

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



What is the potential of solar PV power generation in Xinjiang? (3) In the situation where the construction of PV power plants in Xinjiang is fully developed, the theoretical potential of annual solar PV power generation in Xinjiang is approximately  $8.57 \times 10^6$  GWh. This is equivalent to  $2.59 \times 10^9$  tce of coal. Furthermore,  $6.58 \times 10^9$  t of CO<sub>2</sub> emissions can be reduced.



Can Xinjiang meet its annual electricity demand? Therefore, a progress level of 25% in Xinjiang was fully capable of satisfying Xinjiang's annual electricity demand. In terms of PV power generation,  $2.14 \times 10^6$  GWh of PV power generation is equivalent to  $6.48 \times 10^8$  tce of coal combustion for coal-fired power generation.



Does Xinjiang have power generation potential? PV power generation potential is approximately 27 times the energy consumption of Xinjiang in 2020. Through the suitability assessment and calculations, we found that Xinjiang has significant potential for PV systems.

### 1. Introduction



Which area in Xinjiang is suitable for solar power generation? Hami and Turpan, in eastern Xinjiang, had sufficiently high and stable solar radiation. (2) The area in Xinjiang classed as highly suitable for solar PV power generation is about 87,837 km<sup>2</sup>, which is mainly concentrated in eastern Xinjiang.



Does Xinjiang receive more solar radiation than lower regions? The observed sunshine duration data from stations in Xinjiang (2000-2014) were calculated and interpolated. This study used the average annual sunshine duration (SSD) as a criterion. Elevated regions receive more solar radiation than lower regions, but building PV power plants in elevated regions costs a lot [34].

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



How much green energy does Xinjiang have? According to Wang, the base can generate about 2.1 billion kWh of electricity from green energy annually, nearly 4.5 percent of Shihezi's total electricity output in 2022, saving 650,000 tonnes of standard coal. Xinjiang's installed power capacity from new energy sources has surpassed 62 million kilowatts.



In terms of spatial distribution, the Kunlun Mountains in southern Xinjiang had the highest solar radiation during the span of the study period. Hami and Turpan, in eastern Xinjiang, had sufficiently high and stable solar radiation. the theoretical potential of annual solar PV power generation in Xinjiang is approximately  $8.57 \times 10^6$  GWh



Therefore, the construction of dispersed photovoltaic power stations and independent micronetworks can be highly promoted. These findings reveal that the solar energy resources in southern Xinjiang are extremely abundant, demonstrating a stable growth trend and high utilization value. This research analyzes the temporal-spatial distribution of



Estimation of photovoltaic power generation potential in 2020 and 2030 using land resource changes: An empirical study from China the PV potential of the 12 provinces decreased to different degrees from 2020 to 2030. In Xinjiang, the generation potential in 2030 is only 0.05% less than that in 2020. Climate and land-use change impacts



The southern area in Xinjiang is Class ?? area with the most solar energy resources, Power generation by solar energy has experienced rapid development since 2011 at a zero level. The value was 3.26 million kW at the conclusion of 2014. It has a potential area of wind power with the area of 51,567

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



wind and PV power generation potential of China is about 95.84 PWh, which is approximately 13 times the electricity demand of China in 2020. The rich areas of wind power generation are mainly distributed in the western, northern, and coastal provinces of China. While the rich areas of PV power generation are mainly distributed in



In 2010, the generating capacity of China's renewable energy reached about 78.2 billion kW h and generating capacity from wind power was 50.1 billion kW h, accounting for 64.1% of all the renewable energy generation; solar power generated about 600 million kW h, representing about 0.8%; 27.5 billion kW h came from biomass and other energy, rating for ???



In the S2 and S3 situations, the annual PV power generation potential of Xinjiang could reach  $4.28 \times 10^6$  GWh and  $6.42 \times 10^6$  GWh, respectively. The generation potential of S2 was about 14 times higher than ???

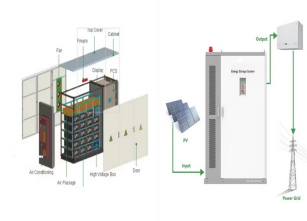


Cloud and aerosol are two important modulators that influence the solar radiation reaching the earth's surface. It is intriguing to find diverse impacts of clouds and aerosols over Southern



Solar power, also known as solar electricity, is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV) or indirectly using concentrated solar power. Solar panels use the photovoltaic effect to convert light into an electric current. [2] Concentrated solar power systems use lenses or mirrors and solar tracking systems to focus a large area of ???

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



The total potential for solar radiant energy of  $1.7 \times 10^{12}$  Southern Ningxia, Central Gansu, Eastern Qinghai, Southeastern Tibet, and Southern Xinjiang: III: 2200???3000: 5016???5852: 170???200: The subsidies for solar PV power generation projects include: (1) the excess of the on-grid price of renewable energy power over the standard on



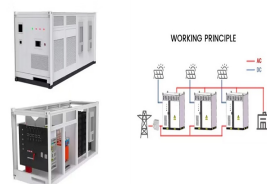
2 ? State Grid Aksu Power Supply Company makes every effort to guarantee the full-capacity grid-connected power generation of the largest photovoltaic project in southern Xinjiang.



