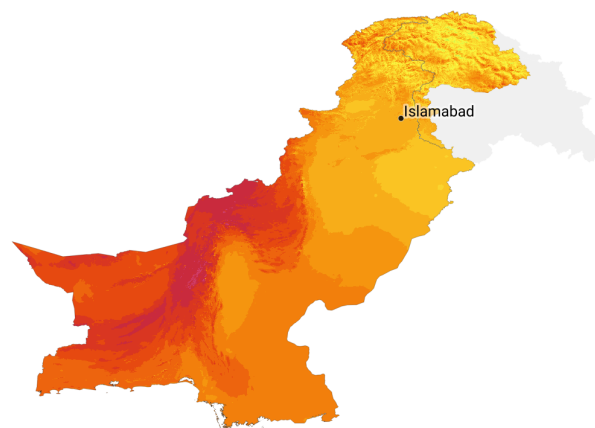
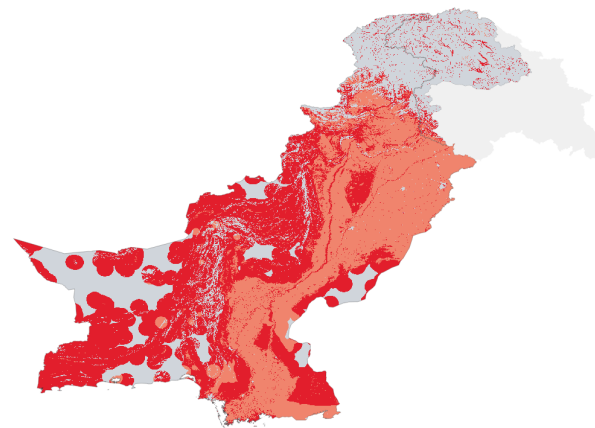


Pakistan



Photovoltaic power output (Practical potential, Level 0)

2.0 3.0 4.0 5.0 6.0 kWh/kWp N/A



Practical potential zonation: ■ Level 2 ■ Level 1 ■ Level 0 ■ N/A

The boundaries, colors, denominations and any other information shown on the maps do not imply, on the part of The World Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

INDICATORS

Total area / Evaluated area	796,100 / 796,100 km ²
Population (2018)	212,215,030
GDP per capita (2018)	1,473 USD
HDI / rank (2017)	0.56 / 146
Electricity consumption per capita (2014)	448 kWh/year
PV installed capacity (2018)	1,568 MWp
Average theoretical potential (GHI) / rank	5.341 kWh/m ² / 82
Average practical potential, level 1 / rank	4.713 kWh/kWp / 49
PV equivalent area	0.071%
PVOUT seasonality index (country range)	1.37 (1.14 – 2.47)
LCOE average (country range)	0.09 (0.08 – 0.11)

DISTRIBUTION OF PHOTOVOLTAIC POWER OUTPUT

kWh/kWp	41.9 %	72.7 %	100.0 %	of evaluated area
over 5.4	3.9 %	4.0 %	4.8 %	
5.4 — 5.2	6.8 %	7.1 %	9.1 %	
5.2 — 5.0	8.0 %	8.2 %	13.8 %	
5.0 — 4.8	6.3 %	7.0 %	10.1 %	
4.8 — 4.6	8.4 %	17.6 %	20.2 %	
4.6 — 4.4	4.1 %	9.8 %	12.4 %	
4.4 — 4.2	3.5 %	12.5 %	15.6 %	
4.2 — 4.0	0.6 %	6.2 %	8.9 %	
4.0 — 3.8	0.1 %	0.2 %	2.1 %	
below 3.8	0.2 %	0.2 %	3.0 %	

