

REVERSE ENGINEERING NULE SOLAR POWER PLANT

**A Pilot Project to Maximize The Potential of Local Renewable
Energy to Transform The Indonesian Archipelago into A Sustainable Island**

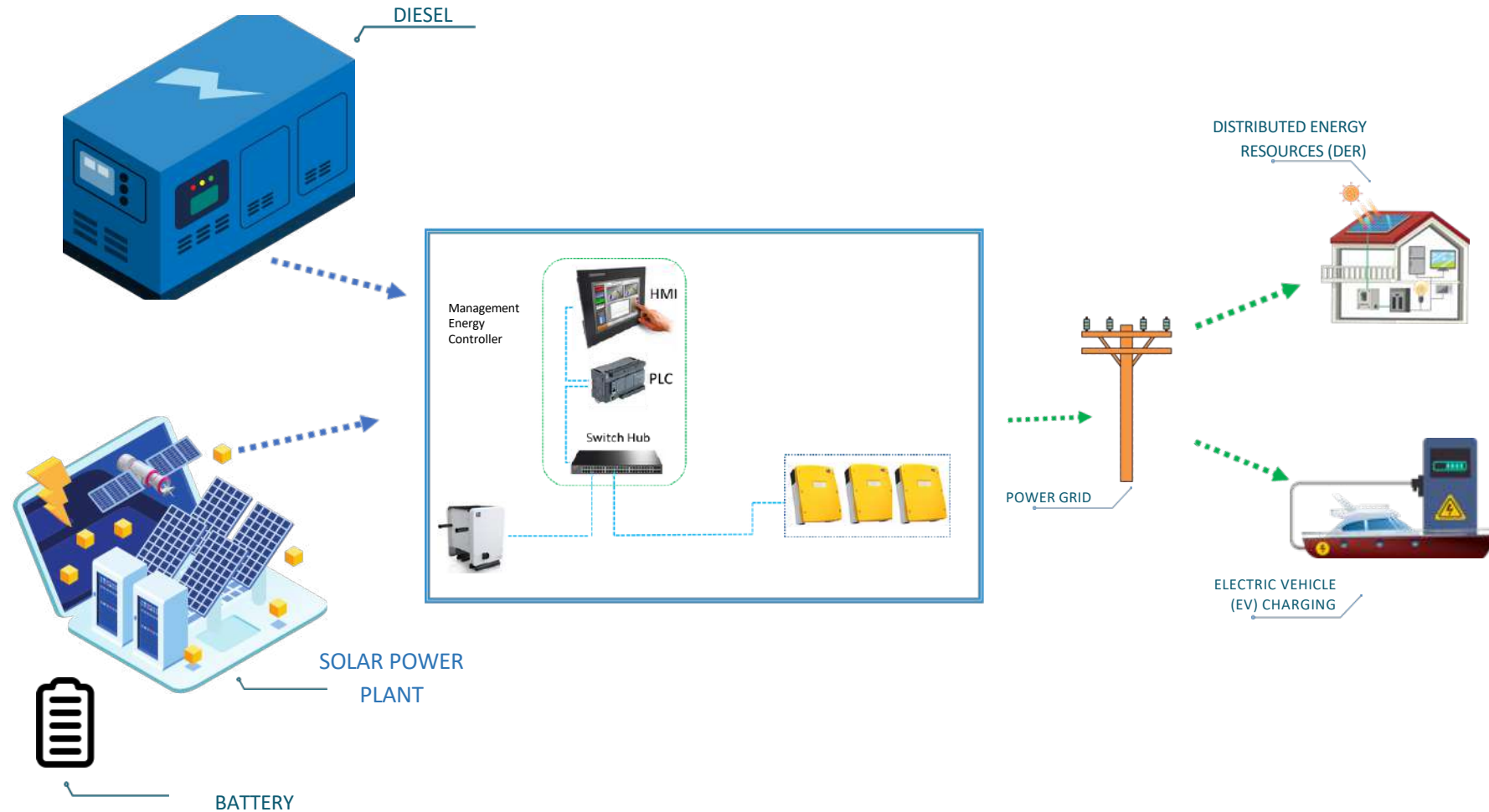
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FLEXIBLE STORAGE CONCEPT



Philosophy of Flexible Storage System :

