

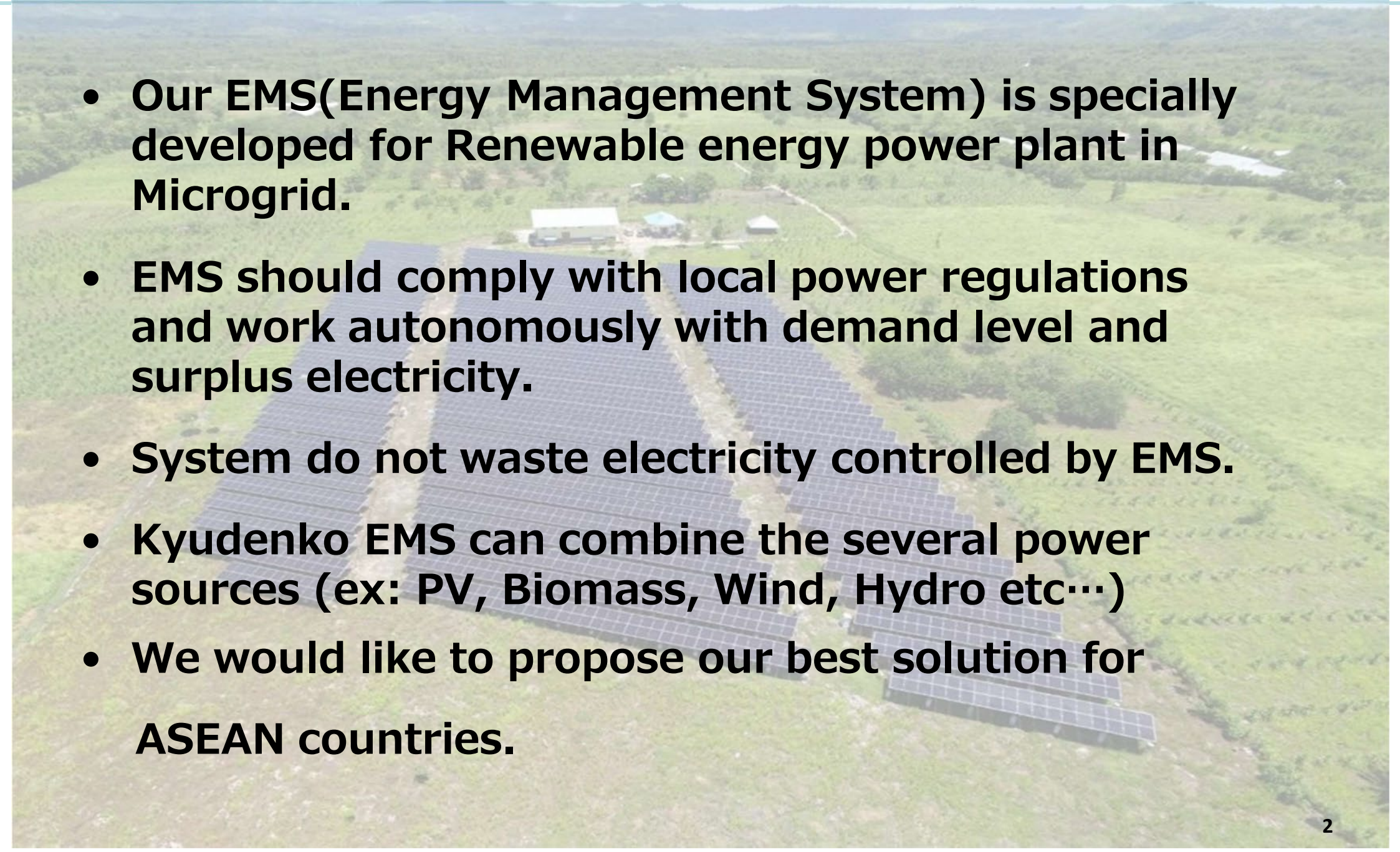


## ***CEFIA Microgrid Flagship Project***

# **Distributed Generation by Renewable Energy**

**July 23, 2024**



- 
- **Our EMS(Energy Management System) is specially developed for Renewable energy power plant in Microgrid.**
  - **EMS should comply with local power regulations and work autonomously with demand level and surplus electricity.**
  - **System do not waste electricity controlled by EMS.**
  - **Kyudenko EMS can combine the several power sources (ex: PV, Biomass, Wind, Hydro etc...)**
  - **We would like to propose our best solution for ASEAN countries.**



# 2. KYUDENKO, An Integrated Facility Contractor

Kyudenko is a leading company of :

- \* Electrical Construction work
- \* Heating, Air conditioning and Mechanical Installation work
- \* Power distribution line work
- \* Renewable Energy plant – Construction, O&M

