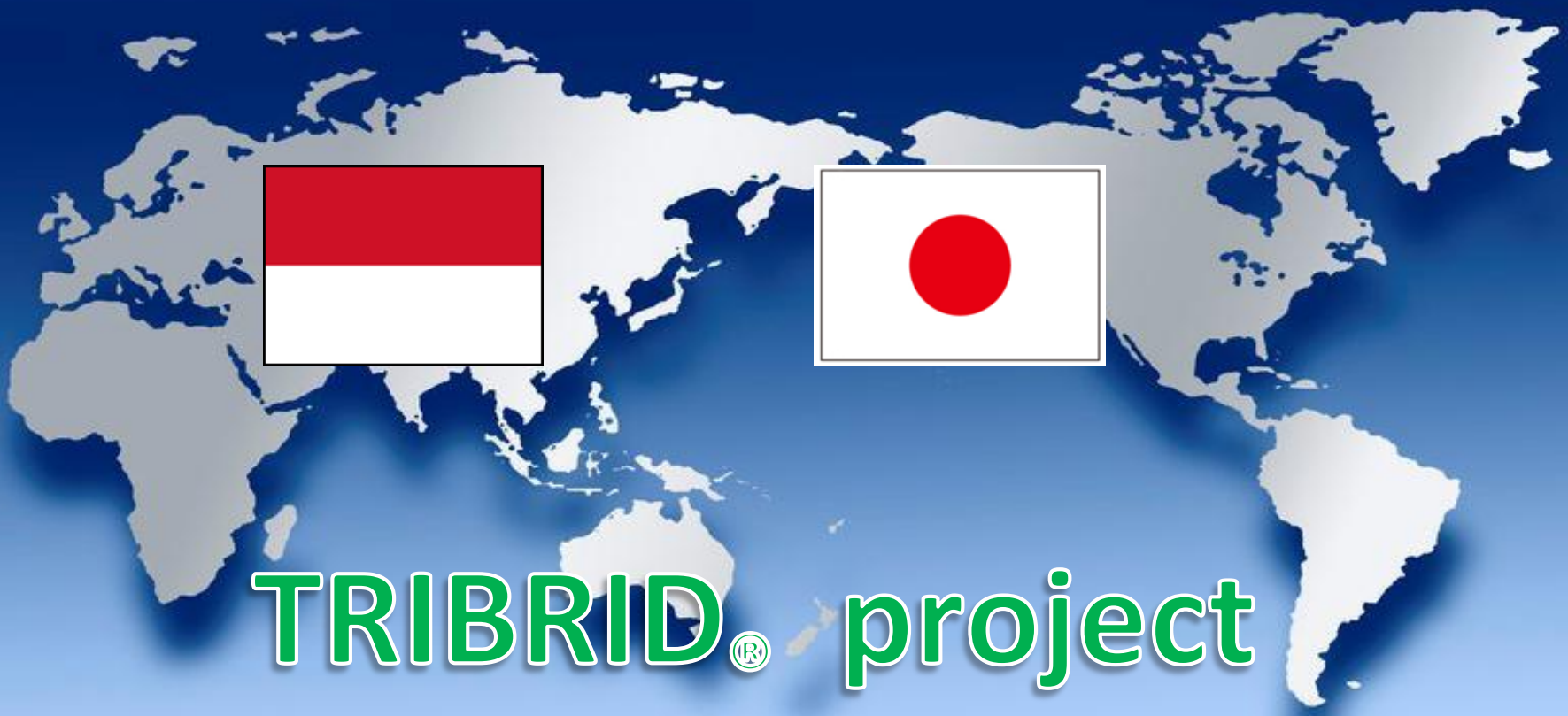
Document for the Website



TRIBRID® project

The low carbonization of Mobile communication's BTS (Base Transceiver Station) by the Introduction of "TRIBRID system" in Indonesia