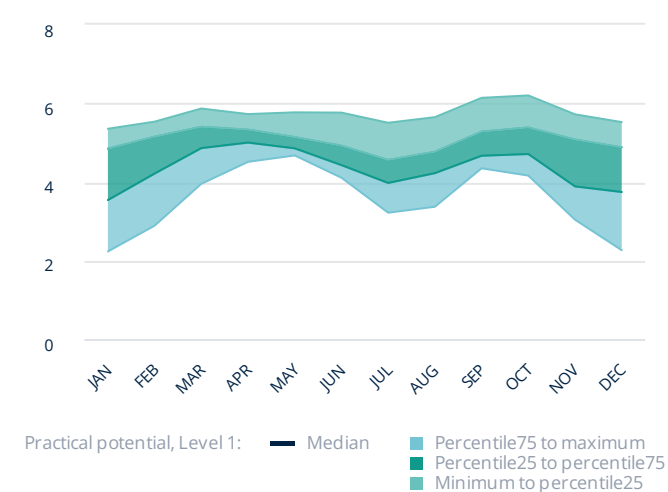
Practical potential: ■ Level 2 ■ Level 1 ■ Level 0

SUMMARY STATISTICS

Maximum	6.22	Maximum	5.55
Percentile 75	5.79	Percentile 75	5.04
Median	5.51	Average	4.71
Average	5.44	Median	4.67
Percentile 25	5.01	Percentile 25	4.38
Minimum	4.21	Minimum	3.99

Theoretical potential kWh/m² ■ GHI Practical potential, Level 1 kWh/kWp ■ PVOUT

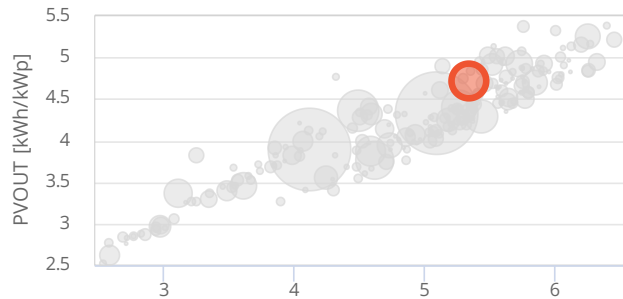
MONTHLY VARIATION OF PHOTOVOLTAIC POWER OUTPUT



Pakistan

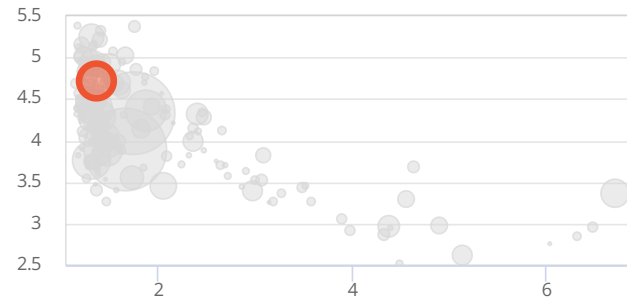
Average theoretical potential (GHI, kWh/m²)

5.341



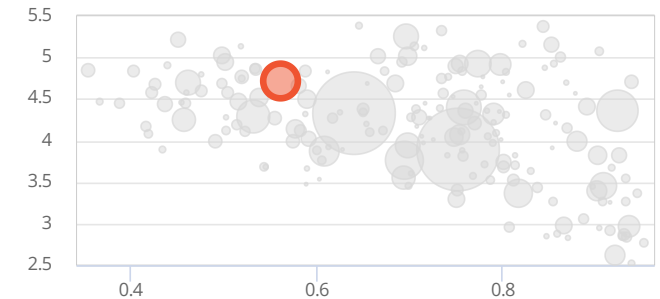
Seasonality index

1.37



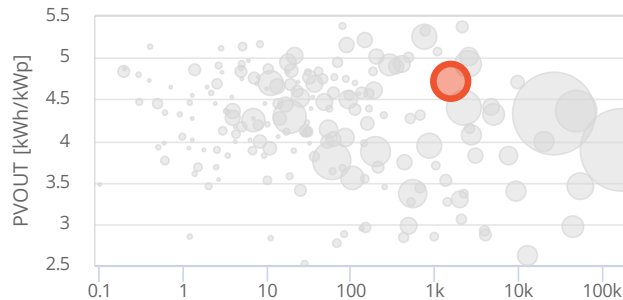
Human development index (2018)