**Over 2,200 MW experiences in Photovoltaic Power Plant construction throughout Japan**

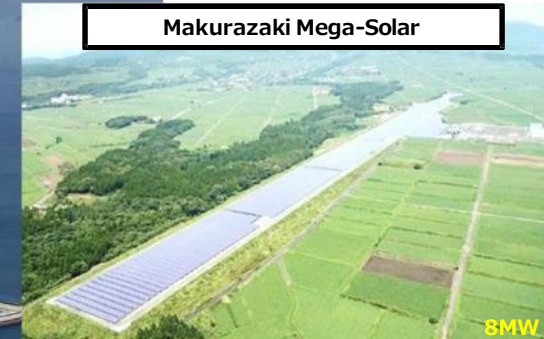
**Nanatsu Island Mega SP Station, 70 MW**

**Taiwan On water Mega-Solar**



5MW

**Makurazaki Mega-Solar**



8MW

**Saga Ouchi Mega-Solar**

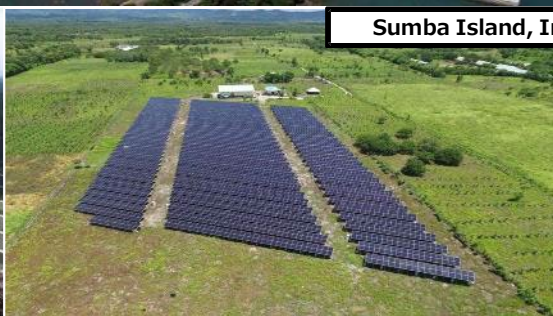


21MW

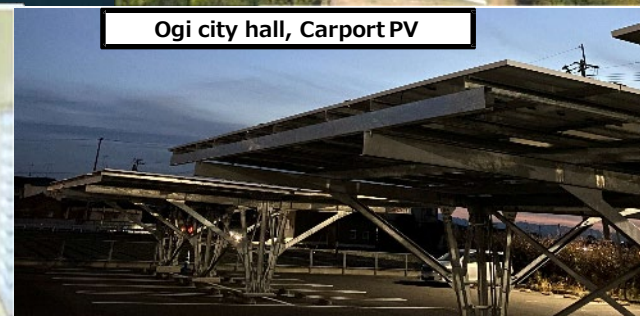
**Kirishima Biomass**



**Sumba Island, Indonesia**



**Ogi city hall, Carport PV**





# 3. KYUDENKO's Track Record of RE and Micro Grid

## Business Operation

	Number of Power Plant	Capacity (Overall Business)	Capacity (Equity Equivalent)
Solar Power	99	1,315 MW	368 MW
Wind Power	11	204 MW	101 MW
Biomass	9	324 MW	34 MW
<b>Total</b>	<b>119</b>	<b>1,842 MW</b>	<b>504 MW</b>

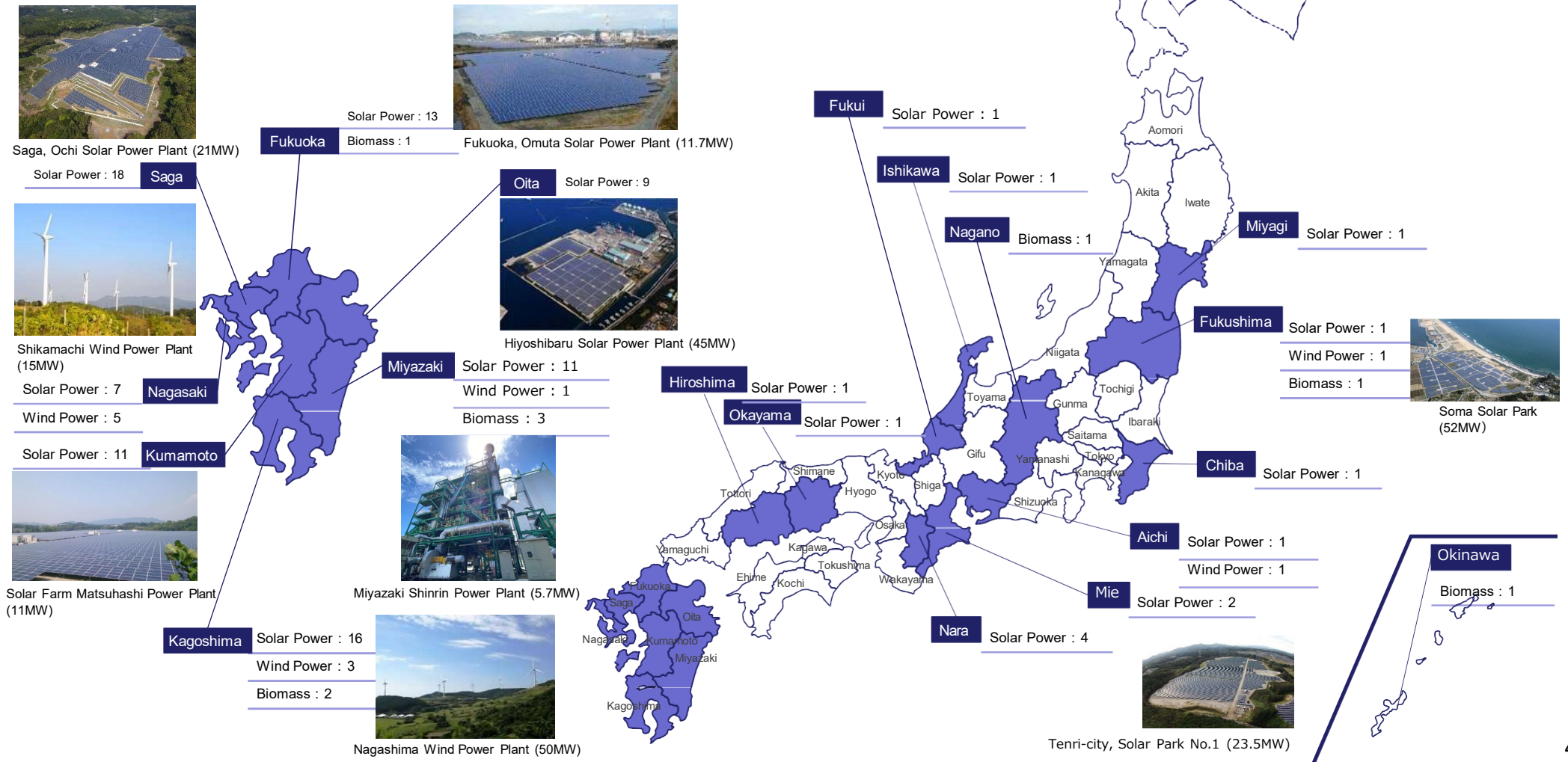
\* Including projects under construction and planning

