

SOLAR ENERGY PROJECTS TAKE UP THE LARGEST SHARE OF THE NATIONAL PROGRAM'S FUTURE PROJECTS

Due to the steady population growth and the continuous demand on energy resources, there is a need to establish alternative sources of energy that are renewable, clean, and harmless to the environment. KSA has worked to find innovative solutions represented in the projects of the National Renewable Energy Program, which aim to increase KSA's share in the production of renewable energy and diversify local energy sources. Number of projects of the National Renewable Energy Program has reached 13 projects with a total capacity of 4,870 MW, where solar energy took up 91.8% with a total capacity of 4,470 MW, while wind energy took up a percentage of 8.2% with a capacity of 400 MW

OBJECTIVES OF THE NATIONAL RENEWABLE ENERGY PROGRAM UNTIL 2024

By 2024, the government plans to generate electricity from the projects of the National Renewable Energy Program, amounting to 15,108,701 MWh annually aiming to contribute to supplying 692,557 houses with energy. The projects of the National Renewable Energy Program aim to provide 7,870 job opportunities by the end of 2024. The amount of fossil fuel consumption shall be reduced, which would contribute to decreasing carbon dioxide (Co₂) emissions by 9,828,156 Ton/year by 2024.

Figure 1 . Electrical Energy planned to be generated from the Projects annually (000 MW/h)

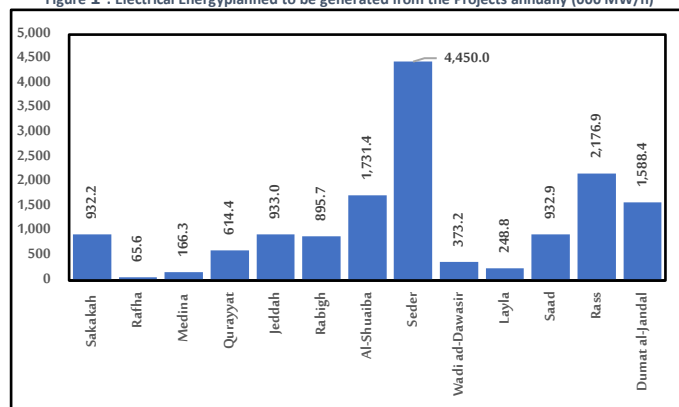


Figure 2 . Reduction of Fossil Fuels Consumption (Million Barrels of Equivalent Oil/day (MBDEO))

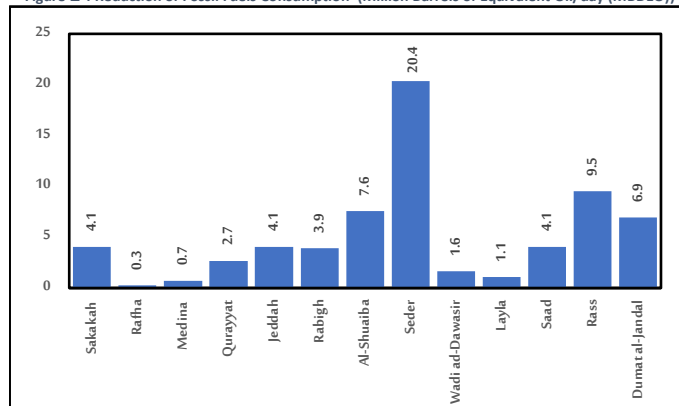
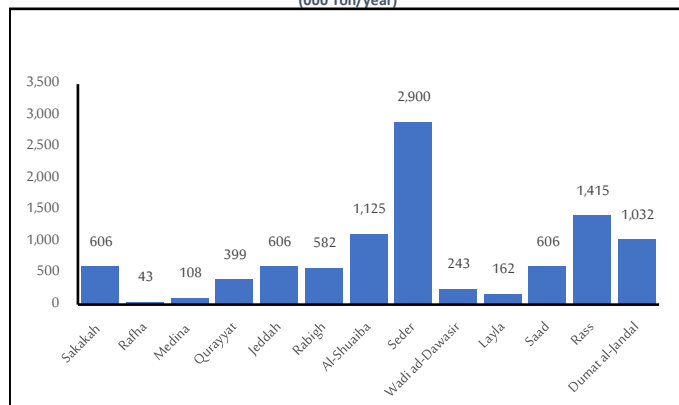


