



Yap Renewable Energy Development Project (YREDP)

A Pacific island success story





SOMMAIRE



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- YREDP Overview

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- RE Power System Performance: PV only

3

- PV + Wind complementarity

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- Maximizing RE Penetration

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- Grid Stability

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- Design vs Reality

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- What Next?



1 YREDP Overview



YREDP Overview

PV

PV + Wind

Maximizing RE

Grid Stability

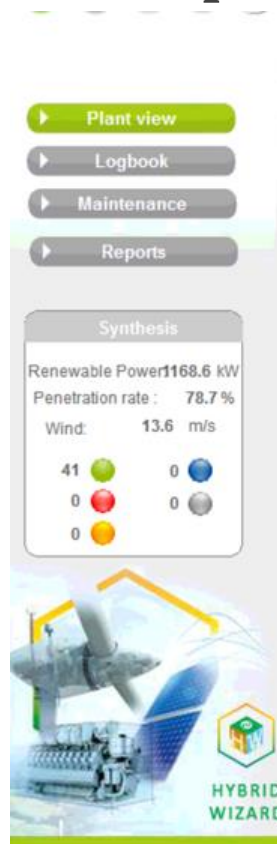
Design vs Reality

What Next?

An Island-wide fully integrated hybrid power system

to address Yap State Power Corporation ambitious objectives:

- 30% RE by 2020
- 50% RE by 2030





1 YREDP Overview



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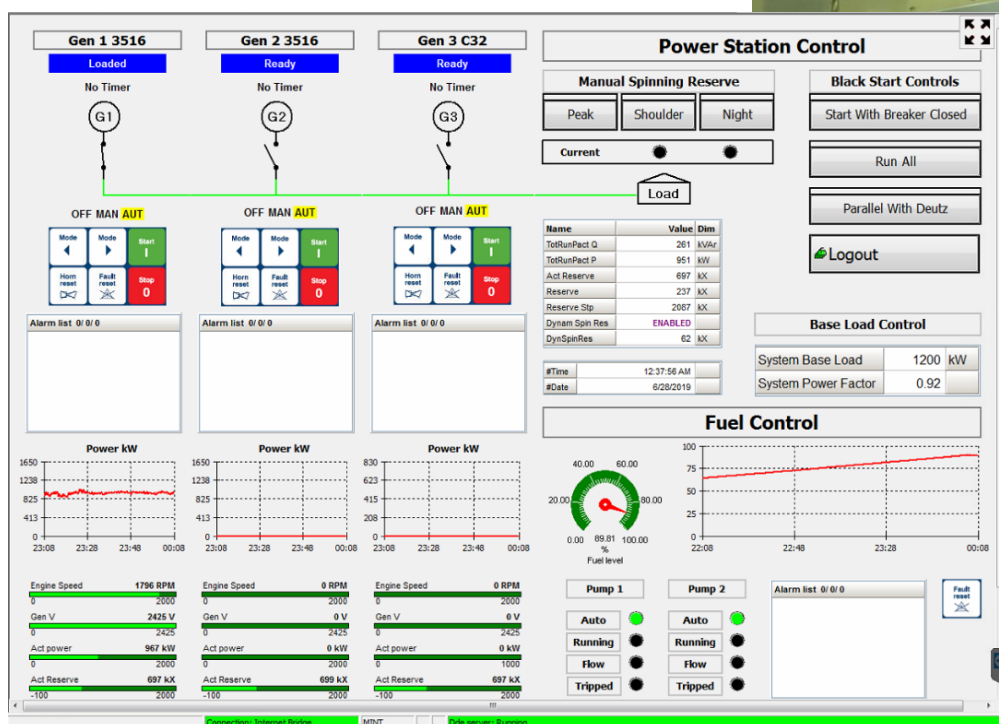
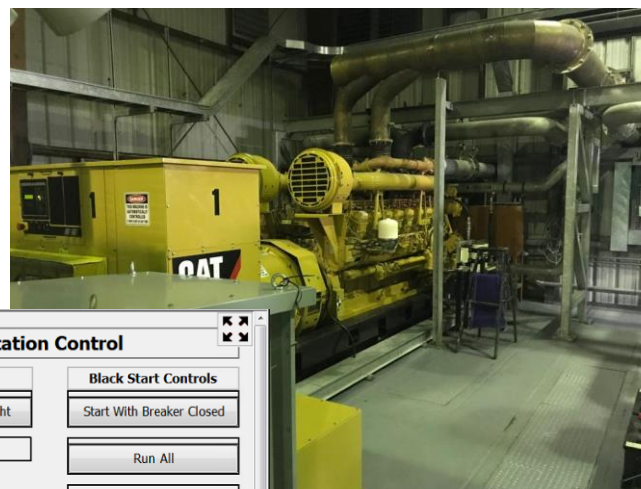
Grid Stability

