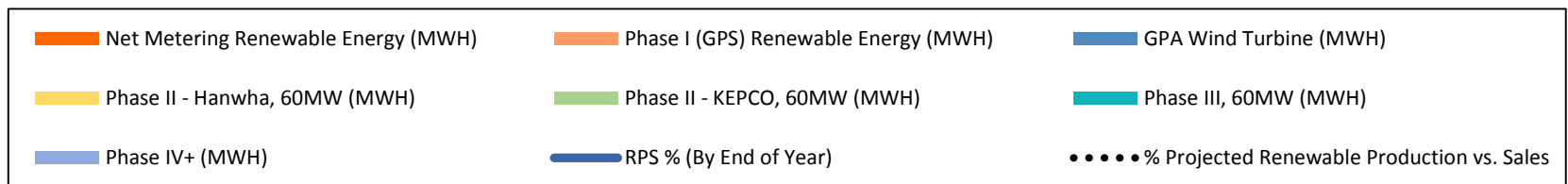
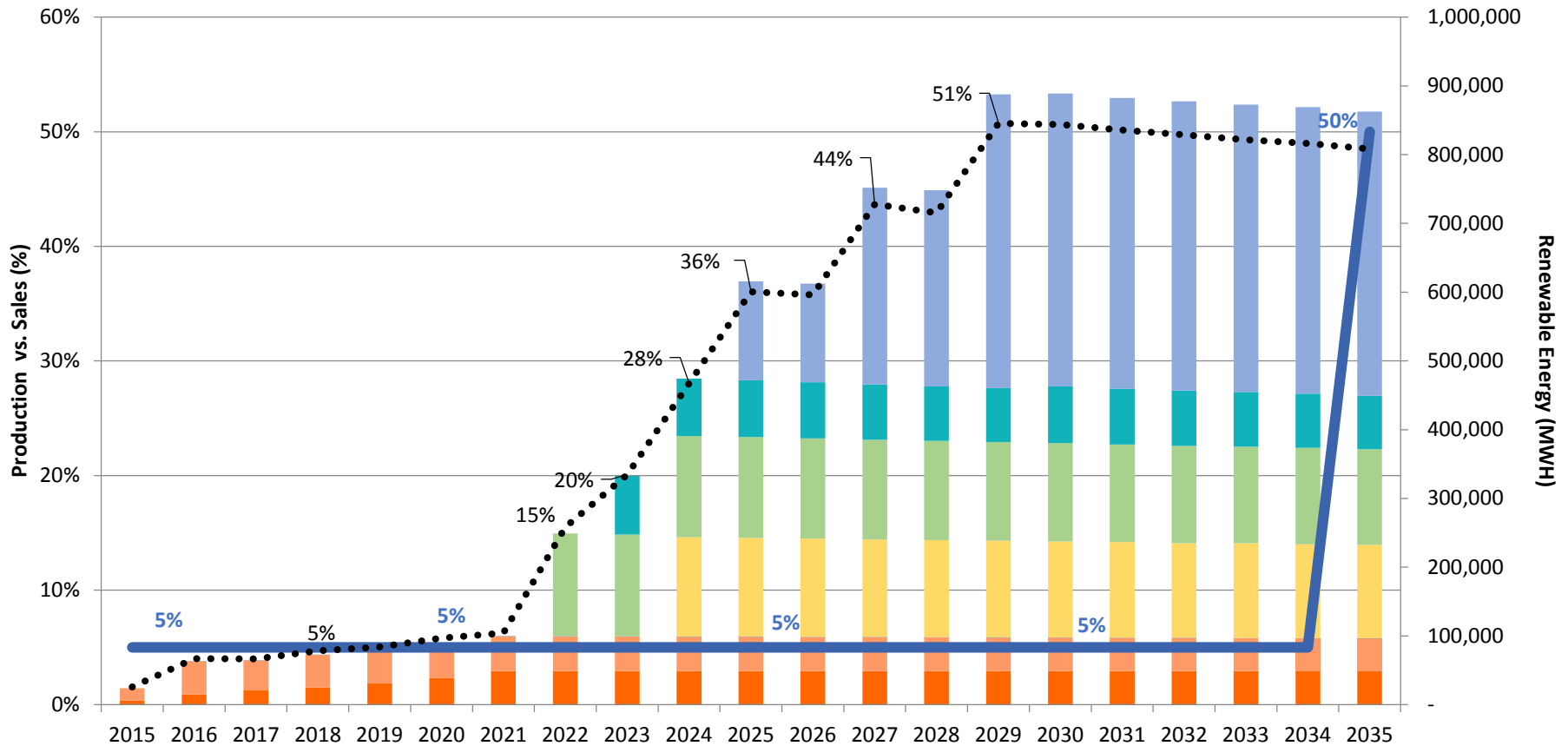
- Solicitation planned for 2021