## Track Record of Construction

	Number of Power Plant	Capacity
Solar Power	1,252	2,681 MW
Wind Power	10	184 MW
Biomass	2	55 MW
<b>Total</b>	<b>1,264</b>	<b>2,920 MW</b>

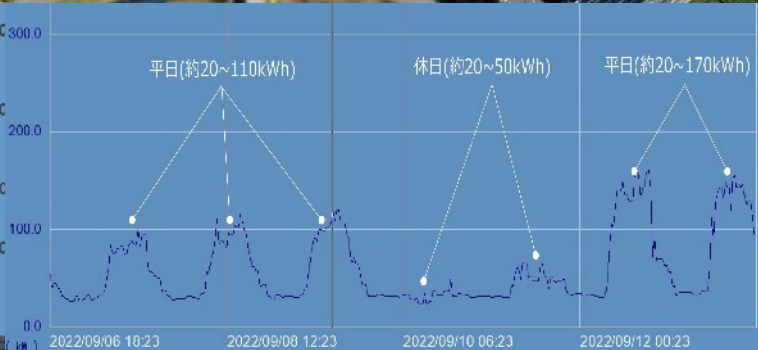
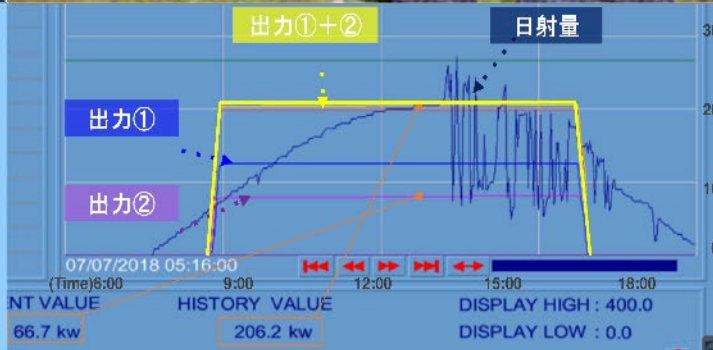
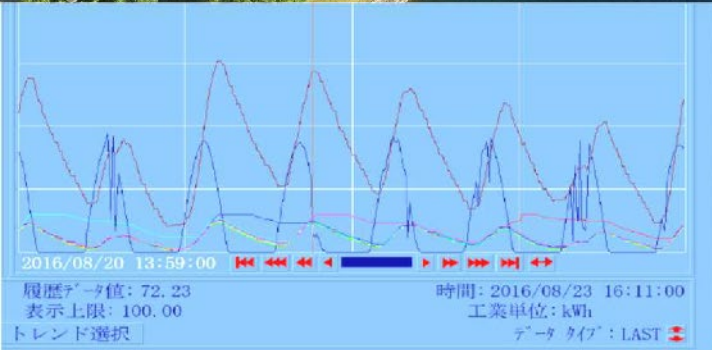
\* Only Main Contractor

As of October, 2022



# 4. "KYUDENKO EMS" is Answer for Microgrid

Small Off-Grid Demonstration	Stabilization of RE On Micro-grid	100% Renewable Energy For City-hall building
Nagasaki Japan	Sumba, NTT, Indonesia	Ogi city, Saga Japan
PV: 30kW	PV: 400 kW	PV: 552 kW
Battery 120 kWh	Battery 1,152 kWh	Battery 3,456 kWh
Start from Jul.2015 Still Battery SOH is 93%	Transmission of 200kW To Local PLN grid	100% covered by Renewable Energy to city hall buildings