KDDI Corporation

Company Profile

Personal Segment

Tele-communication services for consumers

Value Segment

Content application and payment services for consumers

Business Segment

Telecommunication and IT solution/Cloud services for enterprises

Global Segment

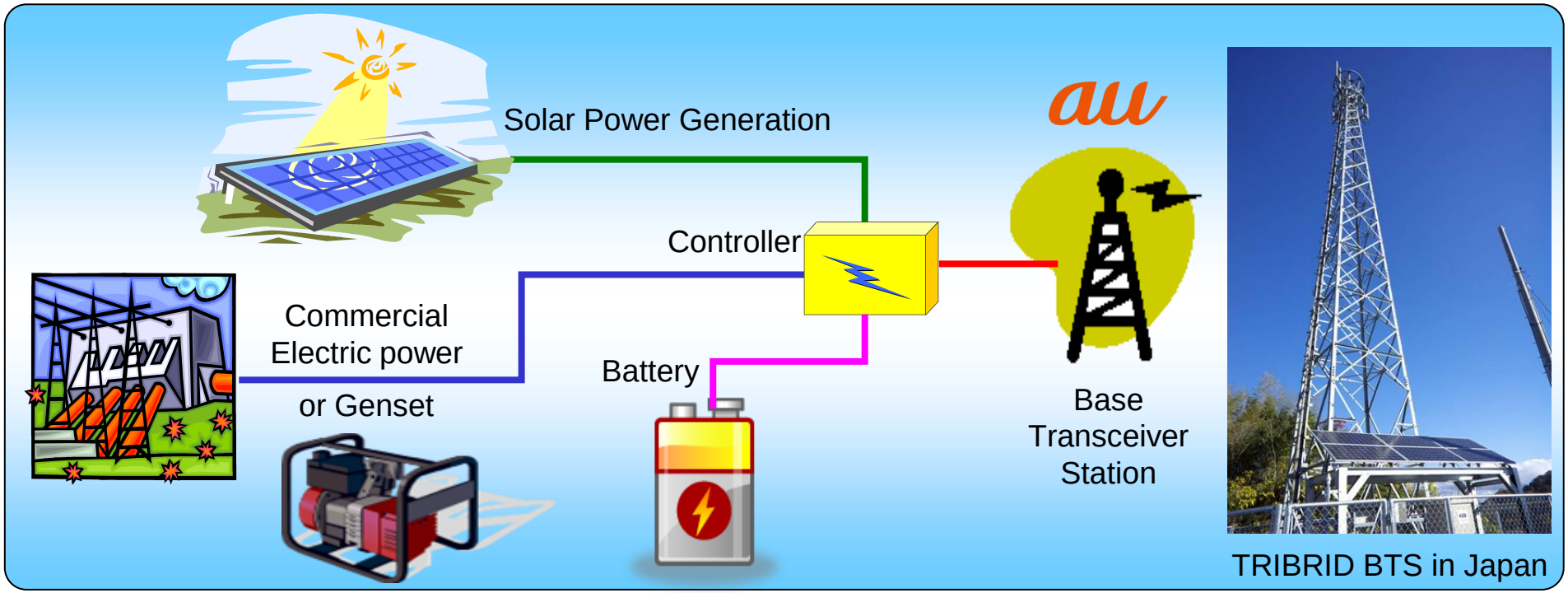
Telecommunication and IT solution services for consumers and enterprises

Strength in Mobile + Fixed Networks & Global Capability

KDDI's Technology: TRIBRID®

TRIBRID controls three types of power

- ✓ Generated by solar panels, stored power in batteries, commercial power or generated power by Genset, are efficiently provided for each time period to the base station.



Result from Trial

Trial Test

Trial system was installed and has been ensured that system reliability and effectiveness before implementation.

Result

By the trial, 43% energy saving was achieved even with old diesel generator, and also very limited solar power effect due to shaded site condition.