Design vs Reality

What Next?

High Speed Diesels: 4550kW

2x 1860 kW
1x 830kW



Automated & Real-time control
of the high speed generators



1 YREDP Overview



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What Next?

Photovoltaic Plants: 508,5kWp

Water treatment:	13	kWp
Public Safety:	25	kWp
Public Works:	26	kWp
ECE:	50	kWp
Sports Complex:	194.5	kWp
PEC:	200	kWp

Sports Complex





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What Next?



PPA Rarotonga, 05/07/2019

Wind Farm: 825kW



VERGNET GEV MP-C : 275kW

- 🌀 Tilttable design (1 hour up/down)
- 🌀 Light logistics, ground-level maintenance
- 🌀 Unmatched resistance to cyclones
- 🌀 +500 in operation worldwide (150 in the Pacific)





1 YREDP Overview



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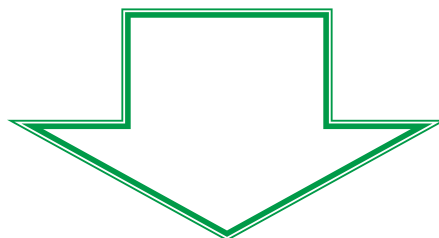
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What Next?

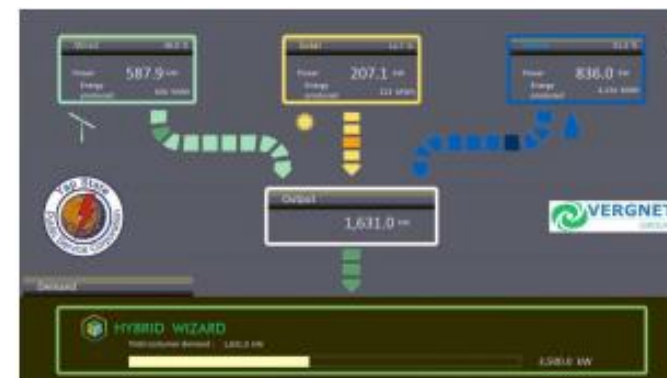
Integration & Control:

- 3 local Scadas (Diesel, PV, Wind)
- Island-wide communication network:
 - Optic Fiber between YSPSC Power plant and the Wind farm
 - Radio connection to all PV sites
- 1 showcase system: yspsc-sc.com



Hybrid Wizard©

- Automated controller
- Algorithm and parameters incorporating a complete modeling of Yap's Electrical grid
- Final settings and thresholds validated and improved during commissioning