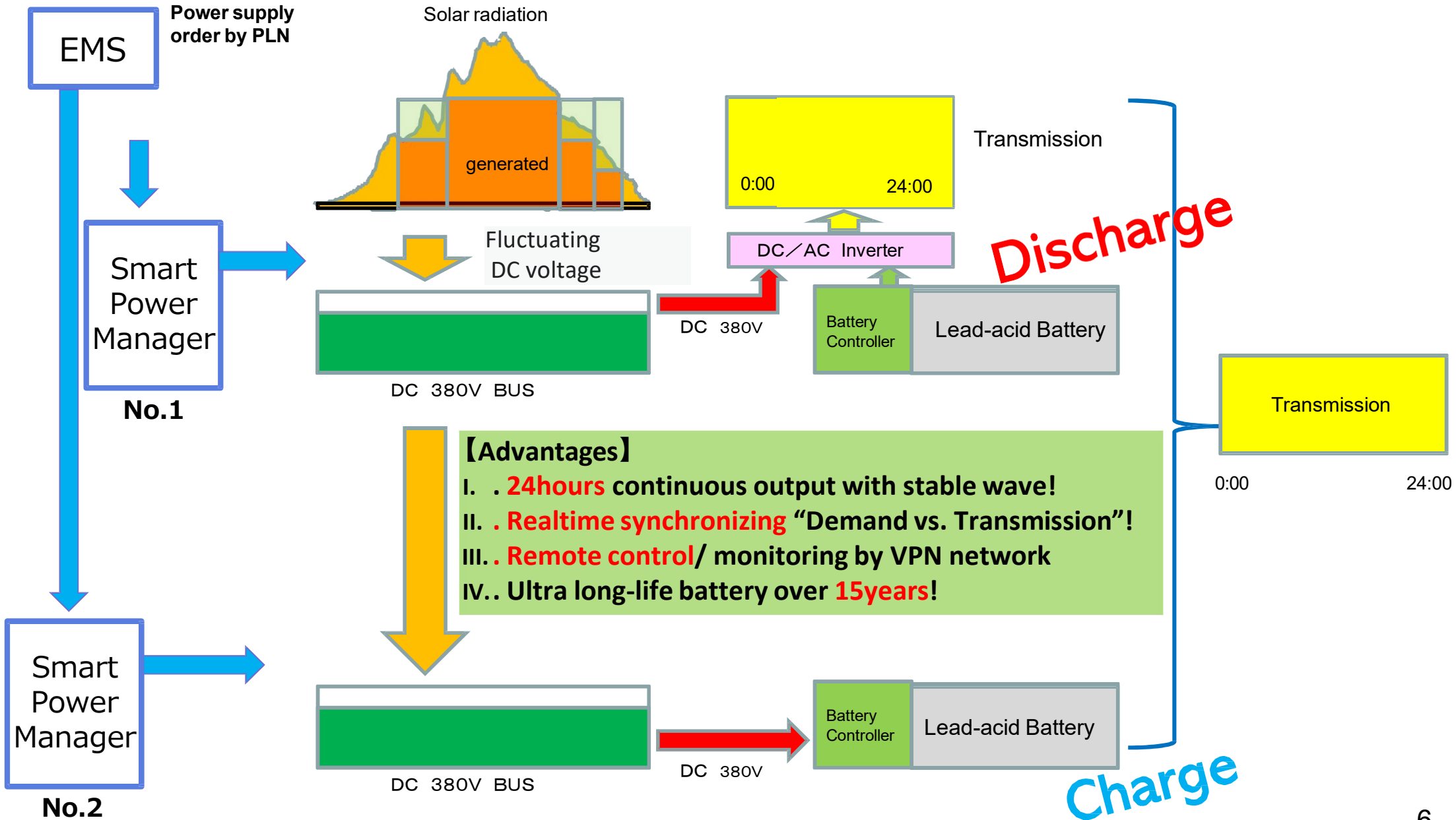


Automatic Load following power plant

Peak-cut of Diesel generators

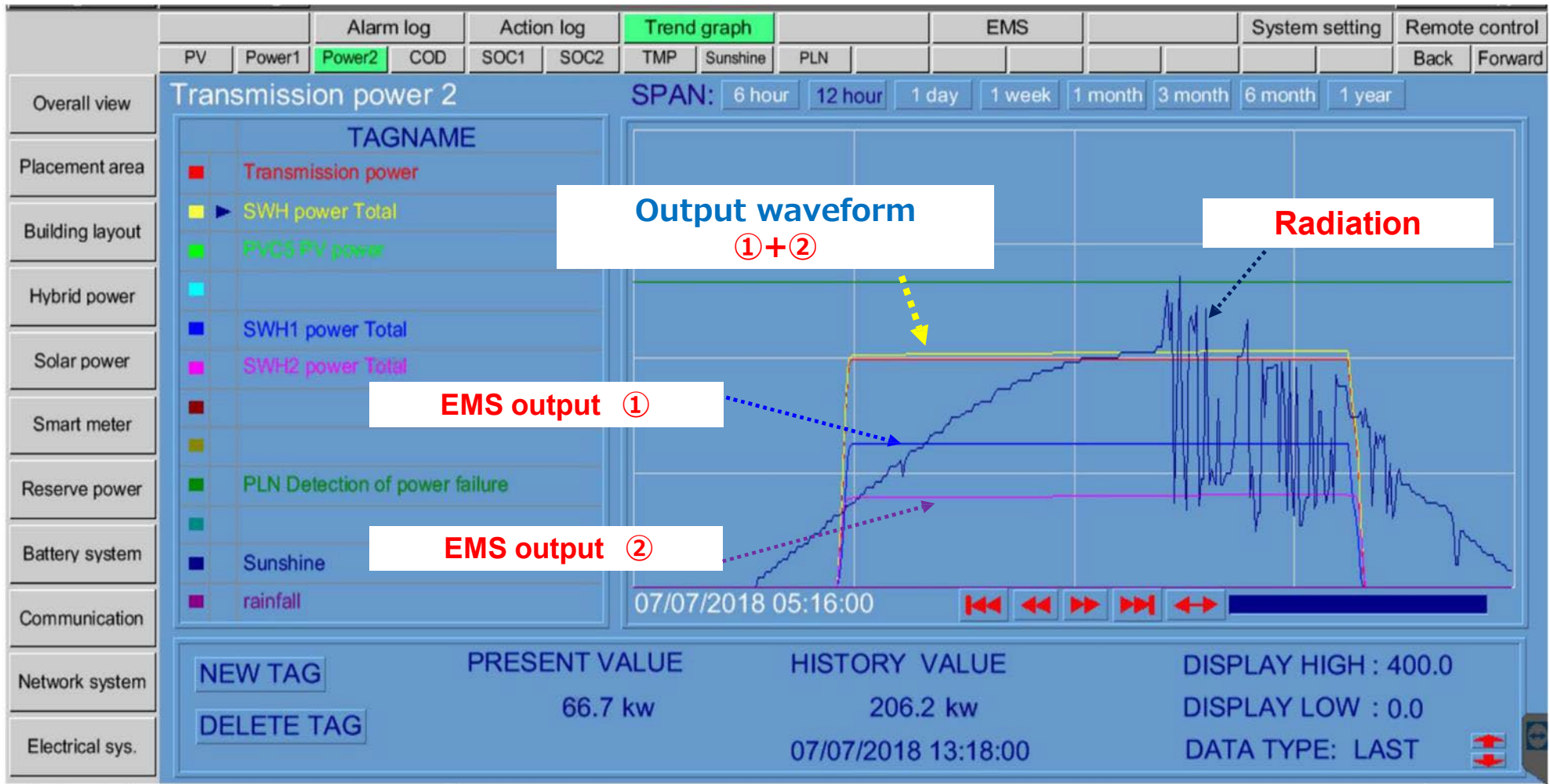
100% Off-grid by PV and Battery  
Also 72hrs emergency power supply 5

# 5. FLOW CHART OF "KYUDENKO EMS"





# 6. Example Out-put of "KYUDENKO EMS"

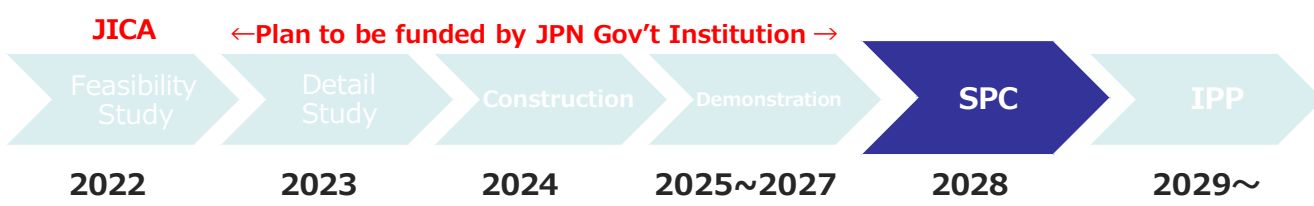


Real record of Sumba Demonstration site.

# 7. North Kalimantan Project (Indonesia)

Sponsored by Indonesia and Japan Government (NEDO)