Figure 3 . Reduction of carbon dioxide (Co₂) emissions expected from renewable energy projects (000 Ton/year)



INCREASE OF GLOBAL HORIZONTAL IRRADIANCE (GHI) AND DIFFUSED HORIZONTAL IRRADIANCE (DHI) IN SOUTHERN REGION IN 2020

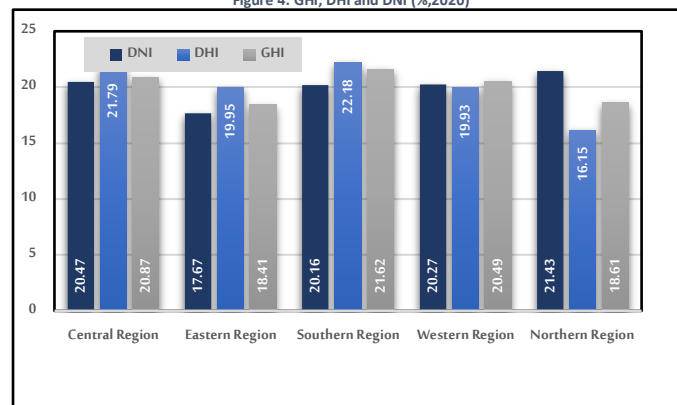
Total Global Horizontal Irradiance (GHI) in KSA amounted 27,615 Wh/m²/day. This type of irradiance is the total amount of short solar irradiance falling on horizontal solar panels. It is usually used in PV cells to produce electrical energy. Southern Region took up the largest share that reached 21.6%.

Total Diffused Horizontal Irradiance (DHI) in KSA amounted 9,572 Wh/m²/day. This type of irradiance is the amount of solar irradiance that falls per unit area without being exposed to any shade and does not reach the cells through a direct path from the sun, but it is diffused by molecules and particles in the atmosphere. All irradiance falls equally from all directions. Southern Region has taken up the largest share that reached 22.2%.

INCREASE OF DIRECT NORMAL IRRADIANCE (DNI) IN NORTHERN REGION IN 2020

Total Direct Normal Irradiance (DNI) in KSA amounted 28,635 Wh/m²/day. This type of irradiance is the solar irradiance per unit area. It is always perpendicular to the cells, and its rays fall in a straight line from the direction of the sun. It is usually used in solar cells that depend on the concentration of radiation and heat, as well as in panels that contain the property of tracking solar irradiance. Northern Region has taken up the largest share that reached 21.4%.

Figure 4. GHI, DHI and DNI (%2020)



Renewable Energy Statistics Indicators of 2020

Indicator	Unit	Year	
		2019	2020
Average daily GHI across KSA's regions	Watt h/m ² /day	5,916	5,523
Average daily GHI in Central Region		6,066	5,763
Average daily GHI in Eastern Region		5,582	5,085
Average daily GHI in Southern Region		5,935	5,970
Average daily GHI in Western Region		5,954	5,658
Average daily GHI in Northern Region	6,043	5,138	
Average daily DNI across KSA's regions	Watt h/m ² /day	5,559	5,727
Average daily DNI in Central Region		5,555	5,863
Average daily DNI in Eastern Region		5,004	5,059
Average daily DNI in Southern Region		5,032	5,773
Average daily DNI in Western Region		5,543	5,804
Average daily DNI in Northern Region	6,659	6,136	
Average daily DHI across KSA's regions	Watt h/m ² /day	2,153	1,914
Average daily DHI in Central Region		2,285	2,086
Average daily DHI in Eastern Region		2,170	1,910
Average daily DHI in Southern Region		2,410	2,123
Average daily DHI in Western Region		2,162	1,907
Average daily DHI in Northern Region	1,737	1,546	

Source: [Tables](#).

Methodology

Through the Renewable Energy Statistics Publication, historical and geographic data and future plans for renewable energy sources in the Kingdom are identified. The Publication relies on data from Household Energy Survey and administrative records-based data from its primary sources in the relevant government entities. Data is collected through official correspondences to data owners. Data is transferred by various vehicles and via e-mail. [Methodology](#).