

Introduction of Mitsubishi Gas Engine Generator Sets

Mitsubishi Heavy Industries Engine Systems Asia Pte. Ltd.

MHI's Engine & Energy Business

Mitsubishi Heavy Industries
(MHI)



Transportation Systems



LNG Tanker



Aircraft



H-IIA Rocket



GTCC Power Plant



Conventional Power
Plant



Chemical Plant



CO2 Recovery
Plant

Growth Strategy Office

Mitsubishi Heavy Industries Asia Pacific(MHI-AP)

① Mitsubishi Heavy Industries Engine & Turbocharger(**MHIET**)

② **MHIES-A** (Singapore)



Generator Set(MGS)



Bare Engine (Land & Marine)



Service and Parts



Design
Engineering



Assembly &
Testing



Onsite
Installation



Aftersales
Service



Parts &
Accessories







⑤ **MHIES-V**
(Vietnam)

④ **MHIES-P**
(Philippines)

③ **MHIES-I**
(Indonesia)



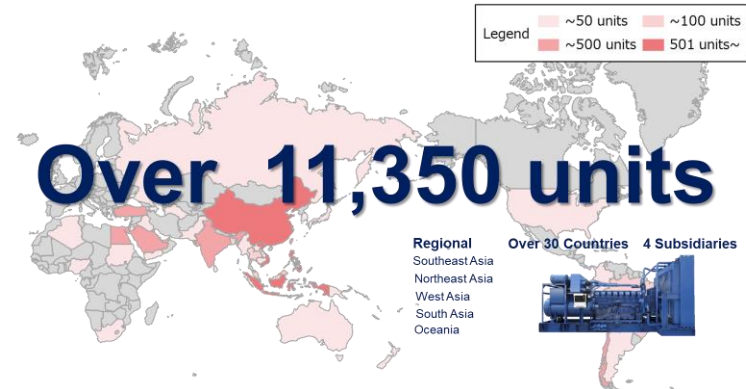
Lineup of Mitsubishi Gensets

Fuel	Gen-set Model		Output(kW)					
			0	500	1000	1500	2000	
Diesel	MGS							
Bio Diesel								
Gas	MGS-G							
Bio Gas								
			50Hz			60Hz		
Genset Model		MGS0500G	MGS1000G	MGS1500G	MGS0450G	MGS1200G		
Output	kW	500	1000	1500	450	1200		
Engine model		GS6R2-PTK	GS16R2-PTK	GS16R2-PTK	GS6R2-PTK	GS16R2-PTK		
Speed	min ⁻¹	1500	1000	1500	1200	1200		
Gen. Eff.	%	40.2	44.0	41.0	42.7	42.7		
Hot water	%	19.6	13.5	12.7	20.4	11.7		
Exhaust heat	%	21.3	19.6	21.0	20.3	21.5		
Total Eff.	%	81.1	77.1	74.7	83.4	75.8		
NOx emmission at O ₂ =0%	ppm	200	200 with de-Nox system	320	200	320		