**MID TERM:**  
**Biomass + PV + BESS for 100% RE in Nunukan & Sebatik Islands**

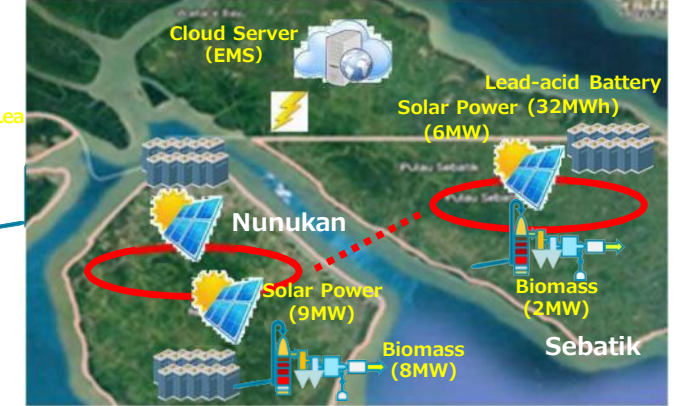
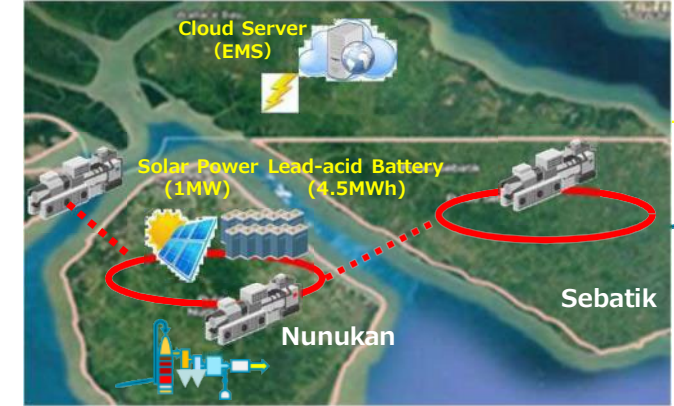
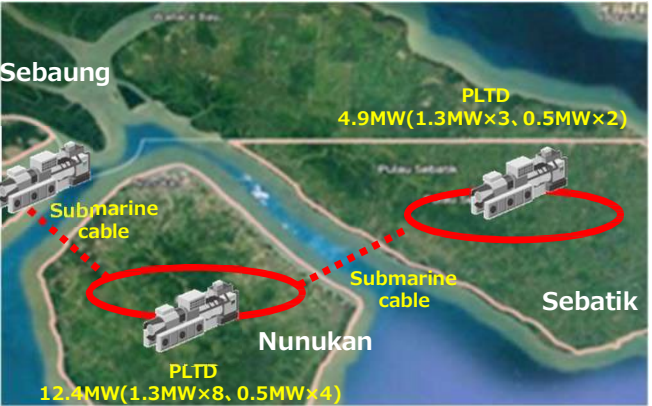


① Existing (2022~) → ② Demo Plan (2025~) → ③ IPP plan (2029~)

① Existing (2022~)  
 [Demand] · Daytime: 12.6~13.0 MWh  
 · Nighttime: 14.2~14.6 MWh

② Demo Plan (2025~)  
 Small Scale ESMS system  
 (Biomass, PV and Battery)

③ IPP plan (2029~)  
 PLTD Replacement and 100% Clean Energy



		Capacity	Output
① Existing power plant	Sebaung(PLTMG)	8.0 MW	3.3 MW
	Nunukan(PLTD)	12.4 MW	8.6 MW
	Sebatik(PLTD)	4.9 MW	3.2 MW
<b>Total</b>			<b>15.1 MW</b>

		Capacity	Output
① Existing power plant	Sebaung(PLTG)	8.0 MW	3.3 MW
	Nunukan(PLTD)	12.4 MW	8.6 MW
	Sebatik(PLTD)	4.9 MW	3.2 MW
② Demo Project	Solar power	1.0 MW	0.4 MW
	Biomass	2.0 MW	1.6 MW
<b>Total</b>			<b>17.1 MW</b>

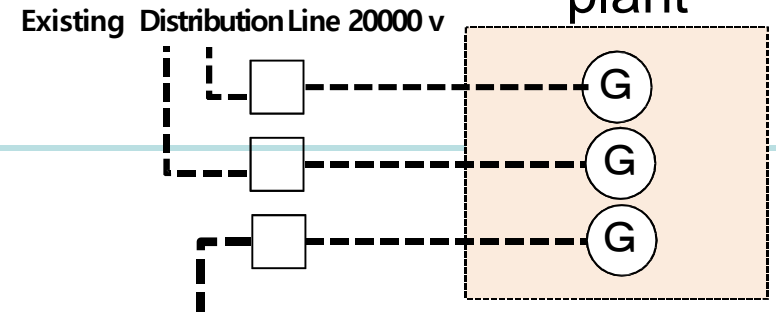
		Capacity	Output
② Demo Project	Solar power	1.0 MW	0.4 MW
	Biomass	2.0 MW	1.6 MW
③ IPP	Solar power	15.0 MW	6.1 MW
	Biomass	10.0 MW	9.0 MW
<b>Total</b>			<b>17.1 MW</b>

