

Hybrid Energy System Selling Points

- Although the diesel generator working as traditional island power supply solution did solves the power supply problem, but following problems is difficult to overcome:
 - ❑ Spare capacity for Genset is wasted
 - ❑ Low load rate of Genset;
 - ❑ High operating expenses;
 - ❑ The quality of power supply is relatively poor;
 - ❑ Environmental pollution.
- For different areas and different application, following system solutions can be applied:
 - To solve the problems above, combined with the international environment of carbon reduction and zero carbon policy. Adding energy storage devices to the original diesel generator set system can form a new generation of hybrid energy island power supply scheme.
 - By introduction of Hybrid Energy System, the problems of energy intermittency and volatility of the diesel-powered microgrid system are solved. Under the premise of retaining the original diesel generator set system:
 - ✓ Improve the efficiency of oil-fired power generation;
 - ✓ Ensure the reliability of power supply;
 - ✓ Reduce operating costs;
 - ✓ improve power quality;
 - ✓ Reduce environmental pollution;

Diesel Genset with Storage

Application: System upgrade

Region: All regions

Advantage:

- ✓ Improve the power rate of diesel generator
- ✓ Improved power transient response
- ✓ Optimize diesel fuel economy

Diesel Genset with Storage, PV

Application: Energy modification

Region: Sunshine duration $\geq 2200\text{h}$

Advantage:

- ✓ Reduce the proportion of diesel engine operation
- ✓ Reduce system carbon emissions
- ✓ Significant savings in operating costs

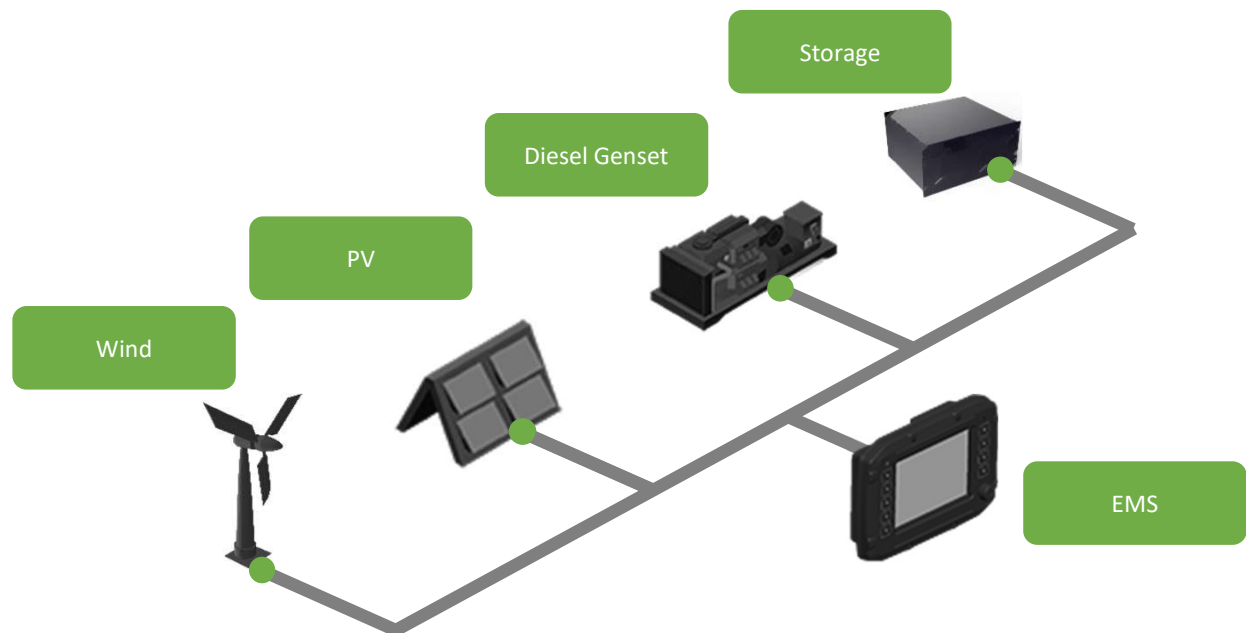
Diesel Genset with Storage, PV, Wind

Application: large-scale power station modification

Region: Sunshine duration $\geq 2200\text{h}$, Average Wind Speed $\geq 5.8\text{m/s}$

Advantage:

- ✓ Diesel genset as a backup power
- ✓ Achieve zero carbon emissions
- ✓ Complete Multi-energy solution



- In the hybrid energy system, energy storage technology and energy management technology are the core technologies of hybrid energy solutions.

■ Typical energy storage structure:

- **Battery Pack** - Generally using lithium batteries;
- **BMS** - Battery Pack Management System;
- **PCS** - Power Conversion System, control energy storage charge and discharge;
- **EMS - Energy Management System** as the brain of the system, the system is fitted with DSE EMS controller, to achieve precise, real-time and convenient system control. Equipped with 800MHz dual-core high-performance processor, IP67 high-protection body, it can be adapted to various brands of genset controllers, so that the original genset can seamlessly connect with the upgraded hybrid energy system. HD colorful screen with 180° viewing angel; PC-Free configuration, the system can be configured via the front panel, with button and encoder.

