Risk-Based Optimal Dispatch for Rural Electricity-Biogas Coupled Microgrid



**Fig. 1.** Load demand



**Fig. 1.** Wind power



**Fig. 2.** PV power

TABLE I Microgrid Parameters

|  |  |
| --- | --- |
| Parameter | Value |
| Installed capacity of gas-fired generators | 6730 kW |
| Total installed PV capacity | 1120 kW |
| Installed wind farm capacity | 1120 kW |
| Charge/discharge efficiency of battery storage/ | 95% |
| Installed battery capacity/ | 500 kW / 1000 kWh |

TABLE II Biogas Parameters

|  |  |
| --- | --- |
| Parameter | Value |
| Volume of anaerobic digester | 20,000 m³ |
| Initial TS concentration | 25 kgVS/m³ |
| Initial temperature | 25°C |
| Biochemical methane potential | 0.42 m³/kg |
| Microbial fermentation parameters// | 0.015 / -0.129 / 0.802 |
| Feedstock heat exchange efficiency | 50% |
| Biogas charge/discharge efficiency/ | 92% |
| Biogas storage capacity/ | 1000 m³ / 24,000 m³ |
| Lower heating value of biogas | 6.6278 kWh/m³ |
| Biogas generator efficiency | 35% |
| Installed biogas generator capacity | 1500 kW |
| Installed electric boiler capacity | 600 kW |