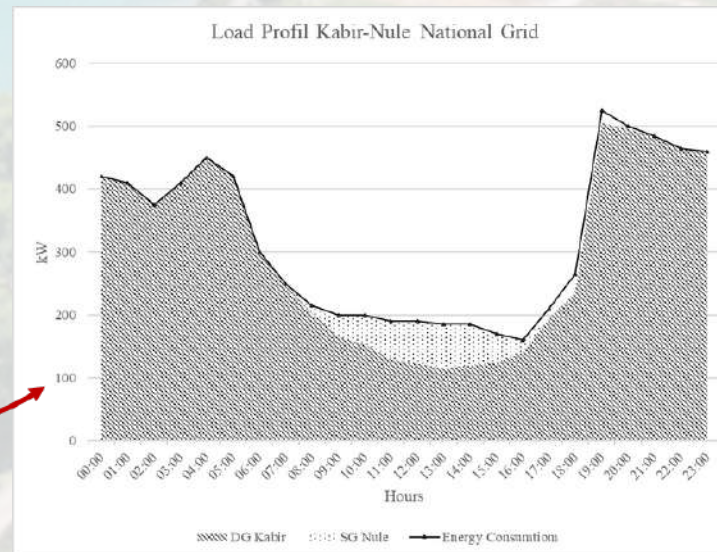
The power that will be exported to the grid, whether it is power from the battery (during night conditions) or combined power between power from the battery and power from the PV Inverter (during day conditions), the nominal power can be set according to needs.

NULE SOLAR POWER PLANT LOCATION

Map of Indonesia's solar energy potential



Pantar Island power grid



Load profile kabir -nule power grid

Nule Solar Power Plant is located on Pantar Island, East Nusa Tenggara Province, which is one of the Provinces with the largest Solar Energy Potential in Indonesia

Nule SPP, Kabir Diesel Power Plant (DPP) and Baranusa DPP are power plants that supply electricity on Pantar Island

Electricity on Pantar Island has a Load Profile with a peak load at night and a lower load during the day

Generator Capacity :

Nule SPP PV	: 248 kWp
Nule SPP Battery	: 1,620 kWh
Kabir DPP	: 2,015 kW
Baranusa DPP	: 590 kW

TRANSFORMATION OF THE PANTAR ISLAND ELECTRICITY SYSTEM



BEFORE

- Pantar Island is divided into 3 isolated systems with separate power plants (Baranusa DPP, Kabir DPP, Nule SPP)
- The electrical grid has a radial shape so it has low reliability