Facing Power Shortage → SOLUTION PROPOSAL



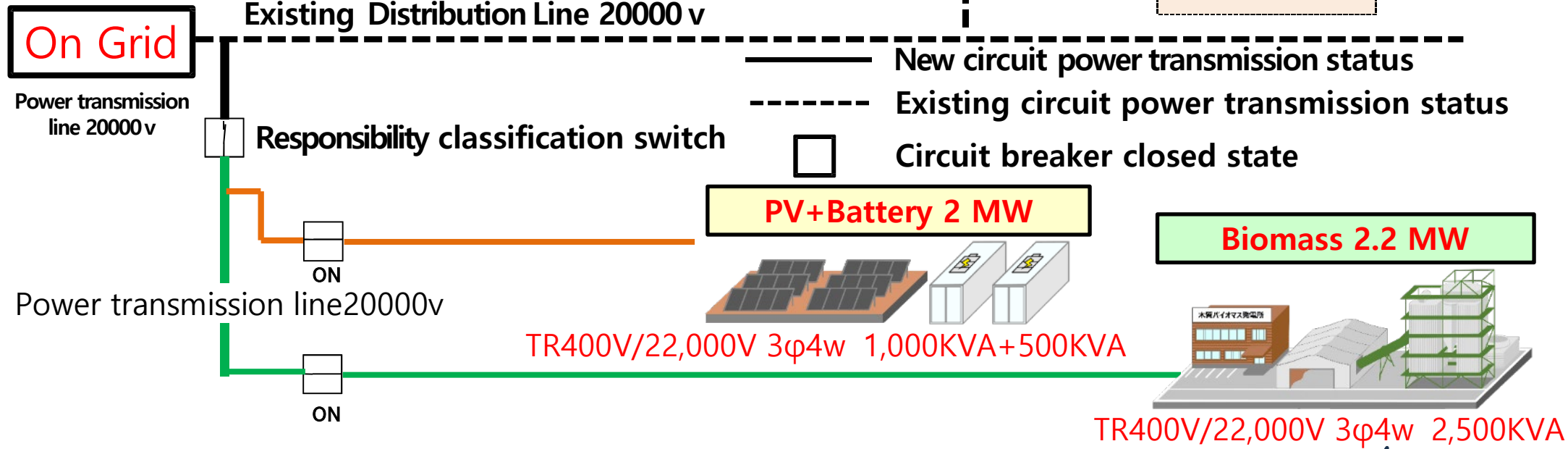
A method to supply electricity from renewable energy to a specific area when the existing power supply in a microgrid goes out. (from On Grid to Off Grid)