【Before and After TRIBRID】

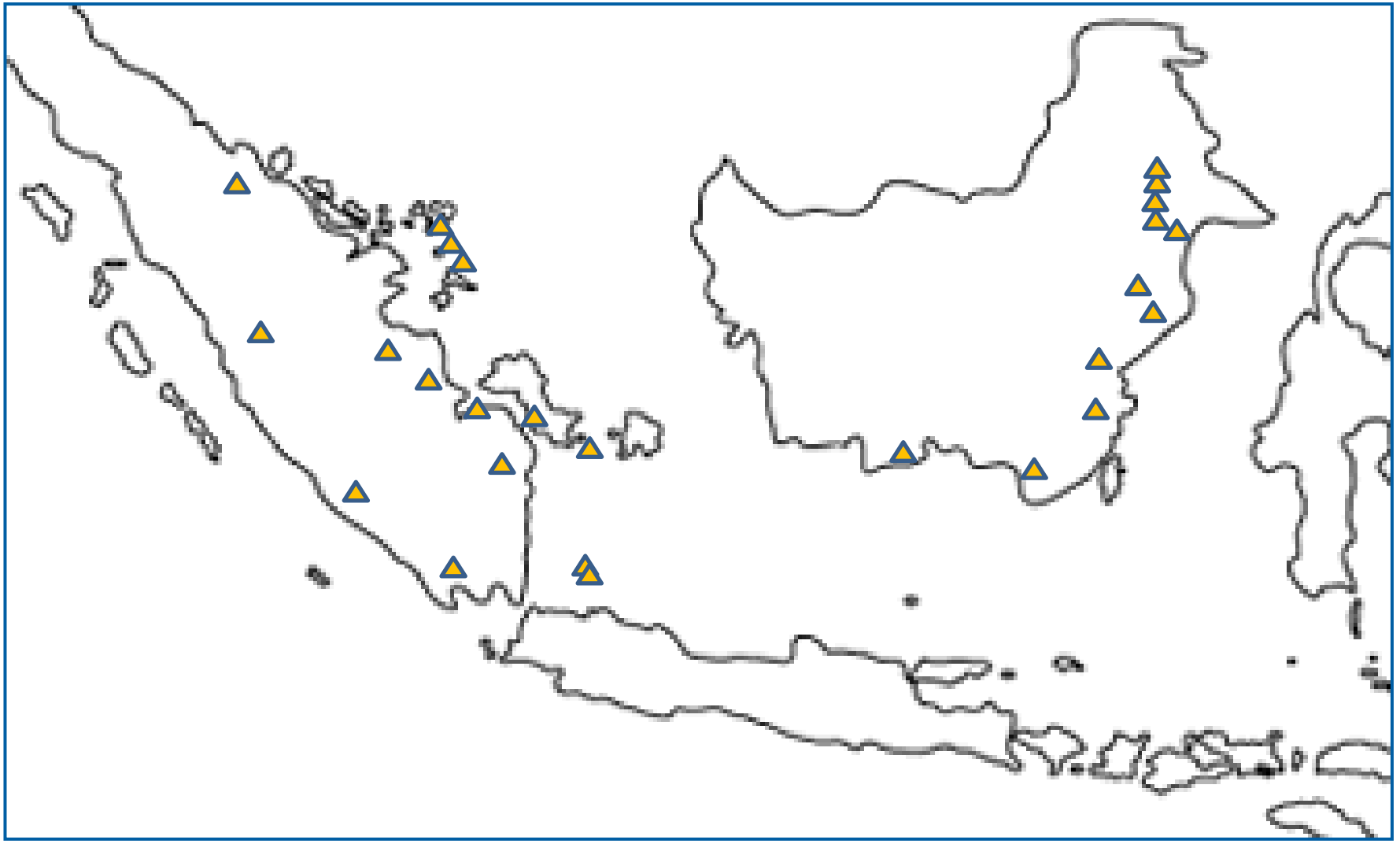
Parameters	Before	After
(a) Generator's Output(kW)	4.0	9.1
(b) Generator's Operating Hours (h)	24	10
(c) Hourly Fuel Consumption (L/h)	3.3	4.5
(d) Fuel Consumption (L/day) (a)×(c)	79.2	45.0
Saving Fuel Amount (L/day)	**34.2**	
Saving Rate(%)	**43.2**	