Lineup of Mitsubishi Gensets



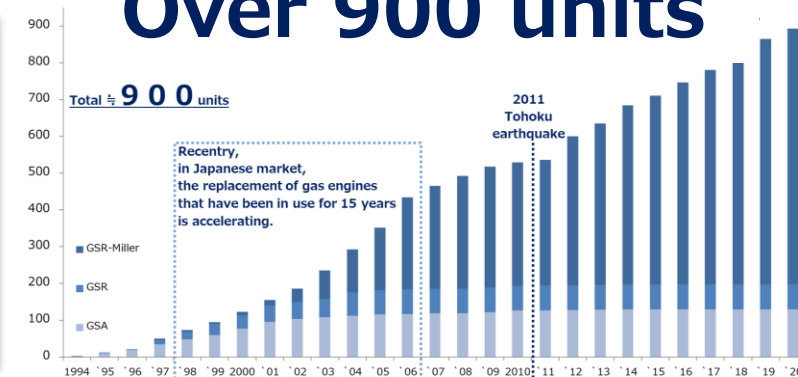
Diesel, Biodiesel



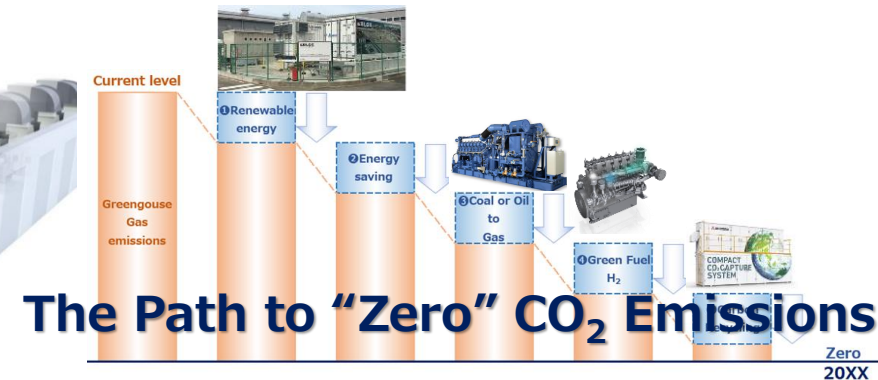
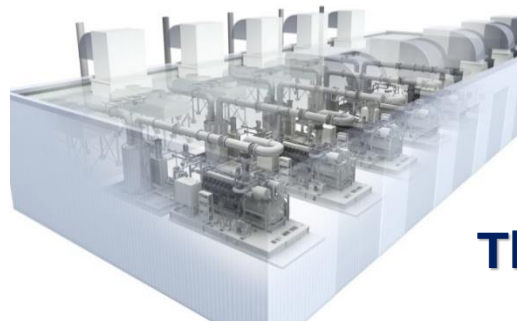
Gas, Biogas



Over 900 units



Hydrogen



Application of Gas Gensets



Commercial buildings
Residential buildings
Hospital, Airport, Data Centers



Grid power unreliable
Supplying power to factory



Parallel operation to the grid
Independent power supply
IPP



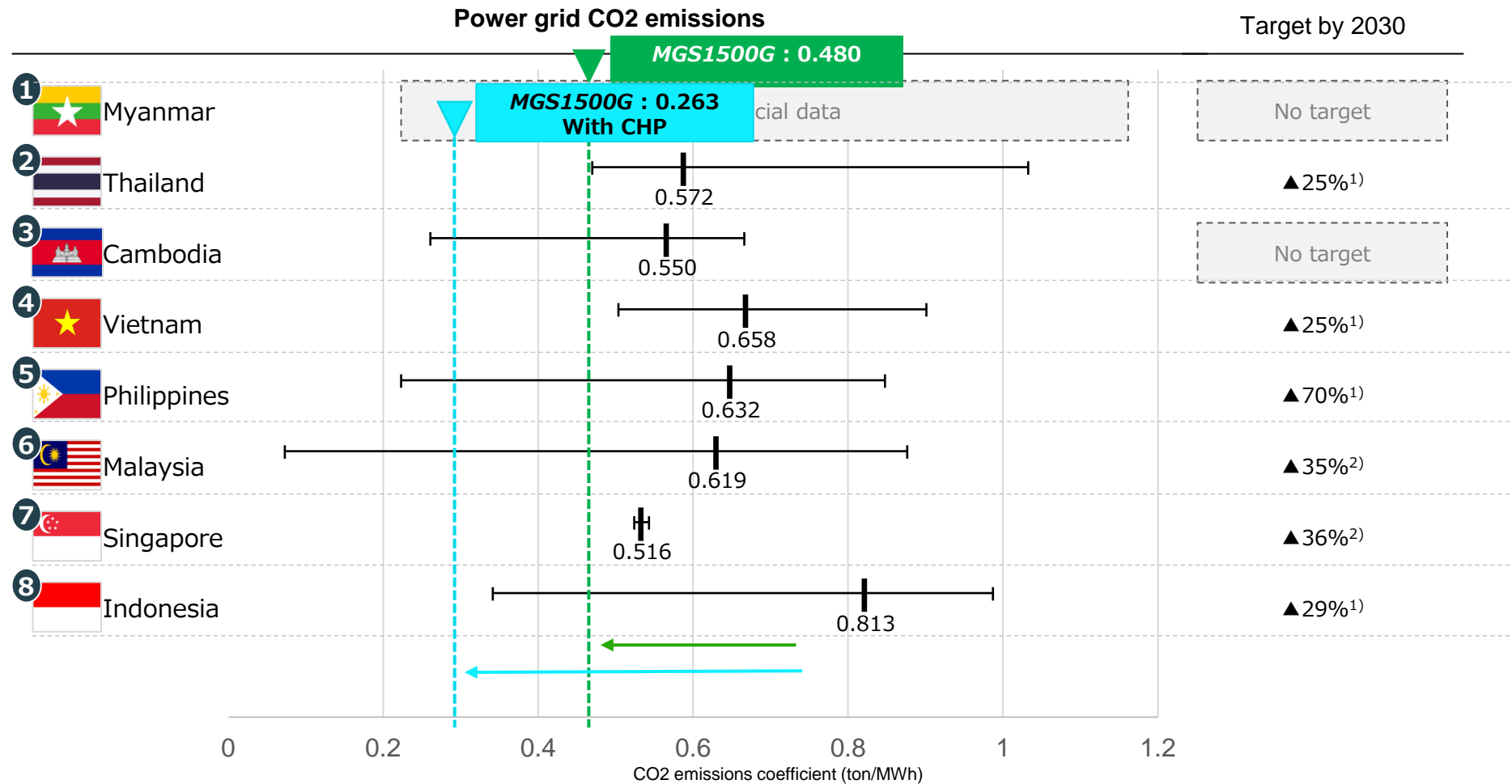
Engine Type		GS16R2-PTK
Generator Output	kW/set	1,000kW
Unit	set	5
Client	-	Urban Area District Heating
Location	-	Tokyo, Japan

