

Mobile and Stationary Power Grid (MPG / SPG) – Introduction

Product Introductory Description



Product Introduction

Advanced Renewable Power (ARP) provides both mobile and stationary power grid systems. These systems use a combination of a power generating source, an energy storage system (ESS) and a power conversion system (PCS).

The power generation system may use traditional fossil fuel powered generators or renewable energy sources such as solar, wind or hydro or a combination of any of these. The PCS monitors the power being produced by the source of power and the power being consumed by the users. Power that is generated by the generating source which is not consumed by the user is stored in the ESS. If the power being consumed is greater than that of the power source, the PCS will dynamically convert the stored energy into power for consumption. In this manner, the system can support peak loads greater than the rated output power of the system for extended periods of time such as the late afternoon or early evening when most households are preparing their evening meals. Once the ESS is full, fossil fueled generators will be turned off and power will be supplied from the ESS through the PCS to the user. If other renewable power is available and the ESS is full, only enough power from the ESS will be used to supplement the renewable source as needed.

The ARP 25 kilowatt hour (kWh) lithium-ion battery pack is the fundamental building block of the energy storage system that is used in the Mobile Power Grid (MPG) and the Stationary Power Grids (SPG). These packs allow ARP to store and discharge quickly and efficiently. A sophisticated battery management system is used to ensure the most efficient and safe operation of the packs in the energy storage system. Combining packs in different configurations allows ARP to produce products from a size that meets the needs of a small worksite, rescue site, or similar application or increase in size for systems that meet the energy needs of hospitals, schools, and small to large communities. The systems can stand alone in their original size and or be joined together with other ARP mobile or stationary power grids as building blocks by ARP to form interconnected microgrids intended to meet the power needs of remote or secluded areas where a grid is inoperable, impractical or unreliable especially the rural needs of non-electrified nations.

Each ARP MPG or SPG can form its own standalone grid or island and support the power consumption for which it is sized. All systems use the same communications protocols that allows each system to be connected to other systems. When multiple systems are connected to support higher loads, one system is selected to form grid and the other systems will synchronize with and "follow" that system. In this configuration, each of the "follower" systems can assume the role as the grid in case the original unit malfunctioned preventing the loss of the entire power grid. Also, with the combination of stored energy and redundant generators and energy storage systems, the loss of one power grid system in the combined grid not only will not shut the entire system down, but allows the downed system's users to be supplied while the down system is being refueled or repaired.

This allows a community or site planner to add units as the need arises. A small worksite or field hospital may only need a 25kW unit, whereas a small community 10 to 15 homes may need a 100KW MPG and a larger community of 100 or so homes would require the 1MW MPG or SPG. When units can form a microgrid and are designed to be paralleled with like units, thereby providing scalability across the range of national and local electricity needs of countries.

The MPG and SPG systems are furnished with battery packs, invertors, generators, battery management systems, power conversion systems, as well as thermal management system to maximize the electricity production and sustainable life of the systems. The MPG systems are mounted, depending on size on single trailers or up to two trailers. Both the MPG and SPG systems are manufactured to the rigorous standards of our customers and the energy industry. The systems can be delivered factory assembled and tested by ARP, but are designed to be assembled at joint venture manufacturing facilities in a partnering country. Joint ventures will be between ARP and partners in each country ensuring original quality parts, ARP trained local labor for manufacturing, quality testing, installation, commissioning and maintenance.

While ARP will train local maintenance personnel, all MPG and SPG systems are able to be remotely monitored by ARP to either notify or assist local maintenance personnel.