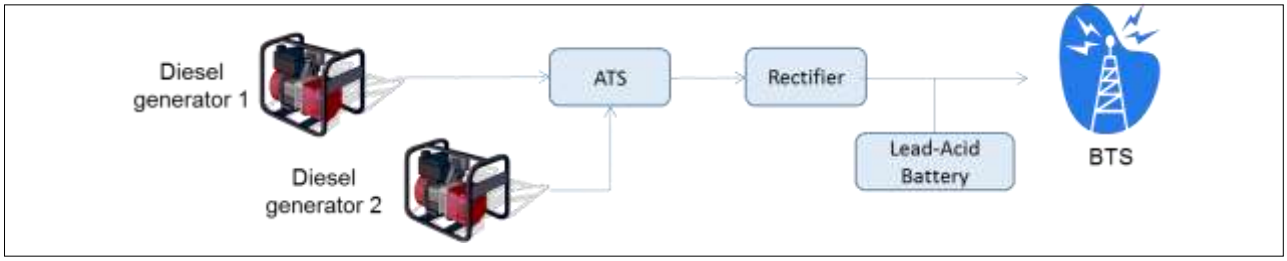
Explanatory note about power system configuration of BTS

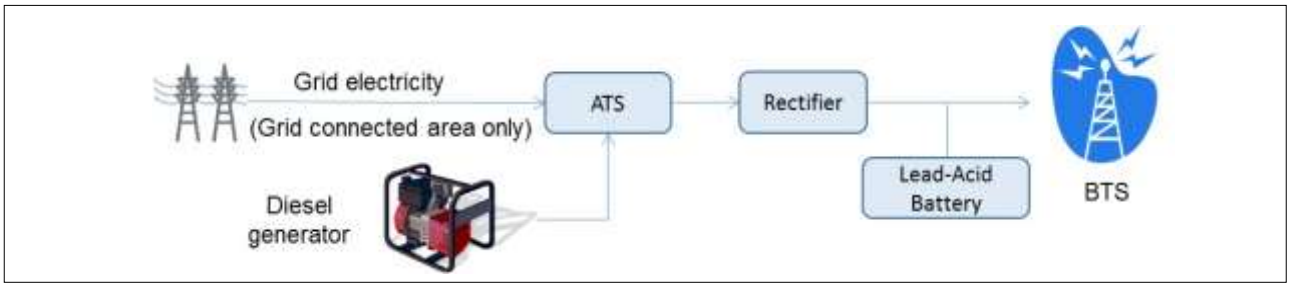
The Base Transceiver Station (BTS) is a telecoms infrastructure to facilitate wireless communication between subscriber device and telecoms operator network. In order to secure 24 hours telecommunication services, the equipment of diesel generator as a source of power and its reliable operation are necessary in regions where the grid is not available or unreliable. In addition, lead-acid battery is equipped to prevent momentary and/or temporary power failure.

Below is the typical power system configuration of BTS in off-grid and unreliable grid area in Indonesia:

[Off-grid Area]



[Unreliable grid Area]