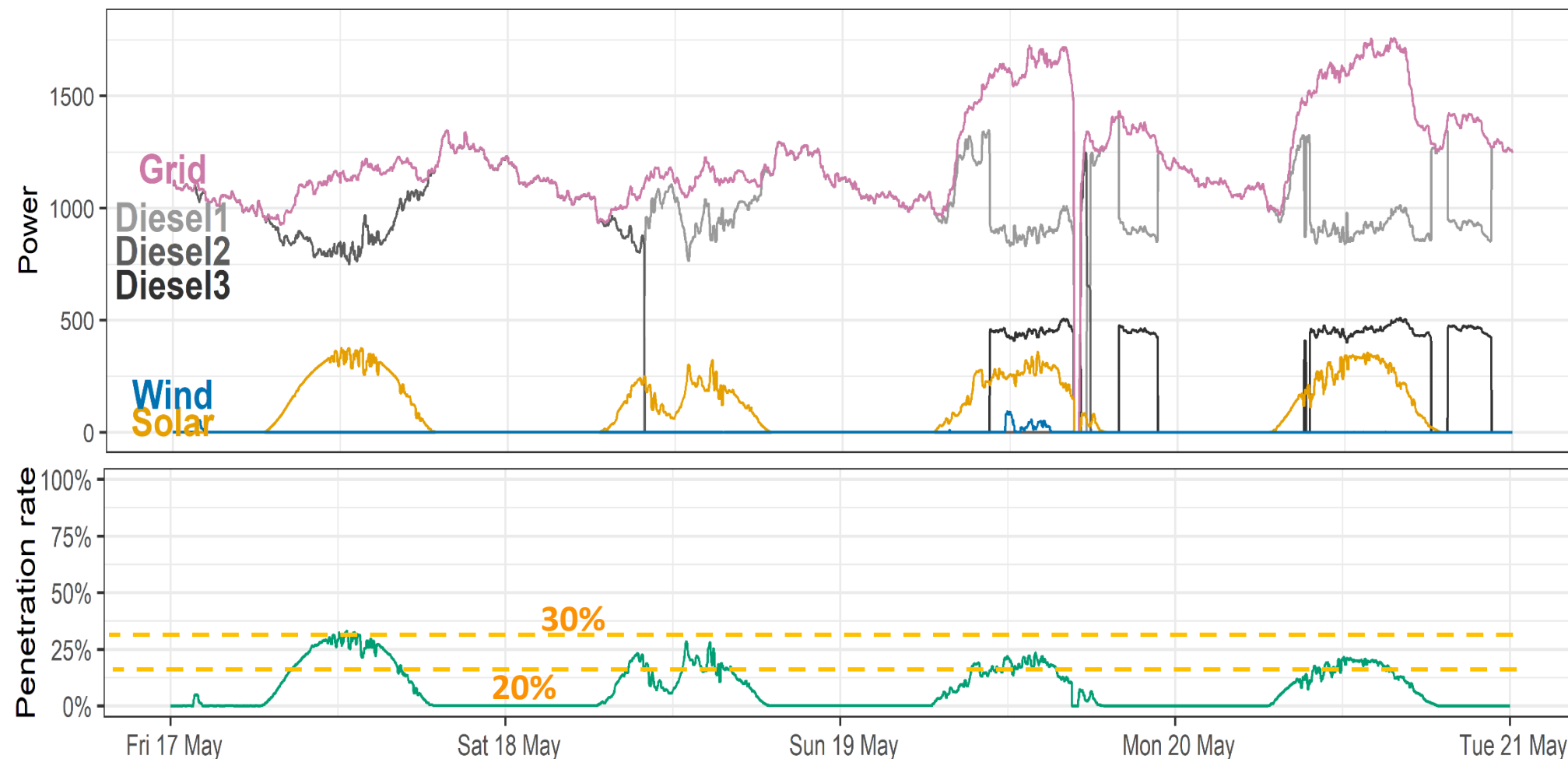


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RE Power System Performance: PV only