Engine Type		18KU30GSI
Generator Output	kW/set	5,500kW
Unit	set	6
Client	-	IPP
Location	-	Indonesia

Engine Type		GS16R2-PTK
Generator Output	kW/set	1,500kW
Unit	set	50
Client	-	IPP
Location	-	Russia

Lower CO2 Emissions from Gas Gensets

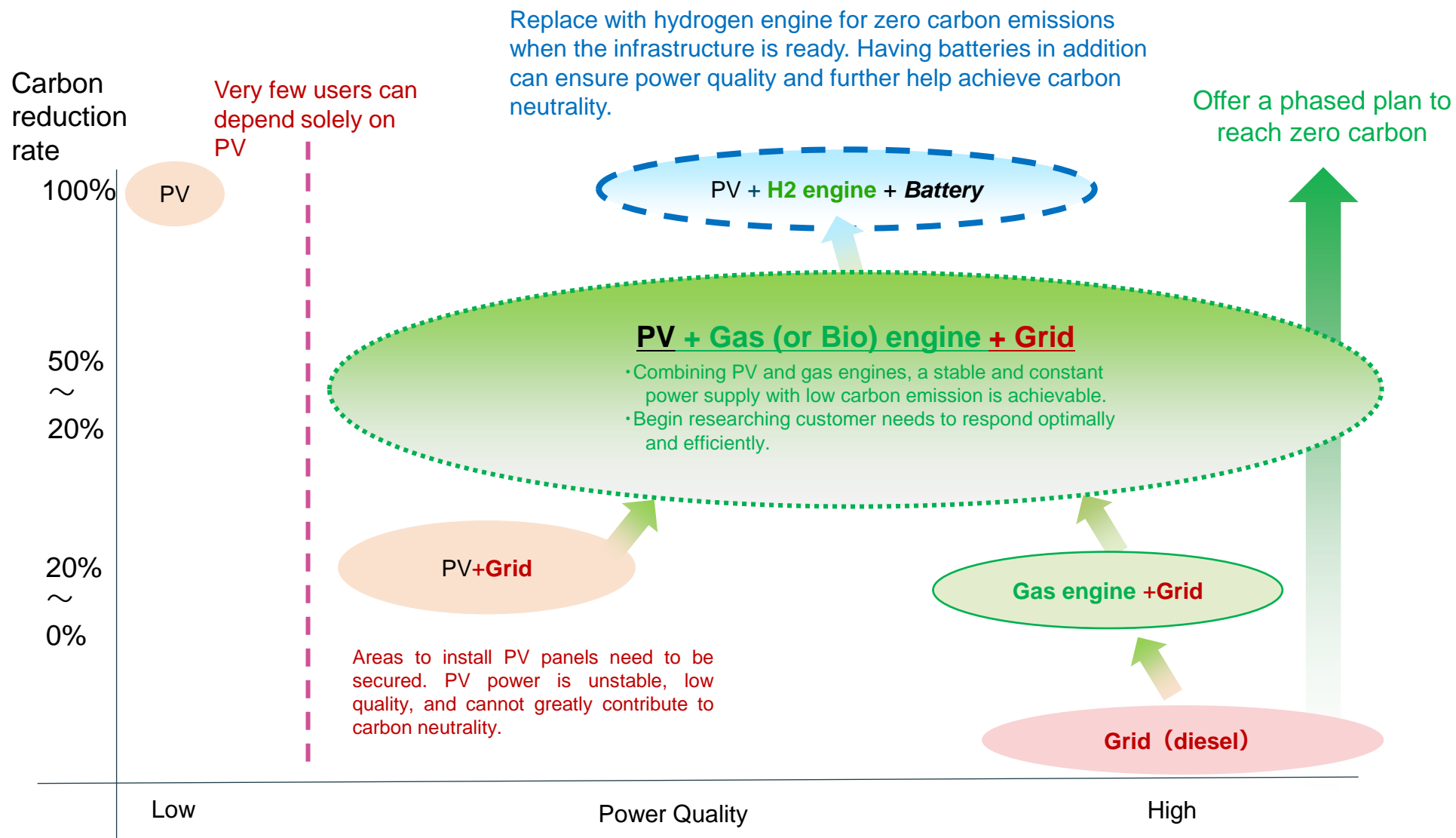
CO2 emission rates in Southeast Asia are higher than that of Japan.