Comparison of the one day

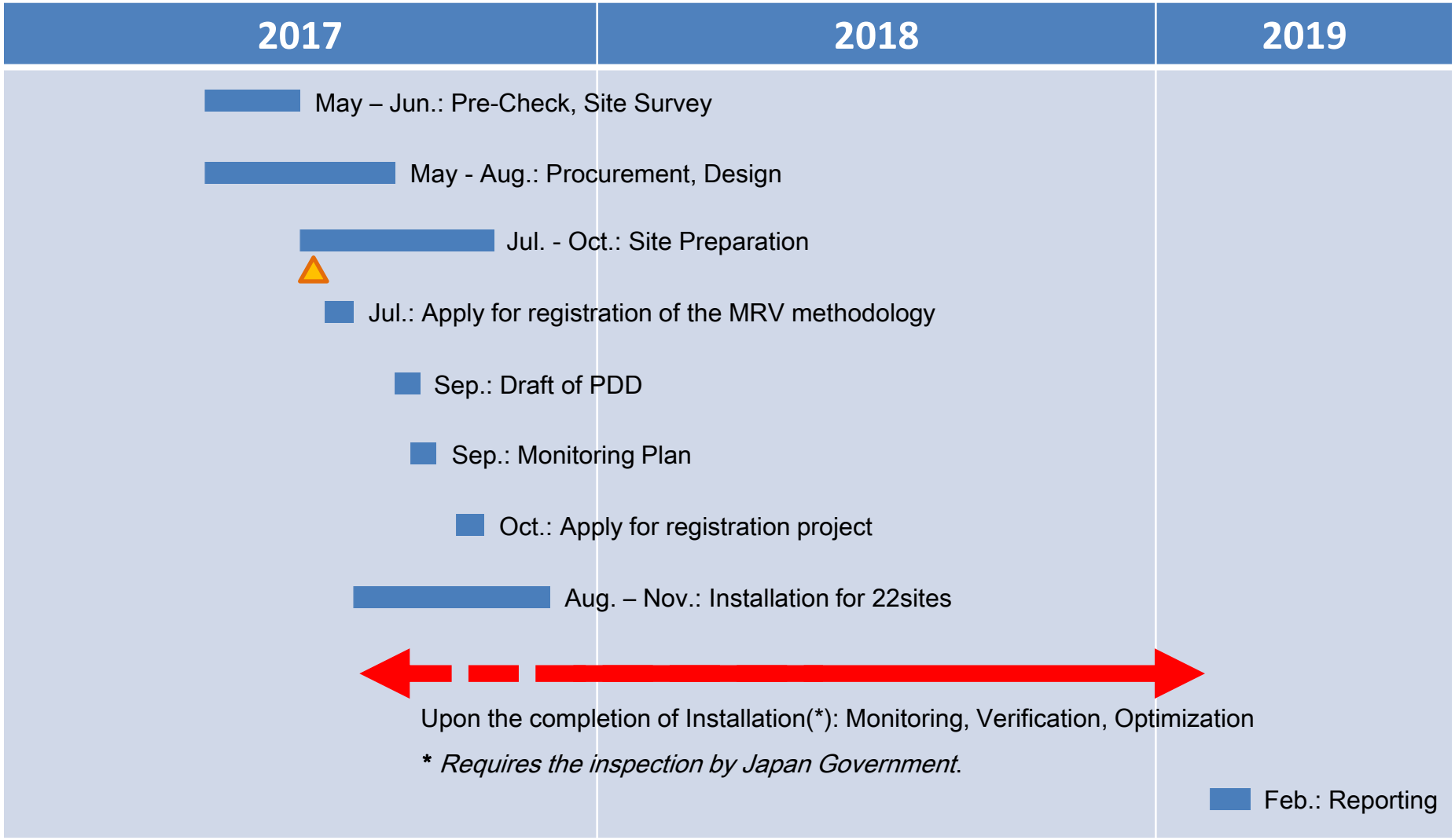
Fuel reduction by 43% !

Site Survey

Site survey 26 sites, and selected 22 sites.