混合能源系统卖点

■ 传统孤岛供电下的柴发机组虽然解决了供电问题，但有以下问题难以攻克：

- ❑ 柴发备用容量浪费
- ❑ 柴发机组负载率低；
- ❑ 运营费用高；
- ❑ 供电质量相对较差；
- ❑ 环境污染。

■ 为了解决上述问题，结合双碳，减碳的国际大环境。在原柴油发电机组系统中加入储能装置，即可组成新一代混合能源孤岛供电方案。

■ 通过引入储能装置，解决了柴发微电网系统能源间歇性、波动性问题。在保留了原有柴油发电机组系统的前提下：

- ✓ 提高燃油发电效率；
- ✓ 保障供电可靠性；
- ✓ 降低运营成本；
- ✓ 改善电能质量；
- ✓ 降低环境污染；

■ 针对不同区域，及不同用电环境，可模块化组成以下系统方案：

柴储

适用场景：系统升级

适用地区：所有地区

优势：

- ✓ 改善柴发低负载率工况
- ✓ 提升供电瞬态响应
- ✓ 优化柴发燃油经济性

光柴储

适用场景：能源改型

适用地区：年日照时长 $\geq 2200\text{h}$

优势：

- ✓ 降低柴发运行占比
- ✓ 降低系统碳排放
- ✓ 显著节省运行成本

风光柴储

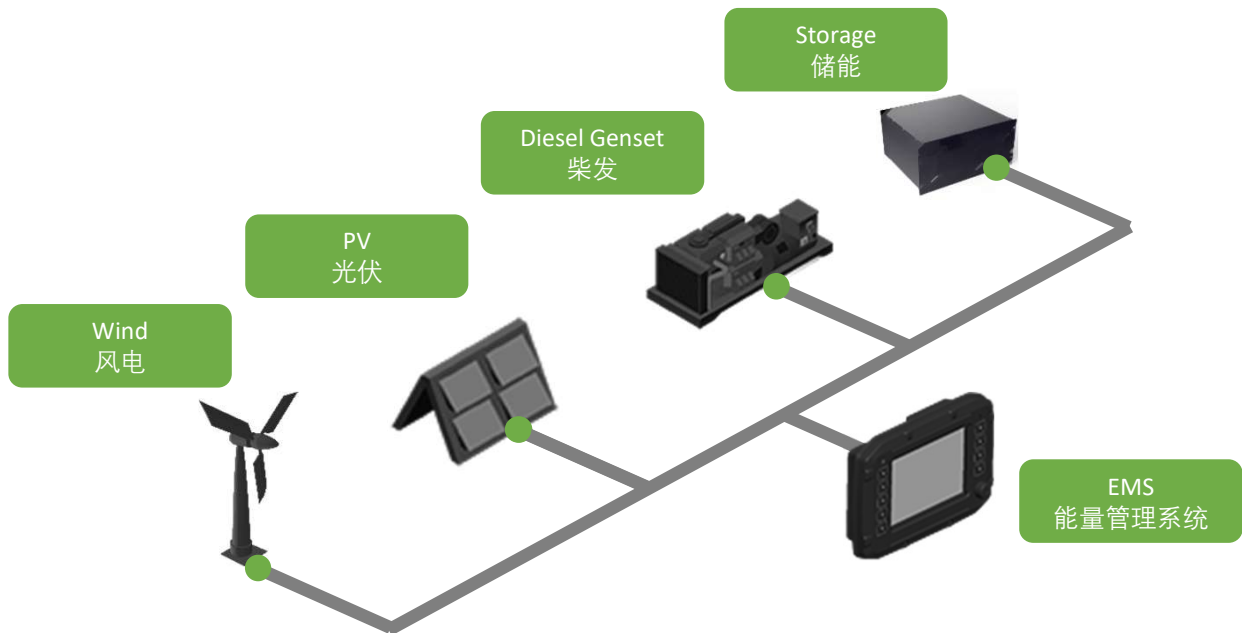
适用场景：大型电站改型

适用地区：年日照时长 $\geq 2200\text{h}$

年平均风力 $\geq 5.8\text{m/s}$

优势：

- ✓ 柴发作为备用电源
- ✓ 实现0碳排放
- ✓ 完备的多能互补微电网



■ 在混合能源系统中，储能技术、能量管理技术是混合能源解决方案的核心技术。

■ 典型储能结构：

- 电池包 - 一般使用锂电池；
- BMS - 电池包管理单元；
- PCS - 储能变流器，控制储能充放电；
- EMS - 作为系统的大脑，选用DSE EMS控制器，实现精准，及时，便捷的系统控制。搭载800MHz双核高性能处理器，IP67高防护机身，可适配各品牌柴发控制器，使原有柴发无缝对接升级后的混合能源系统。无死角高清彩色屏幕；无需电脑，通过前面板即可完成系统配置。