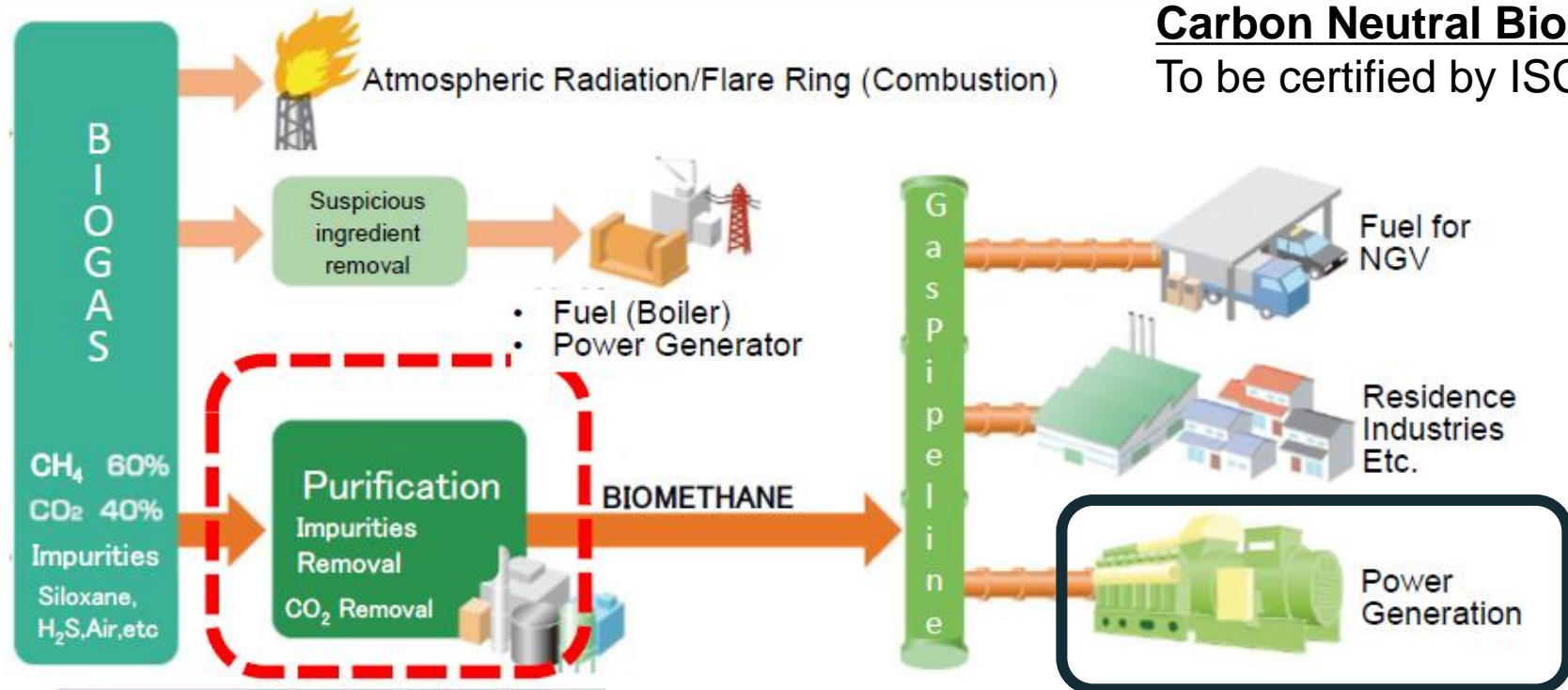
1. Compared with BAU (no additional effort made to reduce emissions); 2. Compared with 2005 (real GDP)