### Existing diesel power plant



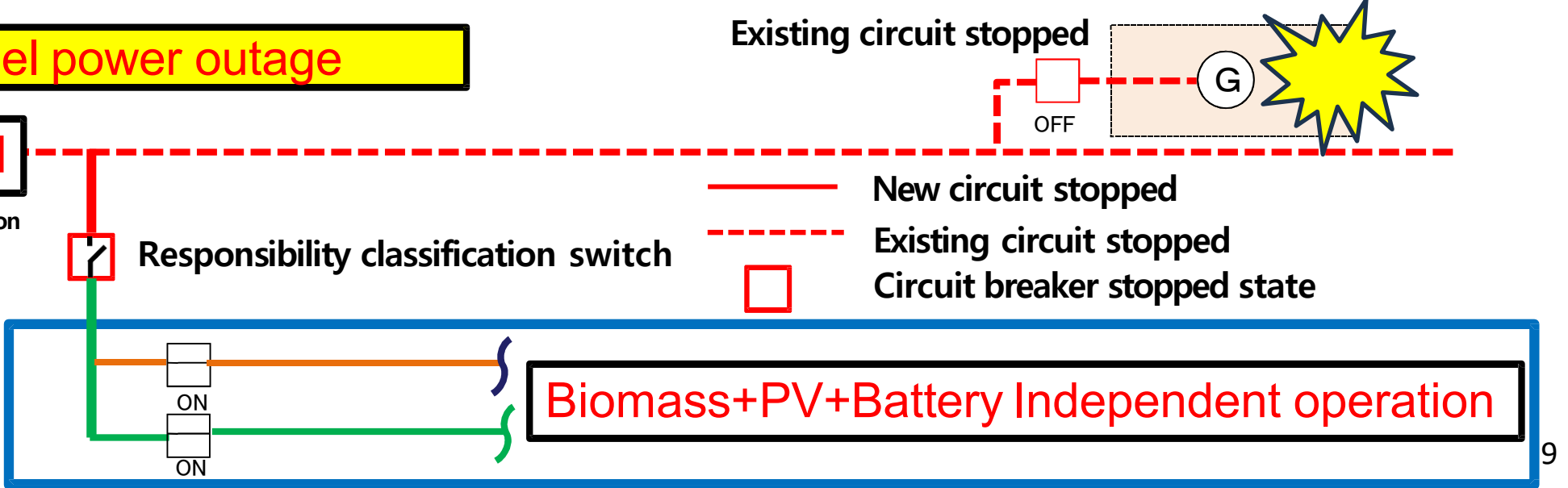
## Normal

**On Grid**



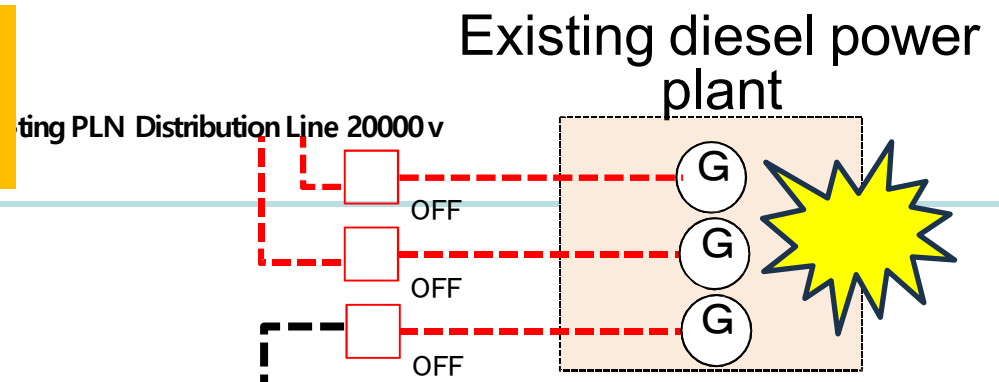
## Diesel power outage

**On Grid**



A method to supply electricity from renewable energy to a specific area when the existing power supply in a microgrid goes out. (Off Grid)

**Diesel power outage**



**Off Grid**

Certain existing PLN distribution Line 20000V

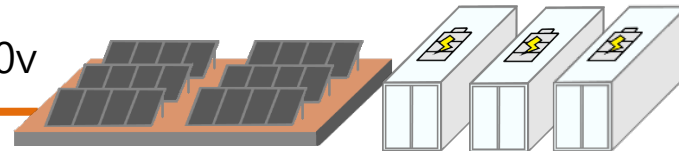
Off-grid switching to send power to specific circuits

Power transmission line 20000 v



**PV+Battery 2 MW**

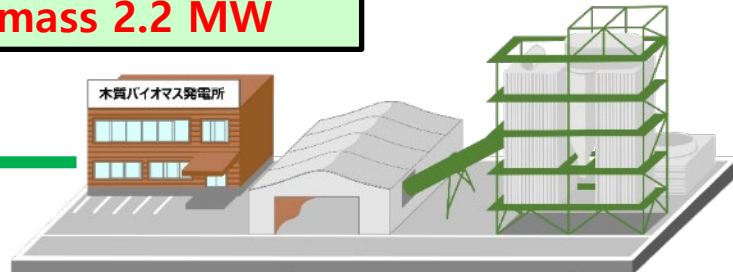
Power transmission line 20000v



TR400V/22,000V 3φ4w 1,000KVA+500KVA

**Biomass 2.2 MW**

Power transmission line 20000v



TR400V/22,000V 3φ4w 2,500KVA



## Achieving 20 Years!

Long Life Valve Regulated Lead-Acid Battery for Renewable Energy

# FCP-500S, FCP-1000S

### Features

- Extremely Long Life!! Expected life 20 years & Number of cycles 6,000 cycle
- Safe, Secure and Competitive
- Suitable for renewable energy storage system



FCP-1000S (Battery Unit)

### Types and performances

Type	Rated capacity	Expected number of cycle (DOD70%)	Expected life (25°C)
FCP-500S	500 Ah/10 HR	6,000 cycles*	20 years* (Maximum useful life)
FCP-1000S	1,000 Ah/10 HR		

\*This value is based on our use conditions, and is subject to change without prior notice.

# Advantages of Lead-acid Battery

## Stable supply

- No rare metal
- Abundant resources

## Easy recycled product

- 99 % recyclable

## Safety

- Superior heat resistance high temperatures
- Non-flammable electrolytes
- Simple deployment  
Air conditioner unit and protection circuit are not mandatory

## Easy maintenance

- No need to refill electrolytes
- Constant monitoring is not required



## Furukawa Battery's Global Delivery Record

Remote island of Indonesia [Kyudenko]  
Solar power plant



FCP-1000 (1,152 kWh) + BMU



Thailand [I-Wind]  
Wind farm



For energy storage and variation absorption use  
UB-1000 (1,152 kWh)



Mauritania  
Fishery organization facility



Independent solar power supply  
FCP-1000 x 24 pcs x 3 sets



China [Shandong Sacred Sun Power Sources]  
Container-type battery energy storage system

A storage battery collaboration partner's project  
FCP-1000 installed with PV power plant



Vietnam  
Solar powered LED street light



FCR-100-6



Fukushima prefecture, Japan [ecology]  
Off-grid independent power supply system

FCP-500 x 24 pcs (24 kWh)



Kagawa prefecture, Japan  
Power supply system for lighting



FCP-500 x 24 pcs (24 kWh)

Nagasaki prefecture, Japan  
Huis Ten Bosch housing area management building



Hybrid independent power supply system  
FCP-500 x 144 pcs + Battery monitoring unit



Saga prefecture, Japan  
Off-grid energy management system

Ogi city hall  
FCP-1000 x 1728 pcs (3,456 kWh)



An image of solar panel cited from  
<https://www.city.ogi.lg.jp/main/37307.html>

**Microgrid Flagship Project will re-start soon!**

**Online Webinar about Microgrid with Renewable Energy is under planning  
In this year**

- ★ *Targeting 100% RE in Microgrid?*
- ★ *Over 15Years long life system??*
- ★ *24hours supplied by RE???*
- ★ *No need big investment for grid????*