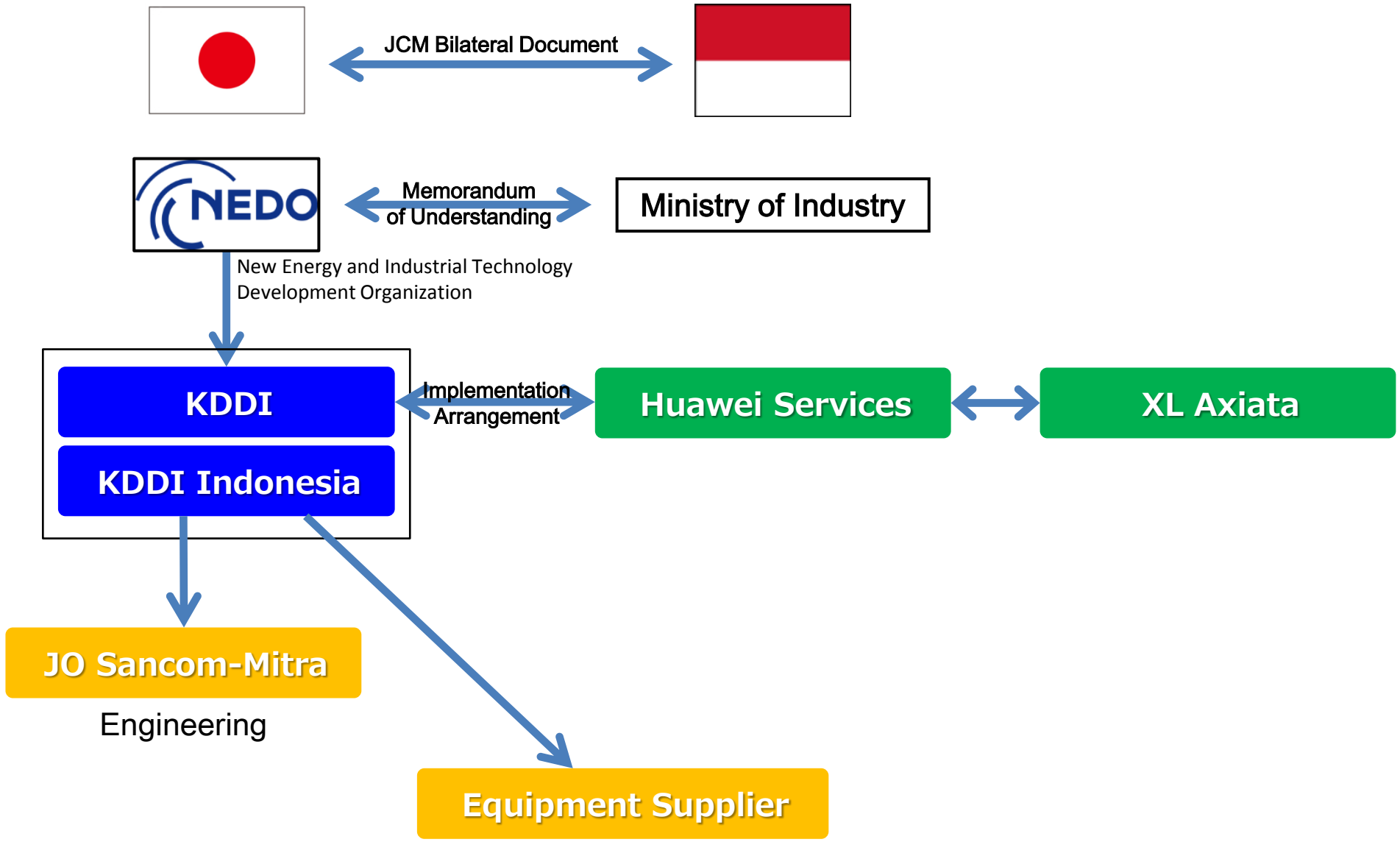


Schedule, Current Progress, and Challenges



- Current Progress: Completed site survey, and started procurement and design.
- Challenges: Tight timeline to complete installation to all 22 sites, some of which access is quite tough.

Formation for Demonstration Project



Formation for Future Deployment

KDDI Indonesia

TRIBRID Controller

Local Supplier
Battery, PV, Genset, etc.

