**Project Summary**

**Project Background**
A total of 17 villages with about 850 households and about 4,000 inhabitants in the province of Huambo (Angola) are to be electrified with decentralized PV systems. The locations are remote rural communities within in distances up to 200km away from the provincial capital of Huambo. The pre project energy supply of the villages was carried out by small diesel generators and single household PV systems. Due to high fuel prices the electricity was only available for a few hours daily. Future energy demand of each site was calculated with about 50,000 kWh per year.

**Project Objectives**
The Off-Grid Solar Systems shall provide continuous electricity supply to public buildings, private households and infrastructure (e.g. water supply, street lighting). With a very high solar fraction the systems should equipped to easily integrate existing generators as an emergency backup. A new distribution system enables all defined consumers access to electricity. Due to still to develop billing methods, a metering system should be included in the distribution.

**Project Activities**
Technical advice to the client over the project period. Planning and system design of the energy supply systems. This included the components of photovoltaic systems, stand-alone manager, battery storage, distribution lines and house connections. The system optimization and sizing was performed using the simulation tool HOMER. Specification of the required components and compiling bills of materials as well as project cost estimation for all sites. For an international tender process tender documents for the Off-Grid and distribution system were compiled.

**Implementation Features**
The village supplies were planned as AC-grid systems. Existing diesel generators can be integrated in the supply systems and act as emergency backup. With a PV module capacity of 45 kW peak, an Island Manager output of 30 kW and a battery capacity of 300 kWh, 90% of electricity consumption will be covered by solar energy. The distribution network with a total length of about 2 km will be constructed as a 3-phase system (400 V/50 Hz) in the centre area, whereas the distribution to end users will be a 1-phase system (230V/50Hz). The house connection boxes will be equipped with ground fault circuit breakers and digital a current meters.

**Services Provided**
- Technical consulting
- Planning and system design
- Simulation of solar systems
- Component selection and compilation of bill of materials
- Compilation bill of quantities
- Risk analysis for the project implementation