Source: <https://www.iges.or.jp/>

Solution for the Journey to Net Zero



Carbon Neutral Biogas To be certified by ISCC



Biogas Purifier in Thailand
made by Osaka Gas since 2015

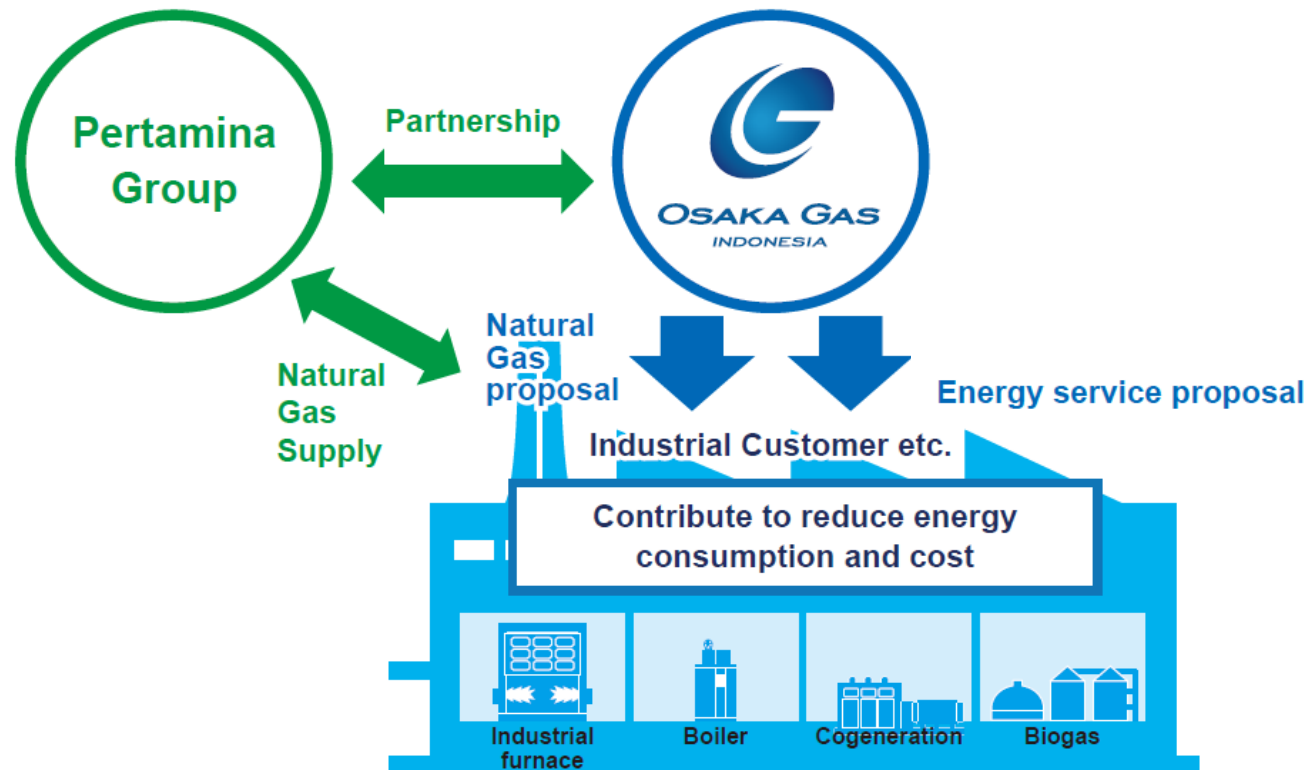


Pipeline injection
since 2010

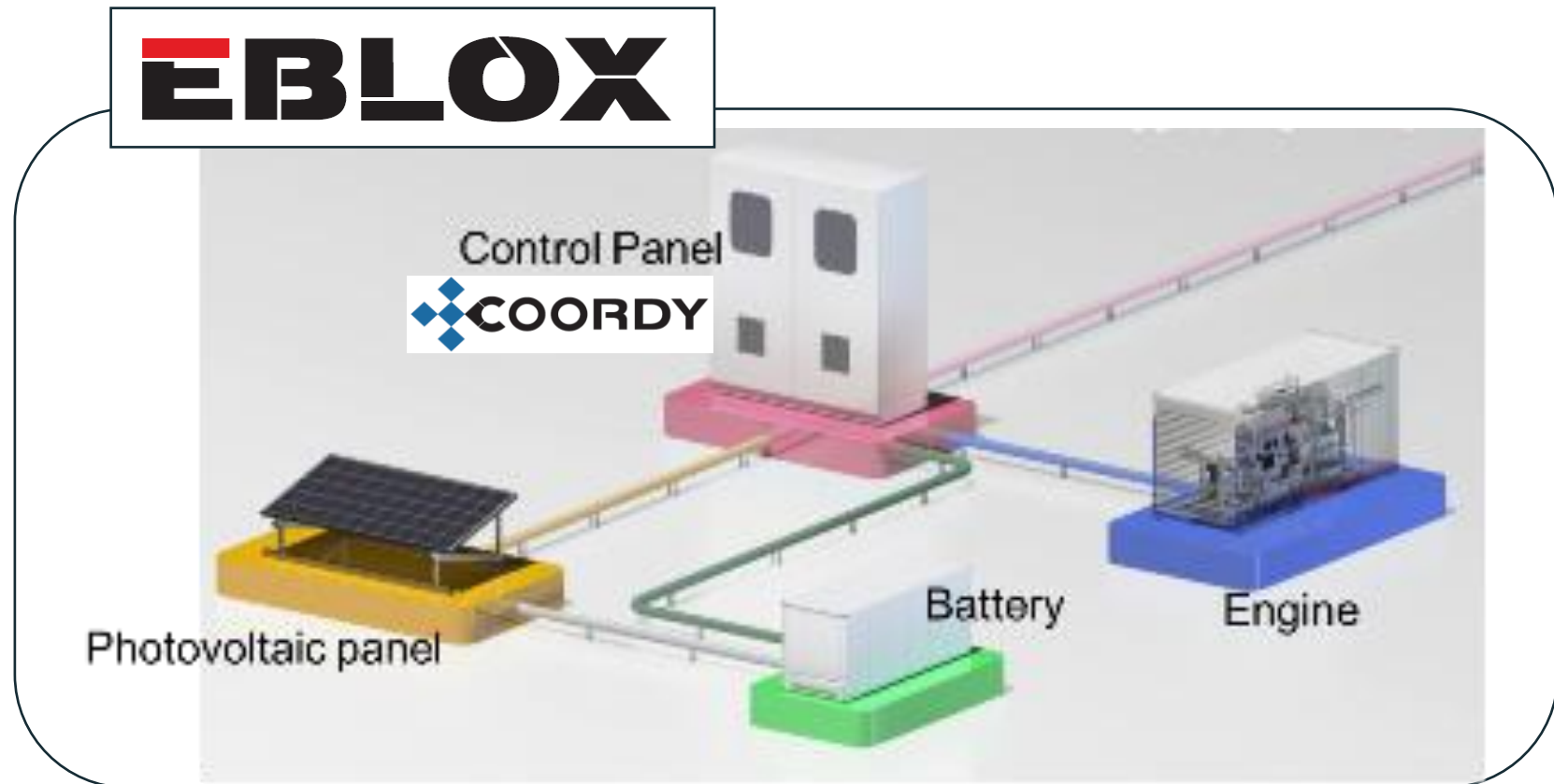