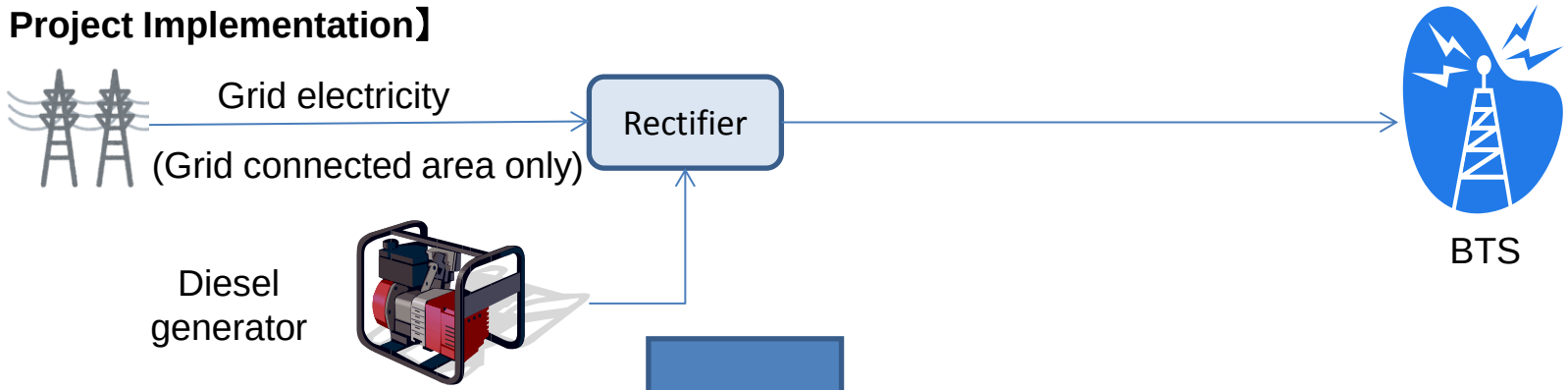
Local Engineering Vender

Local OPEX Provider
Maintenance, Fuel delivery

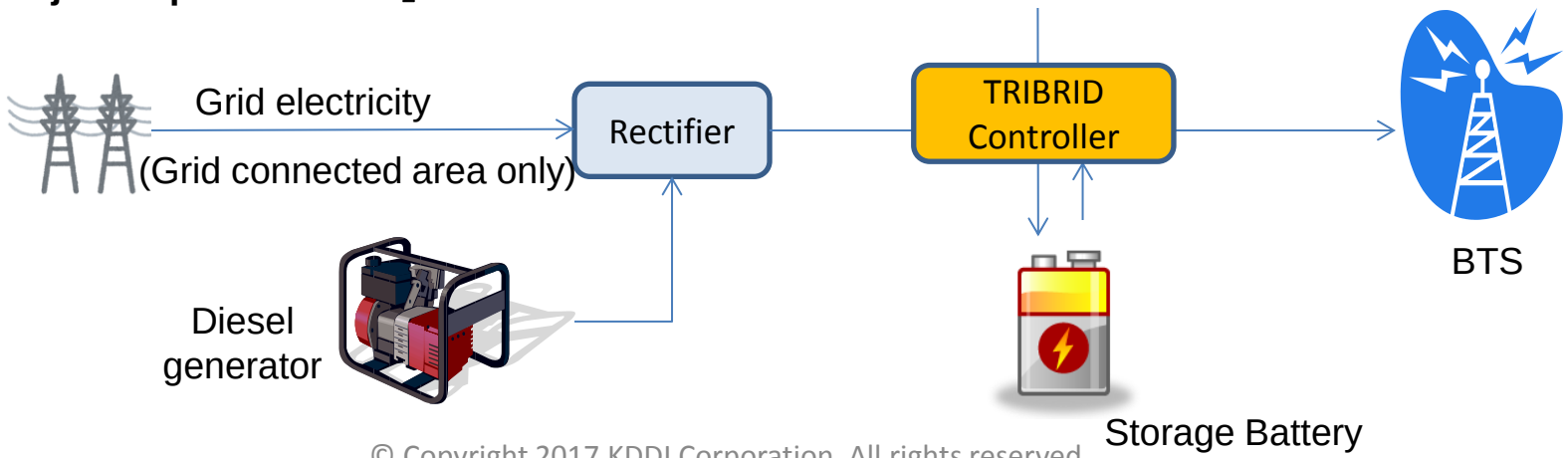
GHG Emission Reduction Measures

Reduces the amount of fossil fuels used in diesel generator and the amount of electricity imported from the grid (in grid connected areas) by introducing the electric power control systems with solar PV, and battery (KDDI's TRIBRID control systems).