All future intermittent (variable) renewable systems require energy shifting storage

Renewable Portfolio Standards (RPS) Tracking

Projection thru 2035

(as of 12/15/20)





Smart Grid

In 2010 a DOE shared grant opportunity allowed GPA to convert customer meters to smart meters and to design and install an Advanced Metering Infrastructure

- Provides opportunity for additional projects
 - Outage management
 - Substation automation
 - Fiber and Radio Network expansion
 - Mobile workforce
 - Site security
 - Distribution automation
 - More
- Data collection for system studies



Energy Storage

GPA continues to evaluating use of Energy Storage Systems to

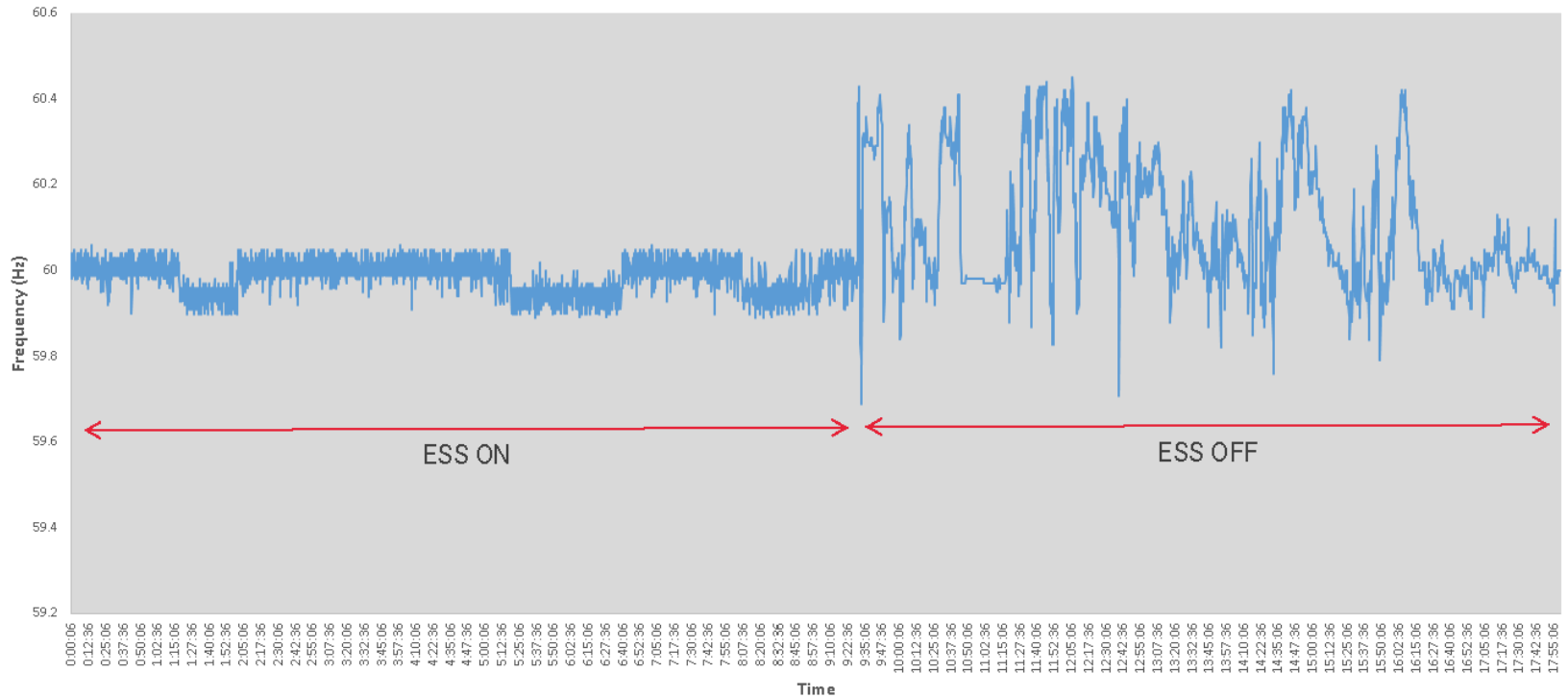
- Improve grid efficiency
- Improve grid reliability and stability

ESS projects to be considered:

- Energy Shifting / Peak Shaving
- Ancillary Services
 - Voltage Support
 - Spinning Reserve
 - Frequency Regulation
 - Renewable Integration
- Grid Controller
 - Conventional Generation (Automatic Generation Control)
 - Renewable Curtailment
 - Battery Energy Storage System Charge and Discharge Control
 - Future EV charging Control

ESS Frequency Regulation Performance

Agana ESS Frequency Regulation (12/31/20)