NGV Station

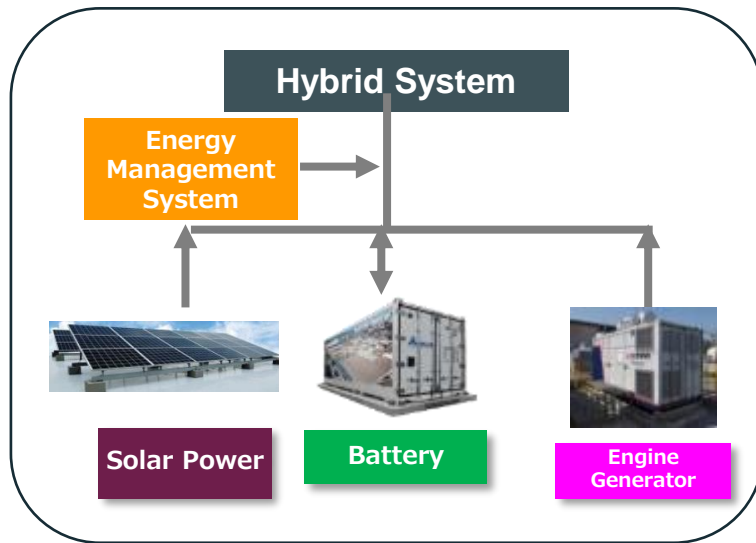
- ◆ Provide one-stop service for fuel conversion and energy conversion services with no initial investment and related utility service
- ◆ Apply potential subsidy with JCM by Japanese government
- ◆ Periodical maintenance and energy audit upon request