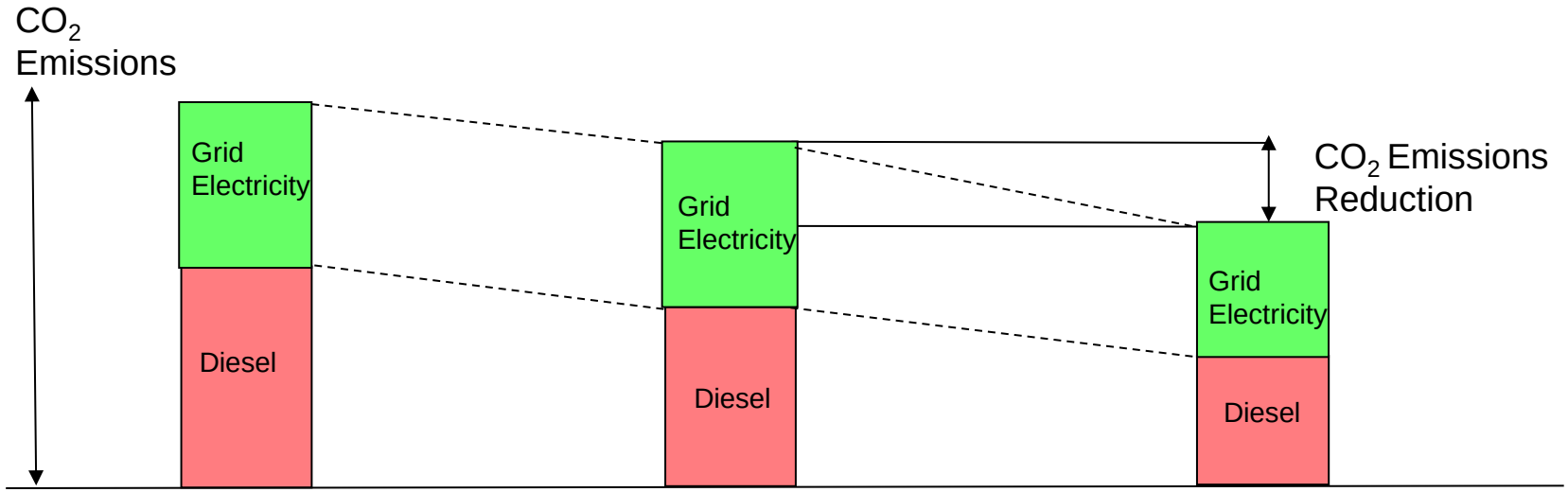
【Before Project Implementation】



【After Project Implementation】



GHG Emission Reduction Through TRIBRID System Installation



【Before Project Implementation】

CO_2 emissions from grid electricity and/or diesel generator.