Low wind or no wind periods





3

PV + Wind complementarity



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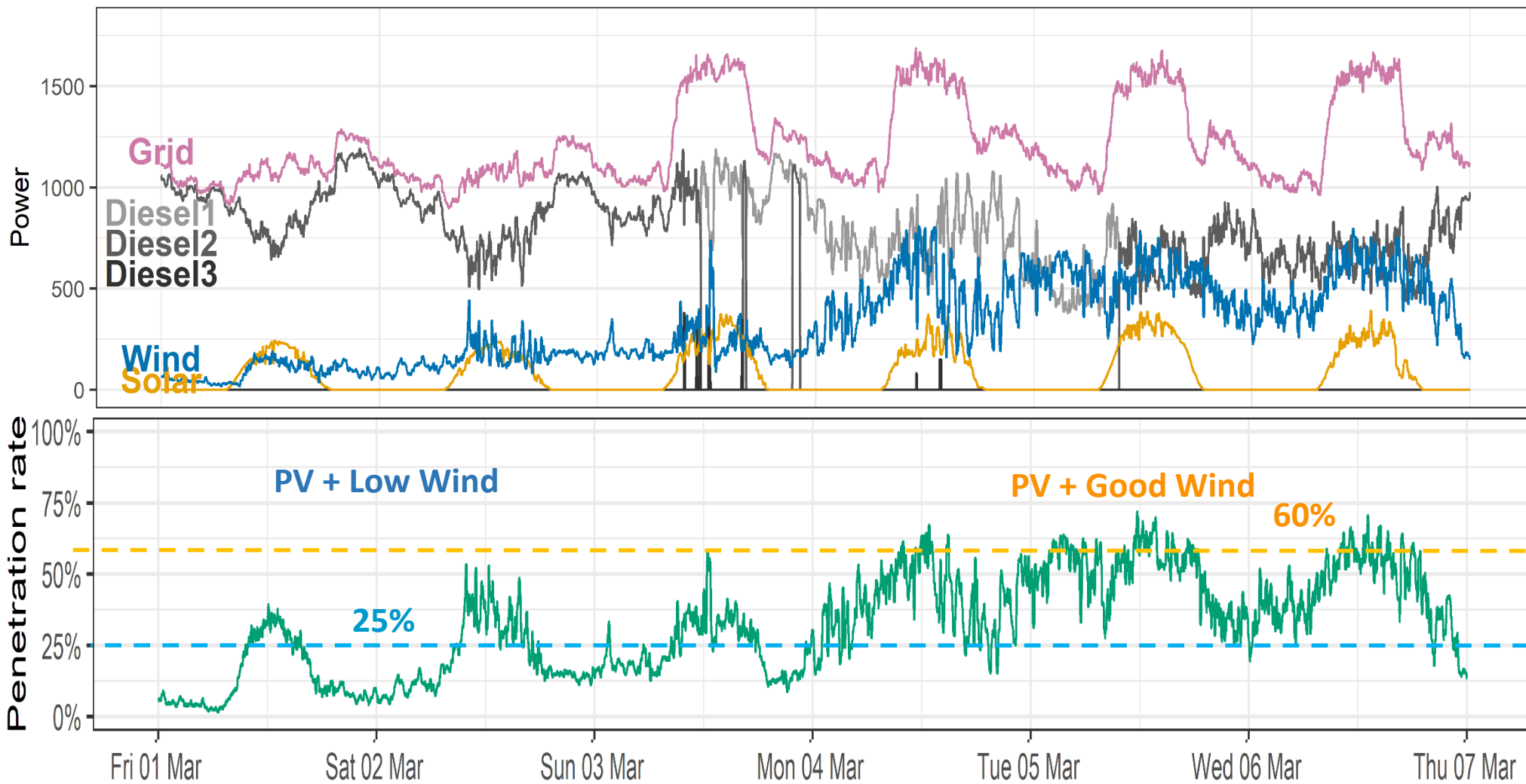
Design vs Reality

What Next?