- ◆ MHIET has developed a “triple hybrid” autonomous power supply system that combines renewable energy such as solar power with a combustion engine generator and storage battery, allowing for optimal stabilization control in island mode operation.



Triple Hybrid Power Generation system



Power supply for Mining



New industrial park



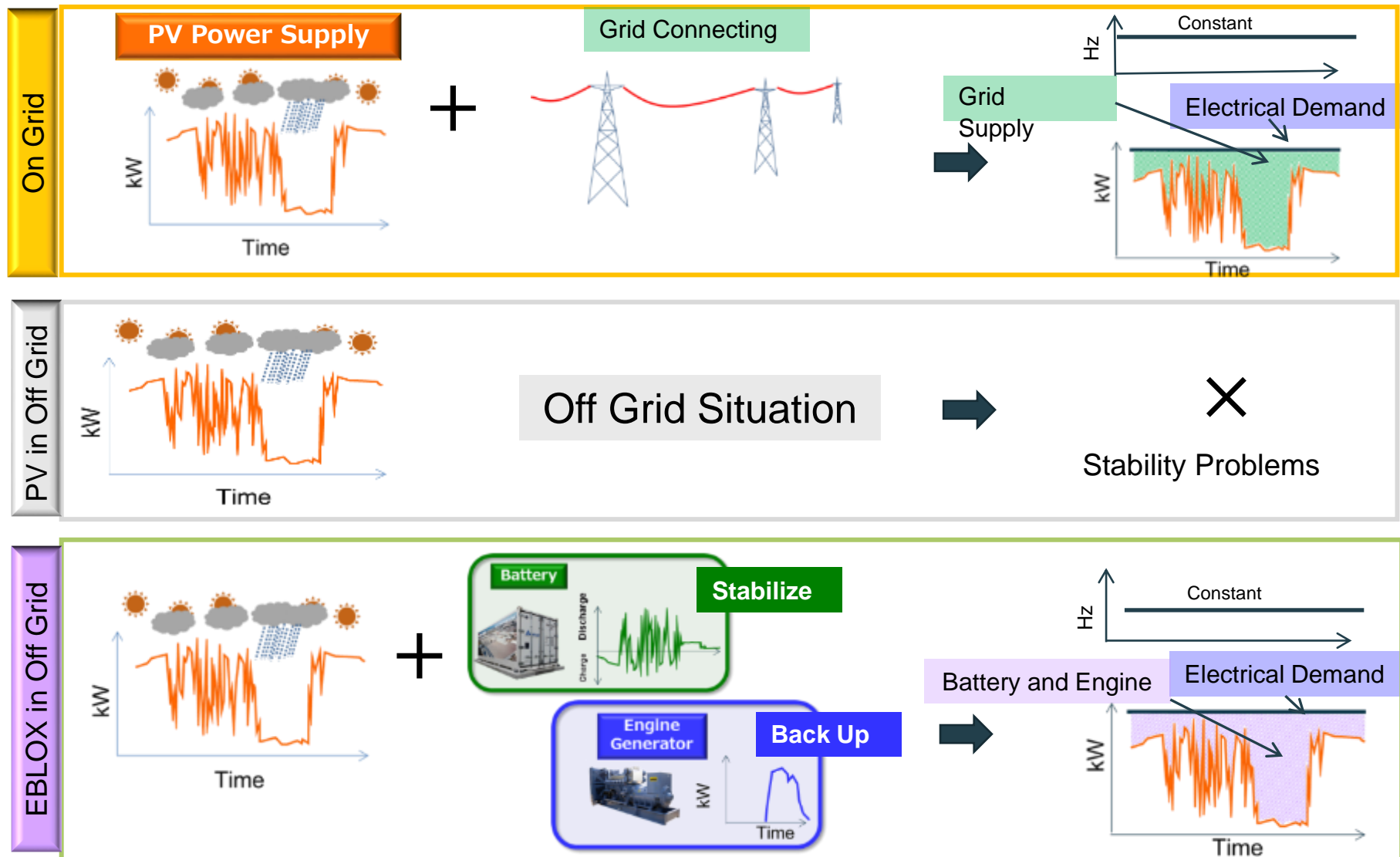
Small Town in Off-grid Area



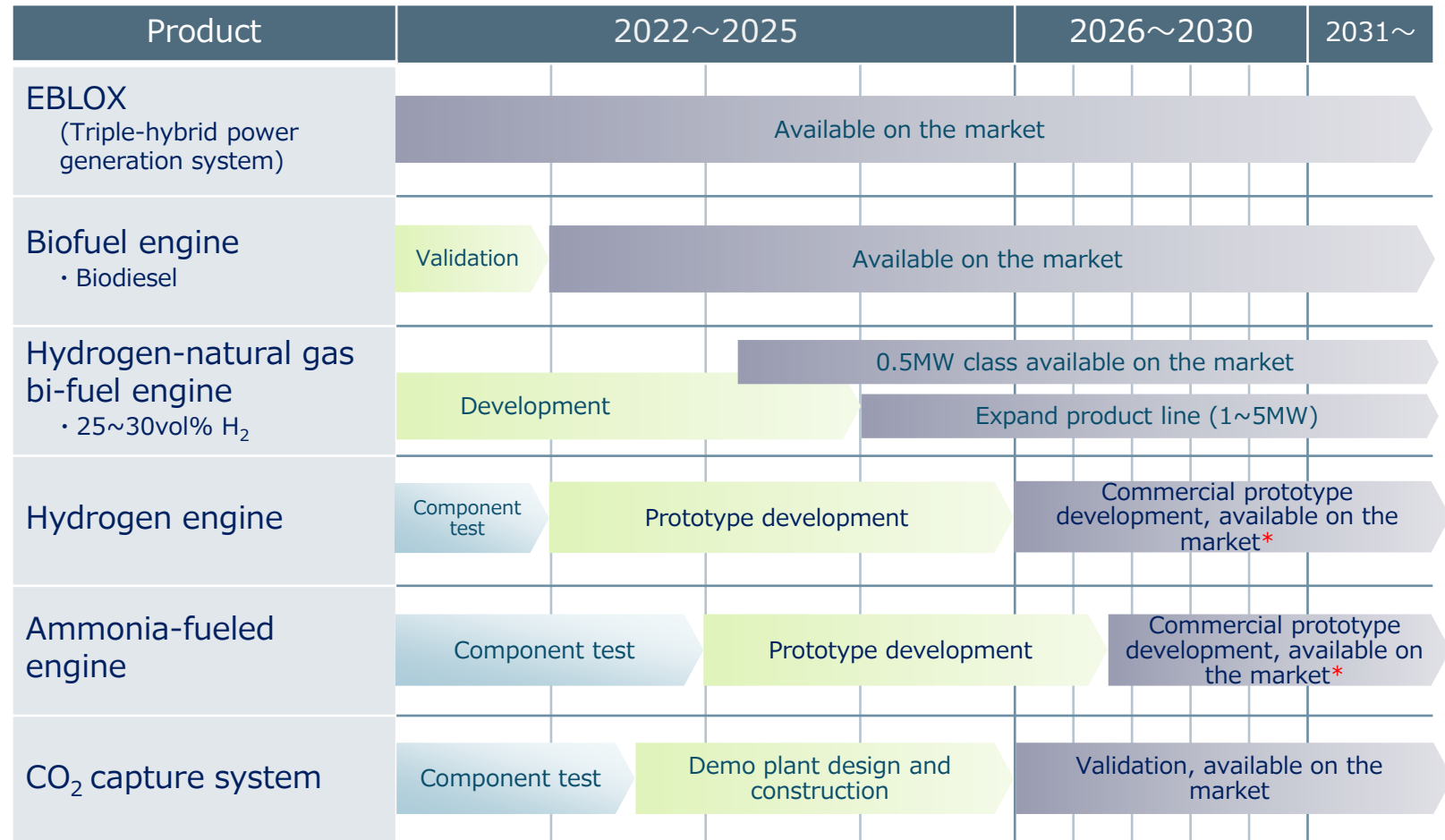
Remote Islands



◆ Off grid solution



Product Development for Carbon Neutrality



*Timing depends on infrastructure readiness

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**MITSUBISHI
HEAVY
INDUSTRIES
GROUP**