

SOLAR RESOURCE MAPPING:

Alternative Energy Development Board (AEDB) in collaboration with World Bank under its Energy Sector Management Assistance Program (ESMAP) initiated Renewable Energy mapping through the installation of wind and solar measurement stations throughout the country. For solar resource mapping, a total of nine (09) ground based solar measurement stations were installed at following places:

- i. National University of Science and Technology, Islamabad.
 - ii. Kala Shah Kaku Campus of University of Engineering and Technology, Lahore.
 - iii. Mian Nawaz Shareef Campus of UET, Multan.
 - iv. University of Engineering and Technology, Peshawar.
 - v. NED University of Engineering and Technology, Karachi.
 - vi. Mehran University of Engineering and Technology, Jamshoro.
 - vii. Balochistan University of Information and Technology (BUITEMS), Quetta.
 - viii. Balochistan University of Engineering and Technology (BUET), Khuzdar.

Out of the nine stations, eight (08) data stations as mentioned above were installed in universities and one station was installed at QA Solar Park, Bahawalpur. The geographical locations of the sites are distributed all over Pakistan covering different solar and climatic regimes. The data collected from these stations had been used to improve and validate the solar resource model for generating the final, high resolution solar maps for Pakistan. After the validation, high resolution solar maps of Pakistan have been published.

The solar mapping component was completed by World Bank in April 2017. After completion of project, World Bank handed over the ownership of solar data stations to AEDB. AEDB with the support of USAID & NREL operated & maintained the nine (09) solar data stations. Later, AEDB handed over the ownership of these nine (09) solar data stations to host institutes (universities & QA Solar Park) with all future liabilities considering that the host institutes /departments take multiple benefits from the solar data stations installed at their premises.

PHOTOVOLTAIC POWER POTENTIAL PAKISTAN

DESCRIPTION
This map illustrates the potential of solar photovoltaic (PV) power generation in Pakistan. The map is based on a combination of satellite data, ground measurements, and a solar radiation model. The map shows the potential of solar PV power generation in Pakistan, with the highest potential areas (red and orange) concentrated in the southern and eastern coastal regions, and the lowest potential areas (blue and green) in the northern and western mountainous regions. The map is a result of a comprehensive study conducted by the National Institute of Space and Aeronautics (NISA) in collaboration with the Solar Energy Research Institute (SERI) and the National Center for Earth Observation and Remote Sensing (NCEORS).

DATA SOURCES
The data used in this map includes satellite data from the Advanced Very High Resolution Radiometer (AVHRR) and the Advanced Very High Resolution Radiometer (AVHRR) on the Advanced Very High Resolution Radiometer (AVHRR) satellite, ground measurements from the National Center for Earth Observation and Remote Sensing (NCEORS), and a solar radiation model developed by the National Center for Earth Observation and Remote Sensing (NCEORS).

REFERENCES
National Center for Earth Observation and Remote Sensing (NCEORS), National Institute of Space and Aeronautics (NISA), and Solar Energy Research Institute (SERI). (2017). Solar Photovoltaic Power Potential in Pakistan. Islamabad, Pakistan: NISA.



GLOBAL HORIZONTAL IRRADIATION PAKISTAN

DESCRIPTION
This map illustrates the potential of global horizontal irradiation (GHI) in Pakistan. The map is based on a combination of satellite data, ground measurements, and a solar radiation model. The map shows the potential of global horizontal irradiation in Pakistan, with the highest potential areas (red and orange) concentrated in the southern and eastern coastal regions, and the lowest potential areas (blue and green) in the northern and western mountainous regions. The map is a result of a comprehensive study conducted by the National Institute of Space and Aeronautics (NISA) in collaboration with the Solar Energy Research Institute (SERI) and the National Center for Earth Observation and Remote Sensing (NCEORS).

DATA SOURCES
The data used in this map includes satellite data from the Advanced Very High Resolution Radiometer (AVHRR) and the Advanced Very High Resolution Radiometer (AVHRR) on the Advanced Very High Resolution Radiometer (AVHRR) satellite, ground measurements from the National Center for Earth Observation and Remote Sensing (NCEORS), and a solar radiation model developed by the National Center for Earth Observation and Remote Sensing (NCEORS).

REFERENCES
National Center for Earth Observation and Remote Sensing (NCEORS), National Institute of Space and Aeronautics (NISA), and Solar Energy Research Institute (SERI). (2017). Global Horizontal Irradiation in Pakistan. Islamabad, Pakistan: NISA.