PPA Rarotonga, 05/07/2019

Sunshine & Trade Winds



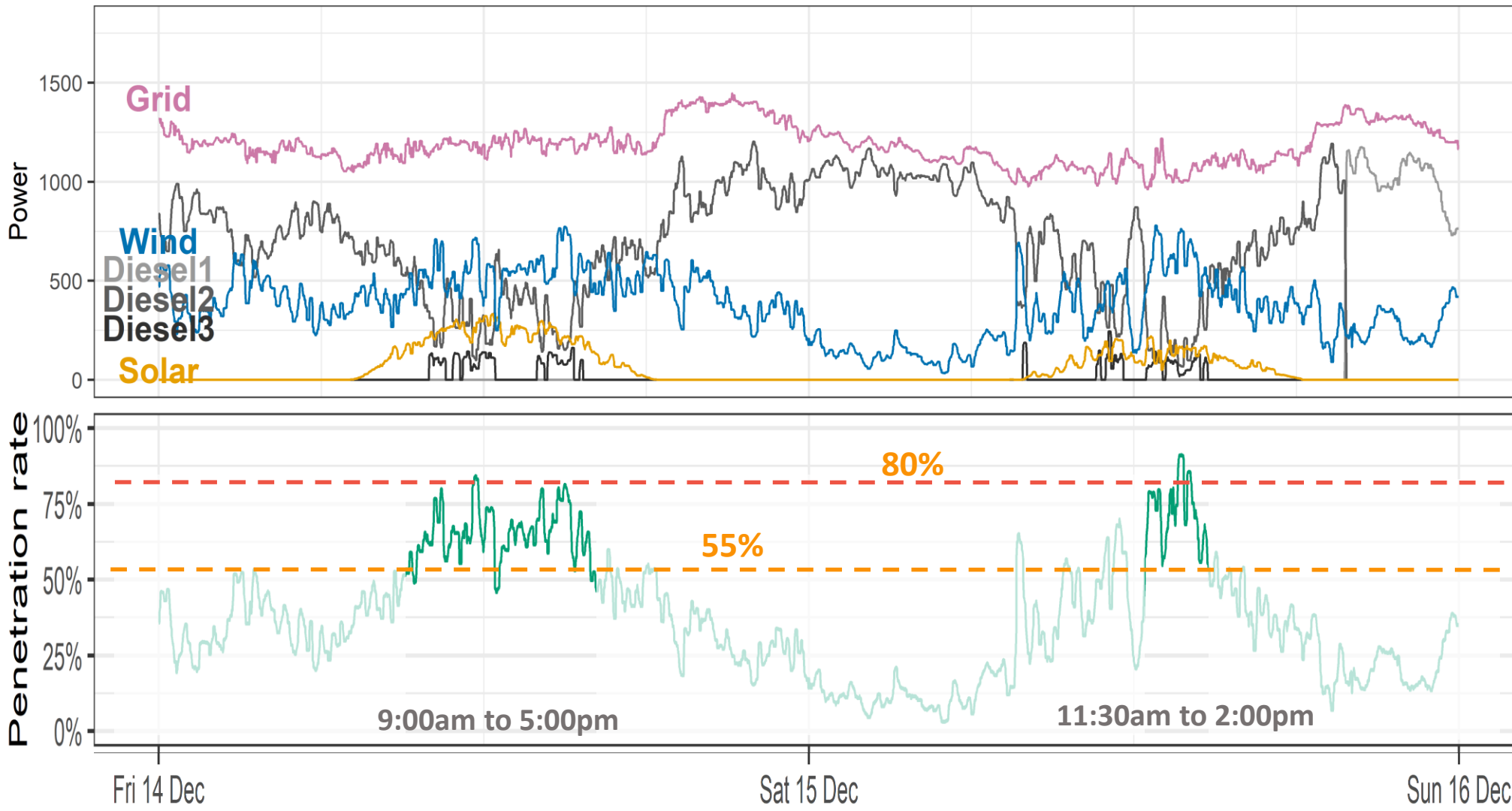


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Maximizing RE penetration



Pushing RE into the Grid to the maximum





6 Grid Stability



YREDP Overview

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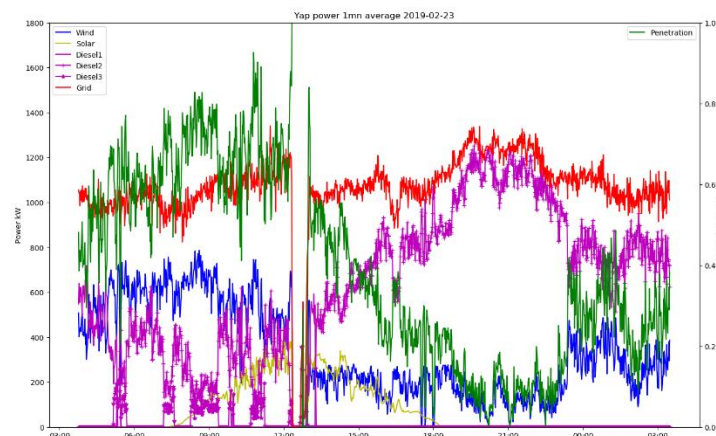
Design vs Reality

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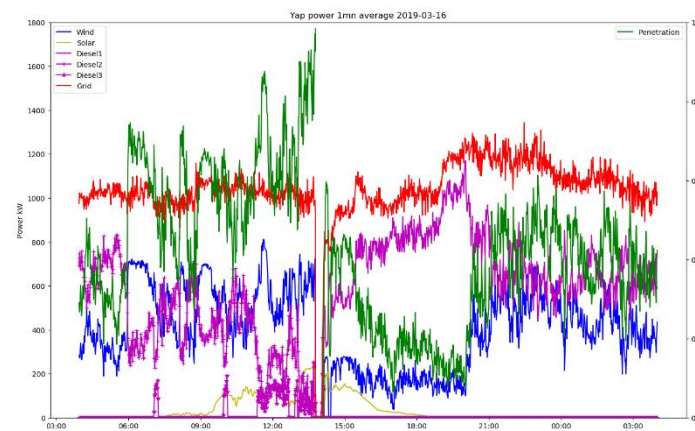