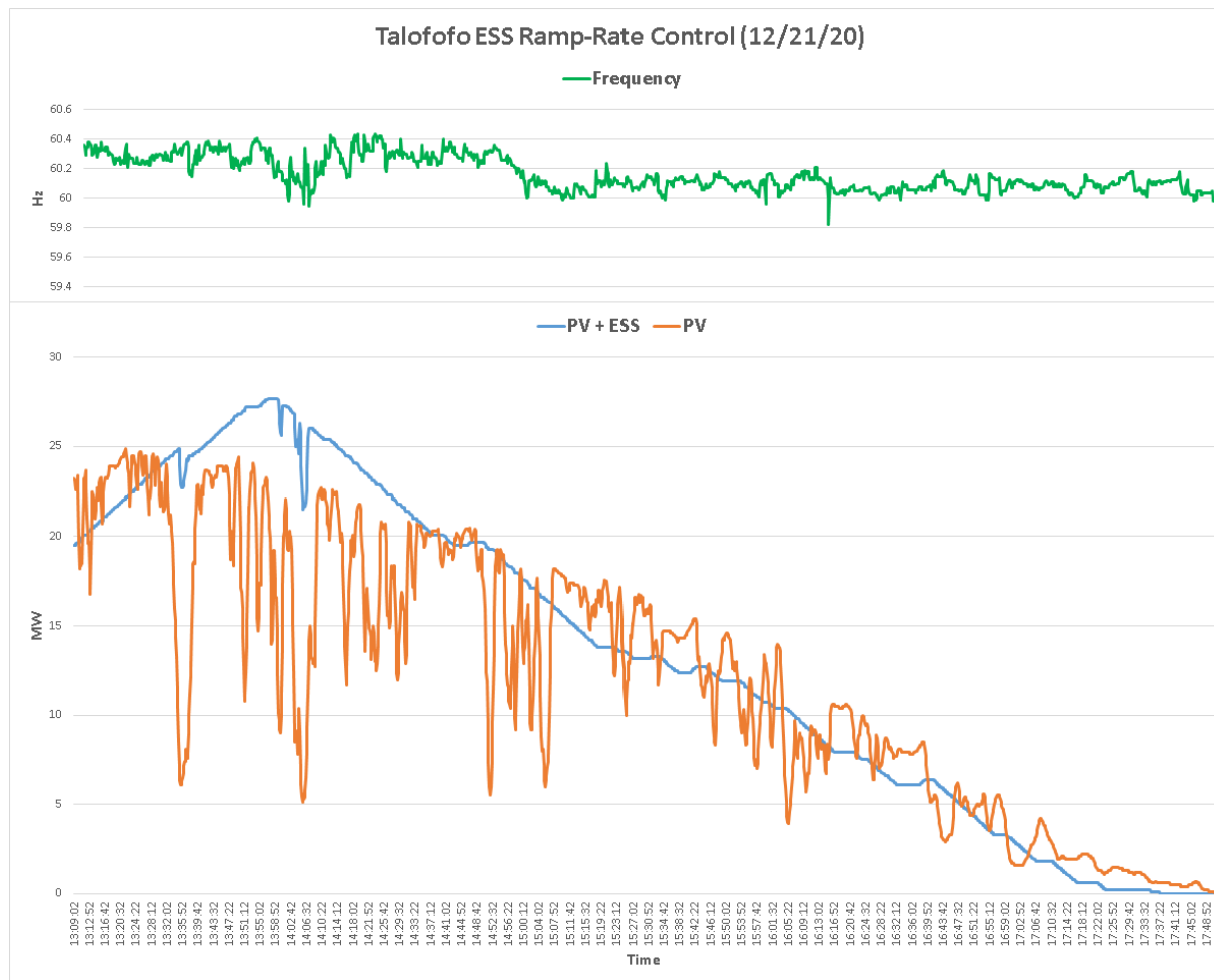


Agana ESS Online

Talofofo ESS Offline

Agana ESS
Offline

Talofofo ESS
Online



Agana ESS Frequency Regulation Performance

| Operating Mode | Period (hours) | Frequency Mean (Hz) | Period Frequency Bias (Hz) | Time Deviation Over Period (seconds) | Time Deviation Over Period (minutes) |
|----------------------|----------------|---------------------|----------------------------|--------------------------------------|--------------------------------------|
| Agana ESS Control | 24 | 60.00979693 | 0.04831796 | 14.11 | 0.24 |
| No Agana ESS Control | 24 | 60.10664432 | 0.09447225 | 153.57 | 2.56 |

Time Deviation estimated by using Frequency Mean and not computing deviation every 0.1 seconds

ESS Control Deadband Set to 0.1 Hertz



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