Topic number: 2
Systems

Wind diesel battery systems for the Greek islands Sifnos, Serifos and Astipalea

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In the majority of autonomous Aegean island grids, the annual penetration of wind energy is lower than 10%, even though there is exceptional wind potential in this area. This situation is due to large fluctuations of demand in summer and winter periods in combination with the technical restrictions of diesel gensets of the autonomous power stations of the Public Power Corporation (PPC). The possibility of increasing the share of wind energy, while respecting power quality standards, requires the use of a short term storage unit, combined with highly efficient power electronics, communication and control devices. The new concept of wind diesel battery system has been successfully demonstrated on the Greek island of Kythnos where the new Intelligent Power System (IPS) is in operation since June 2000, allowing wind energy penetration levels higher than 25%.

Public Power Corporation is planning to replicate the Kythnos wind diesel battery power system on three new islands: Sifnos, Serifos and Astipalea. The current paper presents the design of the advanced autonomous power supply system for the three autonomous grids. The use of new inverter technology will increase the security and quality of the power system. The wind energy production is expected to reach penetration levels over 30%.

ISLAND	INSTALLED CAPACITY [kW]	LOAD DEMAND [kWh]	PEAK POWER [kW]	PLANNED W/T SIZE [kW]
Sifnos	4.050	8.904.237	3.700	2x 600 kW
Serifos	2.250	4.145.747	2.000	1x 600 kW
Astypalaia	1.600	3.533.690	1.400	1x 600 kW