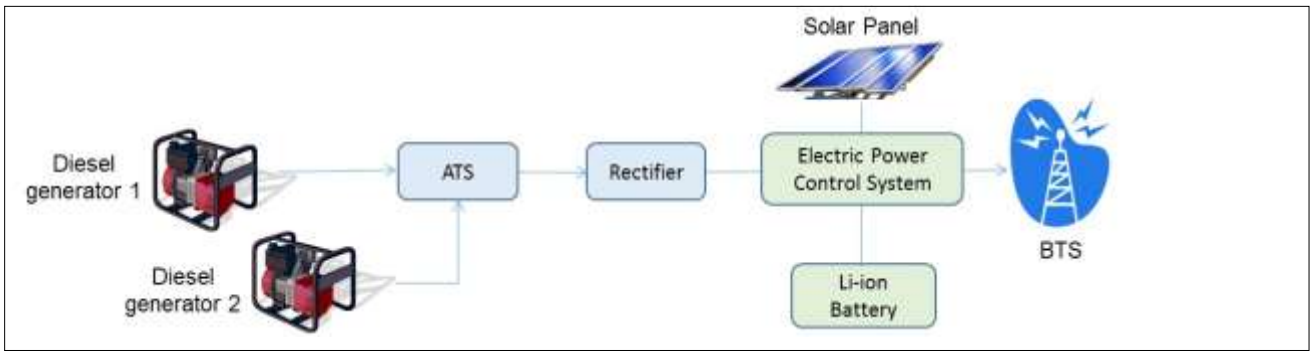


ATS: Automatic Transfer Switch

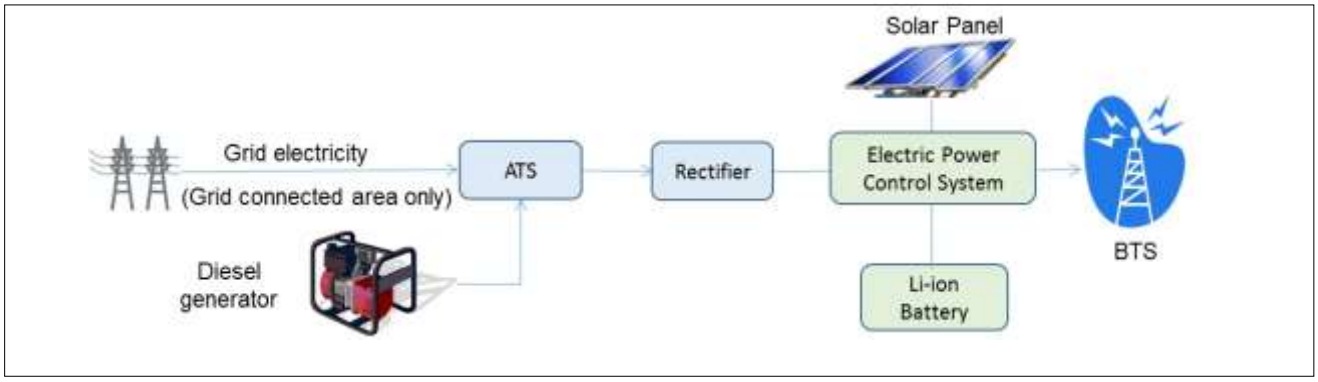
- BTSs in off-grid area have two diesel generators installed in order to ensure a back-up energy source when the main diesel generator fails. Usually, two diesel generators are operated alternately for every 8 to 12 hour
- BTSs in unreliable grid area, ATS works to start-up diesel generator at the time of the power failure from the grid.
- BTSs in off-grid area and unreliable grid area have equipped with lead-acid battery as a standby power supply to ensure the power source when equipment fails and power outage. The lead-acid battery is also used to ensure power source while switching the power source from diesel generator 1 to 2, or from grid power to diesel generator.
- For BTSs in off-grid and unreliable grid area, the diesel generators are operated on a continuous base with low loads in order to ease the mechanical burden on the diesel generators. In addition to that, diesel generators are operated with low loads because they are usually oversized considering the capacity for future expansion and upgrade.

The project activity is to install Tribrid Systems which consist of solar panel, batteries, and electric power control system to BTSs. The system configuration of project BTSs are as below:

[Off-grid Area]



[Unreliable grid Area]



Basic understanding for the calculation of emission reductions

- In case diesel generator is replaced by the project, new diesel generator with the capacity, which is almost same or smaller than the one prior to the project, is installed usually. The reason is because the project aims to achieve the energy saving by optimizing the operation of diesel generator, i.e. increasing the load factor of the diesel generator operation which was kept in low in the reference.
- At a typical BTS site in Indonesia, lead-acid battery for the purpose of standby is equipped as mentioned above. The loss during electricity transfer to lead-acid battery is much larger than the loss by Li-ion battery. The loss by the Li-ion battery was 2kWh/day, while the loss by lead-acid battery was 8.5kWh/day according to the measurement result[1]. Therefore, not considering the loss during electricity transfer to lead-acid battery and Li-ion battery for the reference and project scenario is considered reasonable for simplification of the methodology and conservative as well.

[1] Based on the survey result conducted by KDDI at the BTS located in XXX, Indonesia.