Power Stability Expert

| Case Study |

Turnkey Solution for 20MW Solar Power Park in Qinghai

Create a miracle with installation time of 64 days at high altitudes

In the year 2014, NR has completed a 20MW solar power plant, “Gonghe Hi-Tech Wealth solar power park phase III”, in Qinghai province, China. The total installed capacity of the project is 20MWp. NR undertakes the engineering, procurement & supply, construction and installation. The PV plant was completed on December 25th, 2014 and passed the acceptance inspection at the very first time before the pre-project. The average annual energy output of the PV plant is expected to be 32 GWh with an average annual equivalent utilization time of 1558.39 hour.

Overview

The Gonghe Hi-Tech Wealth Solar Power Park Phase III 20MW grid connected PV project is located in the photovoltaic power generation garden of TalaTan of Gonghe County, Hainan Tibetan Autonomous Prefecture.

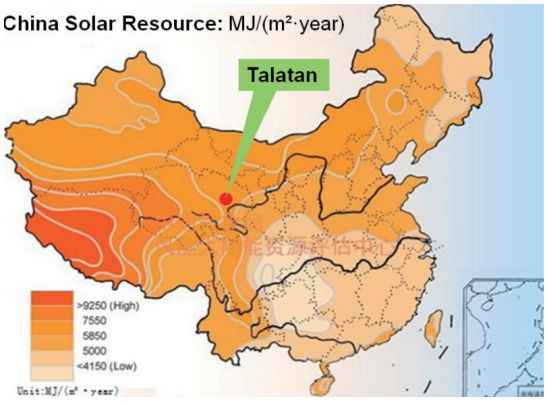
According to the 40-year’s statistics (1971-2010) of Gonghe Meteorological Station, the average annual sunshine time is 2910.6h with a long average daily sunshine of 8h. The major solar radiation is concentrated in March to August, accounting for 60% of the annual solar radiation quantity, which is more suitable for solar power generation. Moreover the data also shows a mere relative standard deviation of 1.5 % and overall annual solar radiant energy range of 6.2%, which means the solar energy resources are stable and inter-annual variation is small in these years. In addition, the local geomorphic unit is simple and composed of fluviatile deposit with a gradual gradient of 3-5° from northwest to southeast. With an average altitude of 2900m, the terrain is mostly flat and open. This makes it real ideal for the PV power station installation.

Customer Needs

Solar power is a kind of reliable, clean and green energy with zero CO_2 emission. PV power installation is thus booming worldwide in recent years driven by low system prices and government incentives. Qinghai is one of the most abundant solar power resource provinces in China.

The government and China National Energy Board pay much attention to solar power development in Qinghai and develop various financial support policy as well as high feed-in tariff.

Hence, it is very meaningful to build this PV generation park in this area with superior solar power resource.



Power Stability Expert

NR Solution

As the main contractor, NR supplies turnkey solution to Gonghe Hi-Tech Wealth solar power park phase III, including system design, manufacturing, procurement and construction. The supply scope covers all components of the PV generation park, including SCADA, PV module, PV support, inverters, transformers and step-up substation for grid-connection, etc. NR elaborately organized a professional project team with qualified project managers to ensure the project can be implemented efficiently and economically.

Each PV module of the project adopts 255Wp polycrystalline silicon structure in series to form a 20 MWp (20.53 MWp Max) capacity PV farm. The PV network consists of 2 rows and 11 columns to occupy 80,520 PV cells in series and parallel according to voltage ratings. An optimum dip angle at 38° (azimuth angle of 0°) fixes the PV arrays to maximally receive the radiation of sun during days.

In the project, the combination of centralized and string inverters are used. Half the capacity of the PV generation adopts centralized inverters with each capacity of 500kW. Two centralized inverters with a step-up transformer make one 1MWp PV generation unit. Totally 10 numbers of centralized generation units are installed. The other half adopts string inverters. There are 8 numbers of string type PV generation units with each capacity of 1.25MWp. All PV generation units with step-up transformer are converged to the 35kV bus for gird-connection via a 35kV interconnection line. For better operation, a ±5MW STATCOM provided by NR is installed for dynamic reactive compensation.

Each PV generation unit is composed of:

- Solar PV module
- DC combiner or AC combiner
- Grid-connected inverter
- Box-type step-up transformer

The 35 kV PV grid-connection substation applies the single-bus wiring mode including 6 switchgear cabinets, which are:

- 1 photovoltaic outgoing line
- 2 photovoltaic incoming lines
- 1 reactive compensation (STATCOM)
- 1 substation-transformer
- 1 PT cabinet

Customer Benefits

The construction of Gonghe Hi-Tech Wealth Solar Power Park Phase III project started on October 23rd, 2014 and completed on December 25th the same year, totally 64 days. NR elaborately organized a professional project team to manage the construction and installation of the project. With NR's featured technology, management and commitment, the PV power park passed the acceptance inspection at the very first time. It is really a miracle for a PV power installation within such short construction period comparatively at high altitudes. It greatly saved the cost of the installation and labor.

The yearly total solar radiation in this area is about 6549.5 MJ/m2. Furthermore, the yearly total long sunshine time is about 2916.9 hours. The estimated first year PV generation is up to about 36.2GWh. In its 25 years' service time, the total PV output will be about 802 GWh considering the common average attenuation of PV equipment with reduction rate not exceeding 10% and 20% within 10 years and 25 years respectively. Besides, it is estimated that the recovery time of the initial investment will be within 7 years.

NR Electric Co., Ltd.
69 Suyuan Avenue,Jiangning Nanjing 211102,China
NRservices@nrec.com / NRsales@nrec.com