0.56



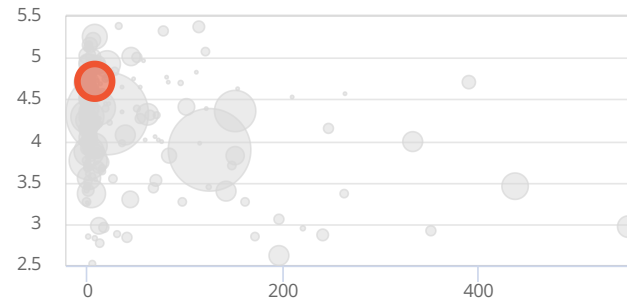
PV installed capacity (MWp, 2018)

1,568



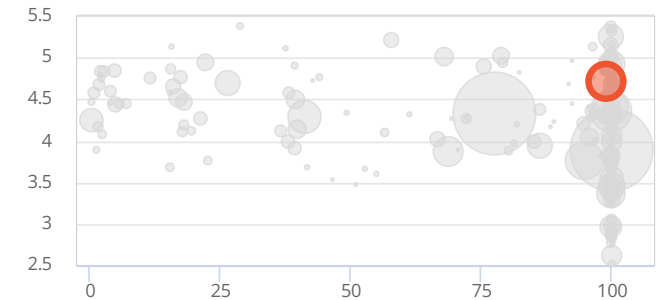
PV installed capacity per capita (Wp, 2018)

7



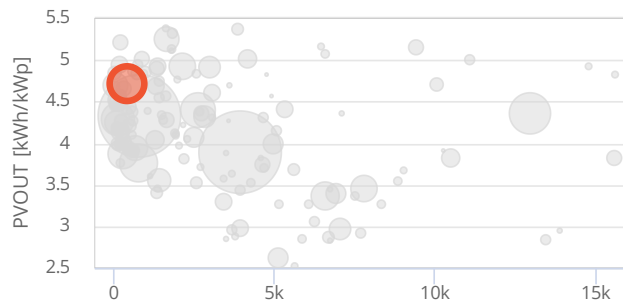
Access to electricity (% of rural population, 2016)

98.8



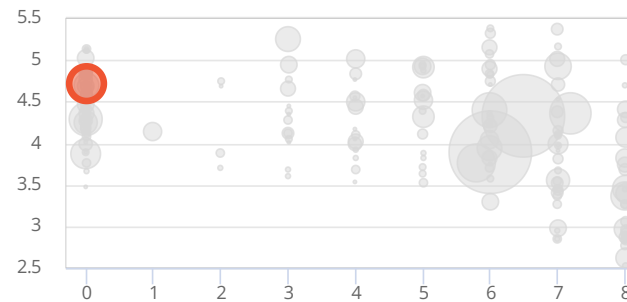
Electricity consumption (kWh/capita/year, 2014)

448



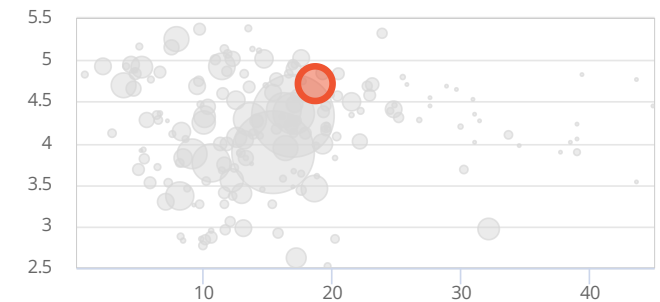
Reliability of supply and transparency of tariff

N/A



Approximate electricity tariffs (USD cents, 2019)

18.7



ABOUT

The World Bank Group publishes this factsheet as a part of the [Global Photovoltaic Power Potential study](#), analyzing data from the Global Solar Atlas, World Bank Open Data, and other public sources. It is a part of the ESMAP initiative on Renewable Energy Resource Mapping, to support the appropriate scale-up of solar power in the worldwide energy mix.