【Reference】

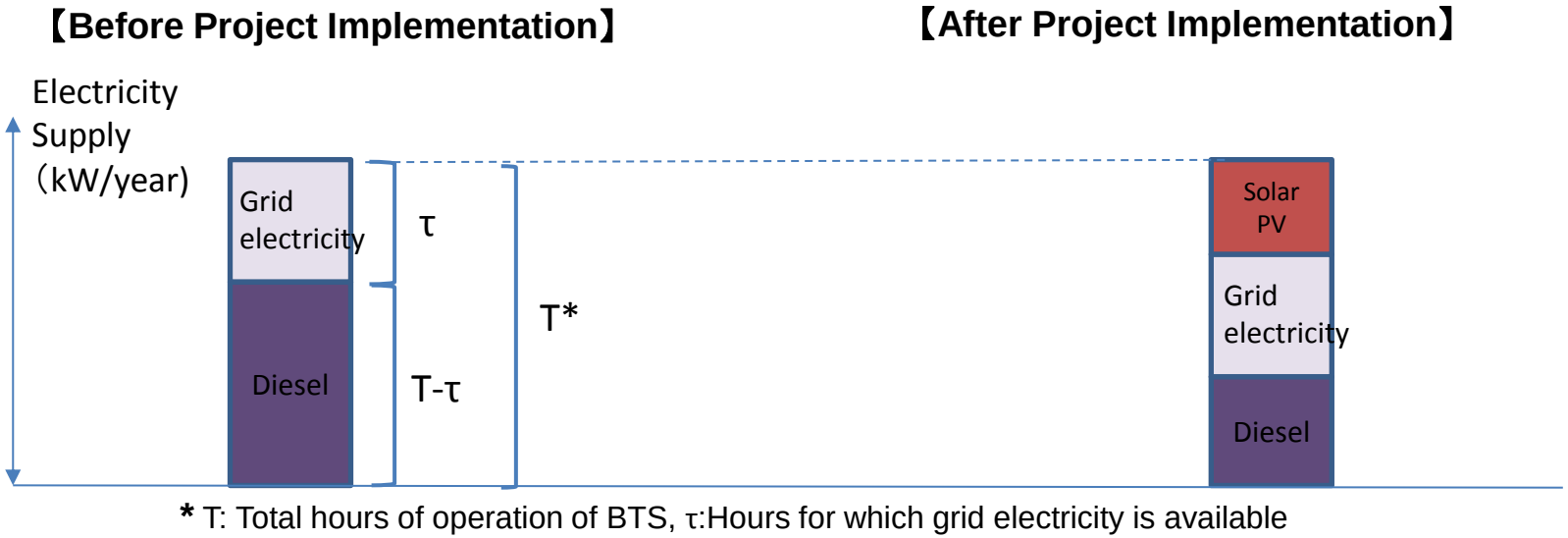
CO_2 emissions from grid electricity and/or diesel generator. Adopting better efficiency of diesel generator (new and design value) to ensure net emission reduction.

【After Project Implementation】

Displace grid and/or diesel generated electricity by solar power, and reduce diesel consumption by optimizing the efficiency of diesel generator.

Calculation of Emission Reductions

1. Establishment of Reference Emissions



* T: Total hours of operation of BTS, τ:Hours for which grid electricity is available

- The reference emissions are calculated based on the assumption that monitored electricity at project BTS is supplied by grid and/or diesel generator with the pattern which is observed before project implementation (time of supply and efficiency).
- Efficiency improvement of the diesel generator is not accounted for the sake of conservative calculation, by adopting the efficiency of new diesel generator which is installed by the project.

2. Calculation of Project Emissions

- Project emissions are calculated on the basis of monitored grid electricity consumption and/or diesel consumption at the project BTS after implementation of the project, and CO_2 emission factor of grid electricity and diesel.

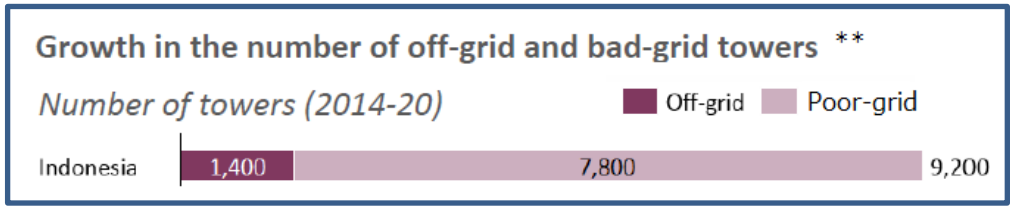
Contribution to Sustainable Development and Technology Replication Opportunities

TRIBRID System will contribute sustainable development of Indonesia in terms of its economy and environment.

- Economy
  - Reduce economic burden of diesel consumption for the operation of mobile tower in Indonesia.
  - TRIBRID System consists of equipment from local suppliers, and so the dissemination of TRIBRID System will contribute to local industry and economy.
- Environment
  - Electricity consumption at mobile tower in Indonesia is 2,350million kWh*, and CO_2 emissions are 1.88million* tCO_2. TRIBRID System will contribute to reduce negative environmental impact of mobile tower.

Technology replication opportunities

- TRIBRID System consists of equipment which can be supplied locally, and KDDI will provide training of technical skills for operations to local engineers during the demonstration project.
- The number of mobile towers in off-grid and poor grid area are expected to grow. So, the dissemination of the technology is expected.



*Source: Greening the Network: Indonesia market Analysis, IFC, GSMA, 2013
** Green Power for Mobile, Dec 2014, GSMA

THANK YOU

Terima Kasih

ARIGATO

Designing The Future

KDDI