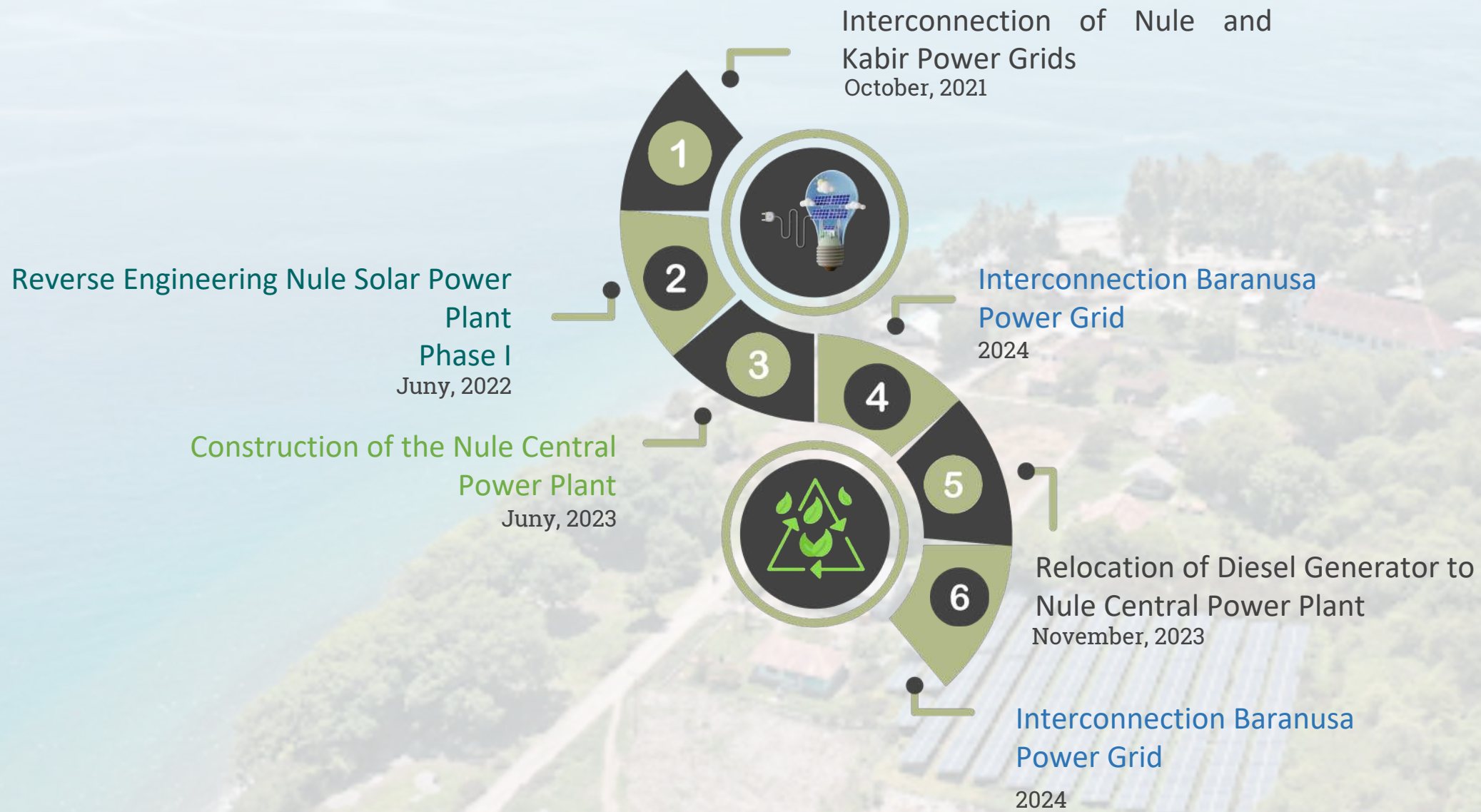
AFTER

- Pantar Island is a pilot project for developing a hybrid electricity system with a central generator in Nule
- The electrical grid is changed to looping which can increase reliability
- Increased income from potential customers on Pantar Island (airport, hospital)

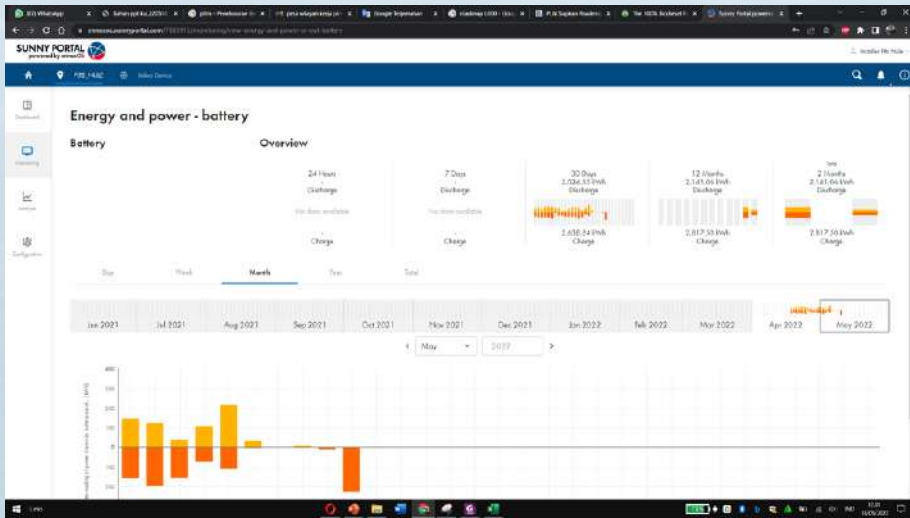


Click here to watch the Reverse Engineering Nule Solar Power Plant Video:
https://drive.google.com/file/d/1FpYhQS66RshV5kzvjmjqSTwLTqyRJzZ_/view?usp=share_link