DIRECT NORMAL IRRADIATION PAKISTAN

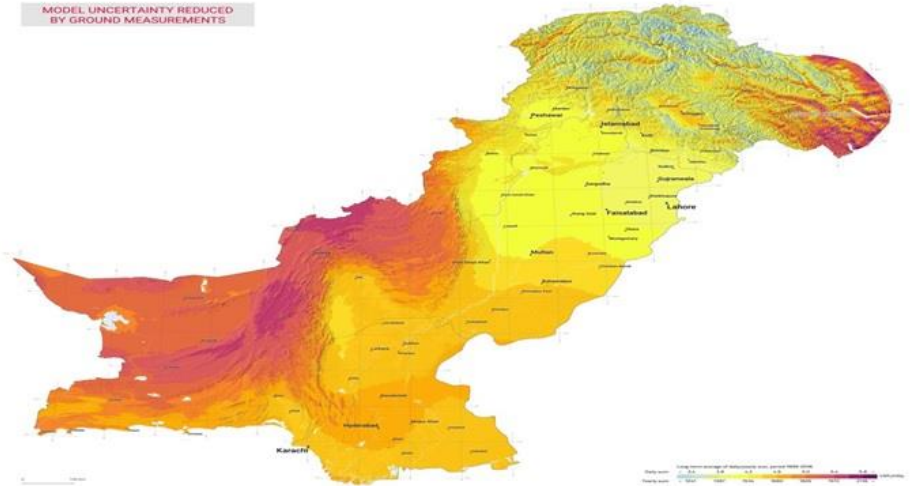
DESCRIPTION
This map illustrates the potential of direct normal irradiation (DNI) in Pakistan. The map is based on a combination of satellite data, ground measurements, and a solar radiation model. The map shows the potential of direct normal irradiation in Pakistan, with the highest potential areas (red and orange) concentrated in the southern and eastern coastal regions, and the lowest potential areas (blue and green) in the northern and western mountainous regions. The map is a result of a comprehensive study conducted by the National Institute of Space and Aeronautics (NISA) in collaboration with the Solar Energy Research Institute (SERI) and the National Center for Earth Observation and Remote Sensing (NCEORS).

DATA SOURCES
The data used in this map includes satellite data from the Advanced Very High Resolution Radiometer (AVHRR) and the Advanced Very High Resolution Radiometer (AVHRR) on the Advanced Very High Resolution Radiometer (AVHRR) satellite, ground measurements from the National Center for Earth Observation and Remote Sensing (NCEORS), and a solar radiation model developed by the National Center for Earth Observation and Remote Sensing (NCEORS).

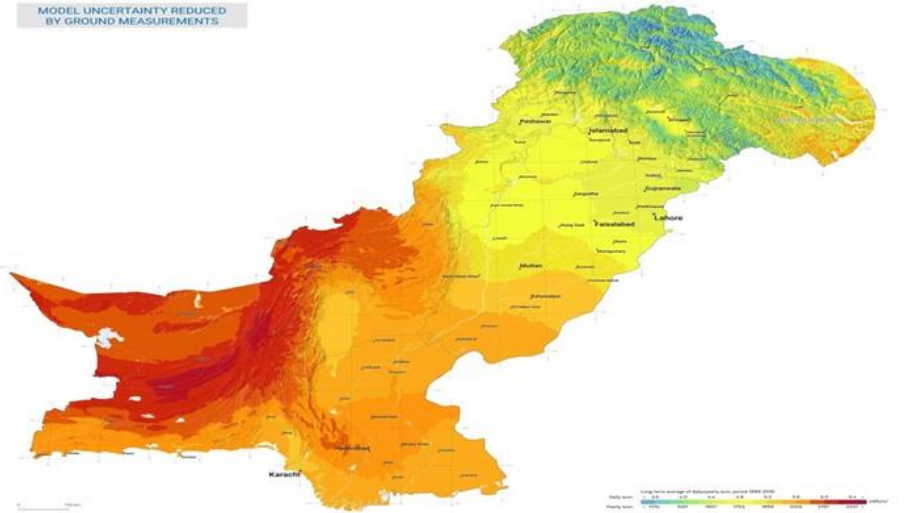
REFERENCES
National Center for Earth Observation and Remote Sensing (NCEORS), National Institute of Space and Aeronautics (NISA), and Solar Energy Research Institute (SERI). (2017). Direct Normal Irradiation in Pakistan. Islamabad, Pakistan: NISA.



MODEL UNCERTAINTY REDUCED BY GROUND MEASUREMENTS



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