PPA Rarotonga, 05/07/2019

Issue	Nber of occurences	Corrective action	Problem Solved?
Reverse Power on Gensets	2	Software adjustment: Dynamic regulation limit windows	YES



23/02/19



16/03/2019

Robust System: No other issue caused by PV or Wind since commissioning



6 Design Vs Reality



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Design vs Reality

Instant RE share

up to 70%

up to 80%

Average RE share

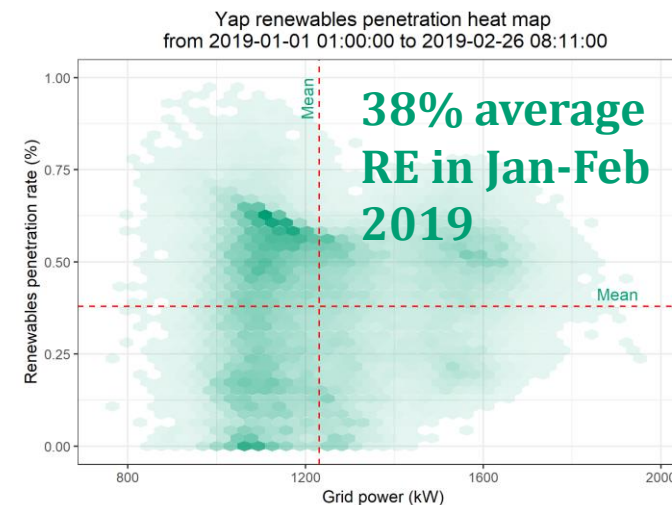
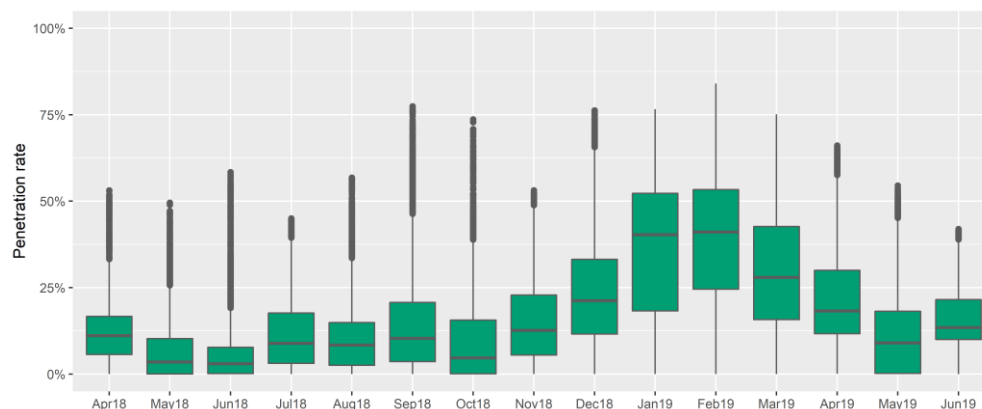
17%

up to 38%

Diesel Displacement
(US Gallons/year)

113,600

139,374





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What Next?

Achieving and exceeding Yap's 2030 RE objective:

Increasing RE Capacity:

- ☞ Solar
- ☞ Wind

Introducing Battery Storage

- ☞ Maintaining a high and stable level of RE Penetration
- ☞ Reduce solicitation on the high speed diesels for Dynamic Spinning Reserve

Further improving the robustness and efficiency of the system:

- ☞ Replacing radio link by optic fiber
- ☞ Select future equipment compatible with Hybrid controls requirements for maximum efficiency (communication & time response)

Hybrid Wizard PLC controller is ready for future extension

- ☞ Seamless scaling up (additional RE capacity, storage, weather prediction...)



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What Next?

Towards 100% Renewable...



100 % RE plant Wind + Battery – Tchad