TIMELINE HYBRID SYSTEM IN NULE



DASHBOARD INFORMATIONS SYSTEM NULE SOLAR POWER PLANT



Dashboard Informations System
Nule Solar Power Plant

Energy
Balance

Monitoring the recording of energy produced by solar panels, including export to the grid or stored in batteries

Battery
History

Monitoring the amount of energy entered into the battery (charge) and exported from the battery to the grid (discharge)

Event
Monitor

Recording the status of PV inverter equipment, battery inverters and other supporting equipment

Analysis

Analysis of production and efficiency of each equipment

Weather

Observe weather conditions, temperature, wind speed and make weather predictions on day+1

CO2
Avoidance

Provides a calculation of the CO2 that has been prevented from being produced

TRINITY RENEWABLE ENERGY ISLAND IN EAST NUSA TENGGARA TIMUR



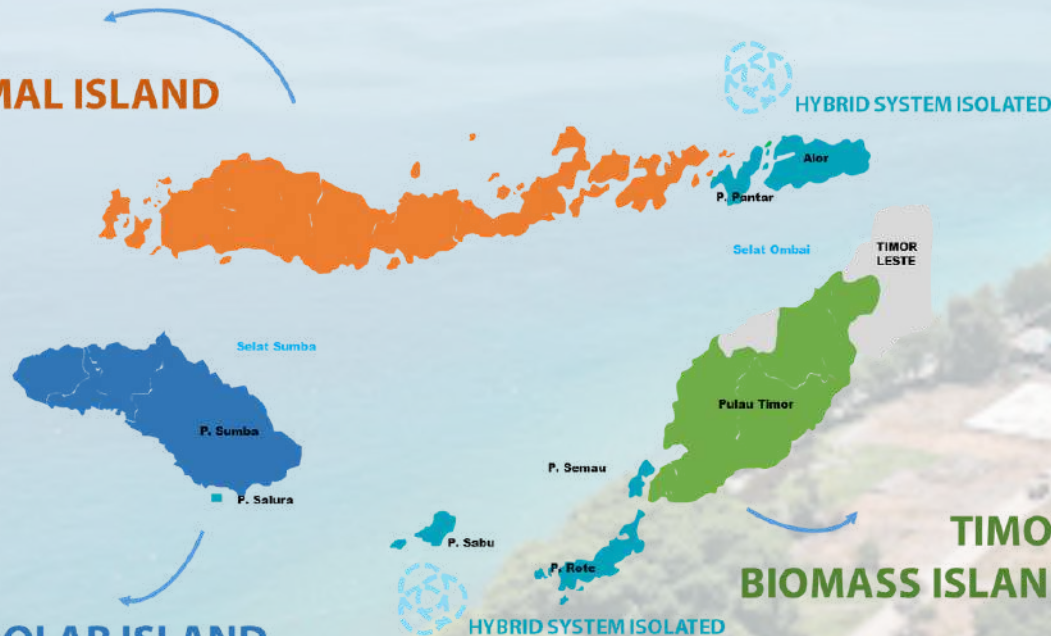
**FLORES
GEOTHERMAL ISLAND**

**SUMBA
HIDRO & SOLAR ISLAND**

**TIMOR
BIOMASS ISLAND**

Reverse Engineering Nule Solar Power Plant is one part of the Trinity Renewable Energy Island program in East Nusa Tenggara. This program maximizes the potential of geothermal energy on Flores Island, biomass energy on Timor Island, hydro and solar energy on Sumba Island, and the development of hybrid plants on isolated islands in East Nusa Tenggara.

A geothermal power plant with a capacity of 10 MW has been built on Flores Island. Bolok CFPP has used biomass from Timor Island to produce clean energy of 1.1 GWh in 2022. Hybrid system development has been carried out in 4 locations (Semau, Raijua, Pura, Nule) including the Nule Solar Power Plant



KEY TAKEAWAYS



Reverse Engineering in 2022 regarding the conversion of solar power from off-grid to on-grid has proven to be able to increase Nule SPP production more than 100%. It can reduce fuel consumption +/- 5 kiloliters/months and reduce CO2 emission 83.95 tons/year. This success is one of the reasons for continuing this project into phase 2 which is estimated to be in 2023. It is a small step to achieve target of 23% renewable energi in 2025 and net zero emissions 2060



Thank You