PDF | On May 1, 2023, Wenjun Tang and others published Dense station-based potential assessment for solar photovoltaic generation in China | Find, read and cite all the research you need on



wind speed characteristics and evaluating wind power potential in Xinjiang, China, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, DOI: 10.1080/15567036.2020.1758250



4 ? Breaking the inter-provincial grid barriers and promoting regional cooperation are beneficial to increasing the potential of wind and solar power generation. Considering that the effectiveness of combining wind and solar energy depends on their complementarity, Many indicators and methods for assessing complementarity have been proposed.

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



The results showed that the annual solar power generation potential of this region can reach around 69,000 TWh. and Xinjiang is relatively high, where the power generation in the Ali Region in Tibet is the largest, in the range of 393 ?? 1/4 483 kWhm ???2, with the Mapping solar energy potential of southern India through geospatial



A decline in the solar power generation potential was observed, with notable reductions evident in areas such as northwestern and southwestern Xinjiang, the southern parts of Qinghai and Gansu, Ningxia, and ???



Photovoltaic power generation technology can be divided into the following categories [37]: (1) Photovoltaic cells that include crystalline silicon materials such as monocrystalline silicon, polycrystalline silicon, and gallium arsenide; (2) thin film solar cells based on amorphous silicon, cadmium telluride, cadmium sulfide, or copper indium gallium ???



Areas such as the Tarim Basin, Jungar Basin, and the northeastern part of Xinjiang, northwestern Qinghai, and northern Gansu were identified as having significant wind and solar power potential



abundant in renewable energy resources such as wind power and solar radiation; on the other hand, Xinjiang is Southern Xinjiang Resource-poor belt 250-280 Northern Tianshan piedmount thermal power takes up most of the renewable energy power generation volume in Xinjiang, reaching as high as 69.27% in the year 2014, followed by wind

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



By 2025, the installed capacity of new energy power generation will be about 102.5 million kW (including 18.5 million kW of nuclear power, 42 million kW of gas power, and 42 million kW of wind power, photovoltaic power and biomass power); the natural gas supply capacity will exceed 70 billion cubic meters, hydrogen production capacity will be about 80,000 ???



Decarbonization of the energy system is the key to China's goal of achieving carbon neutrality by 2060. However, the potential of wind and photovoltaic (PV) to power China remains unclear, hindering the holistic layout of the renewable energy development plan. Here, we used the wind and PV power generation potential assessment system based on the ???



The modeling framework to select suitable sites for onshore wind and solar PV deployment, assess development potential of installed capacity and power generation, and analyze the temporal and spatial disparity in renewable energy resources, followed four consecutive steps: 1) estimated hourly wind and solar power generation from calibrated data ???



Then, the technical, policy and economic (i.e., theoretical power generation) constraints for wind and PV energy development were comprehensively considered to evaluate the wind and solar PV power



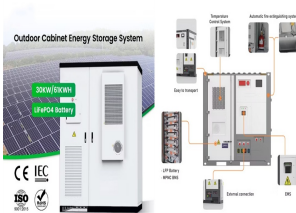
Concentrated solar power (CSP) technology can not only match peak demand in power systems but also play an important role in the carbon neutrality pathway worldwide. Actions in China is decisive. Few previous studies have estimated CSP technology's power generation and CO<sub>2</sub> emission reduction potentials in China.



# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



Solar power is vital for China's future energy pathways to achieve the goal of 2060 carbon neutrality. Previous studies have suggested that China's solar energy resource potential surpass the projected nationwide power demand in 2060, yet the uncertainty quantification and cost competitiveness of such resource potential are less studied.



URUMQI, Dec. 30 (Xinhua) -- Rich in sunshine, Xinjiang Uygur Autonomous Region is significant in China's solar power generation. Besides increasing the installation and grid connection of ???



In addition, Sun and Hof [25] used a high-resolution map of solar radiation and combined it with other constraints to analyze the combined potential of solar PV in Fujian Province, China, and showed that the potential power generation was approximately 4???5 times the total electricity consumption of the province in 2010. However, in addition to the ???



Assessment of concentrated solar power generation potential in China based on Geographic Information System (GIS) Fuying Chen<sup>1,2</sup>, Qing Yang<sup>1,2,3,4\*</sup>, Niting Zheng<sup>2</sup>, Yuxuan Wang<sup>5</sup>, Junling Huang<sup>6</sup>



the Kunlun Mountains in southern Xinjiang had the highest solar radiation during the span of the study period. Hami and Turpan, in eastern Xinjiang, had sufficiently high and stable solar radiation. (2) The area in Xinjiang classed as highly suitable for solar PV power generation is about 87,837 km<sup>2</sup>, which is mainly concentrated in eastern

# SOLAR POWER GENERATION POTENTIAL IN SOUTHERN XINJIANG



New energy electricity generation reached 84.5 billion kWh and accounted for 24 percent of the total electricity produced in Xinjiang in 2020, which is mostly attributed to solar power. It is equal to the power generation capacity of 27 million tons of coal, which would have released 72.9 million tons of carbon dioxide. Xinjiang aims to



The wind and solar power potential, projected electricity demands for 2050, and simulated penetration rates across mainland China. (A) The average yearly estimate of wind power potential at the 100m hub height and solar power potential for each provincial grid using the high-resolution weather data and power-modeling algorithms for 2007???2014.



The potential power generation is estimated to be  $1.38874 \times 10^{14}$  kWh, which is 21.4 times China's national power consumption in 2016 and 13.4 times the projected national ???