The methodology and details behind the data analytics, explaining the graphics and figures in this factsheet, are discussed in the study. The findings aim to address the needs of policymakers, project developers, financial and academic sectors, as well as professionals and individuals interested in solar energy.

This factsheet involves numerical and graphical components:

- Photovoltaic power potential map of the country with the unified color legend for all countries worldwide (thus maps from various factsheets are comparable). Minima and maxima intervals for the country are marked in the legend.
- Country zonation map, showing how the country area is split into practical potential levels 0, 1 and 2
- Indicators section present basic country facts and statistics relevant to PV status in the country
- Summary statistics provide selected results of country-based evaluation of theoretical (GHI) and practical potential on level 1 (PVOUT)
- Distribution of photovoltaic power output histogram communicates how much land in the country is available in practical potential levels 0, 1 and 2, and various PVOUT ranges. It helps to understand, what might be the approximate area for PV development available in the best or moderate parts of the country.
- Monthly variation of the photovoltaic power potential details the seasonal PV electricity generation throughout a typical year; it is an important supplement to the seasonality index
- The bubble charts portray the position of the country in the global context of socio-economic and energy-related indicators. The bubble size is proportional to the population of the country. Current country is highlighted, other countries are in grey. Axis X represents the given indicator, axis Y represents the average practical PV potential at level 1.

Explore more

For more country fact-sheets, country and regional maps, interactive tools, PV calculator, statistics, reports and raster data in GIS formats visit Global Solar Atlas at <https://globalsolaratlas.info>. More detailed data and technical solutions for specialists are provided by Solargis company (<https://solargis.com>).

GLOSSARY

Theoretical PV Potential

Global horizontal irradiation (GHI, measured in kWh/m²/day), the long-term amount of solar resource available on a horizontal surface on Earth.

Practical PV Potential

Photovoltaic power output of a PV system (specific yield, measured in kWh/kWp/day); in this case, the long-term power output produced by a utility-scale installation with fixed-mounted, monofacial c-Si modules with optimum tilt

- **Level 0** – Practical potential disregarding any land-use constraints
- **Level 1** – Level 0 practical potential, excluding land with identifiable physical obstacles to utility-scale pv plants
- **Level 2** – Level 1 practical potential, excluding land possibly under land use regulations due to nature and cropland protection

Economic PV Potential

Levelized cost of electricity (USD/kWh) – the lifetime costs associated with construction and operation of the power plant divided by the electricity produced during this lifetime (the lower the cost, the higher is the economic potential)

PV seasonality index

Ratio between the highest and the lowest of monthly long-term PVOUT averages.

PV equivalent area

Presumed country area proportion to be covered by PV plants producing the equivalent of yearly electricity consumption. The estimated area includes both the active area of PV modules and the area between the module rows (assuming the optimum row spacing).

Total / Evaluated area

Total area is a surface area of a country derived from official statistics, including inland water bodies and some coastal waterways. Evaluated area is a true area, from which the statistics were calculated. It includes land areas, without coastal waters, interior parts of the large water bodies, areas with missing input data and minor outliers caused by input data resolution.

Acronyms

DIF – Diffuse horizontal irradiance
DNI – Direct normal irradiance
GDP – Gross domestic product
GHI – Global horizontal irradiance
HDI – Human development index
LCOE – Levelized cost of electricity
PVOUT – Photovoltaic power output
PV – Photovoltaic

DATA SOURCES

Solargis

Average theoretical potential – GHI (kWh/m²/day)
Average practical potential – PVOUT (kWh/kWp/day)
Distribution of photovoltaic power output
Monthly variation of photovoltaic power output
PV equivalent area (% of the total country area)
PV seasonality index

The World Bank

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<https://www.irena.org/publications/2019/May/Renewable-power-generation-costs-in-2018>