# GRID UTILITY SUDAN

Does Sudan have a problem with electricity supply? Sudan is currently facing a major problemwith electricity supply. According to the report ??? Tracking SDG 7: The Energy Progress Report (2021) ???,only 54% of the population in Sudan have access to electricity; this indicates more than 20 million people aren???t connected to the national electricity grid .

Who regulates electricity in Sudan? There are three energy regulators for electricity,oil and mining,as follows: Electricity Regulatory Authority(ERA),Sudanese Petroleum Cooperation (SPC) and Public Geological Research Authority (PRA),respectively. The National Electricity Corporation (NEC) is the sole generator,transmitter and distributor of electric energy in Sudan.

How many energy regulators are there in Sudan? sector (Table 5). There are three energy regulatorsfor electricity,oil and mining,as follows: Electricity Regulatory Authority (ERA),Sudanese Petroleum Cooperation (SPC) and Public Geological Research Authority (PRA),respectively.

How has the bank been engaged in Sudan's energy sector? 11. The Bank has built a strong client engagement and analytical foundation in Sudan???s energy sector. The Bank has been engaged in Sudan???s energy sector since 2017 through the electricity sector diagnostics work(Diagnostic Review of Sudan Electricity Sector,P153717),which started as a greenfield engagement.

Why is energy use growing in Sudan? Energy use is growing rapidly in Sudan. Traditional biomassprovides most of the energy needs of the local population,especially those who live in the countryside with no access to electricity.

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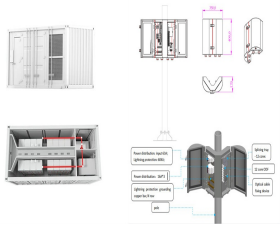
Does Sudan have a low electricity access rate? Even though the energy access rate is low; Sudan is making progress in electrification with annual growth over more than 3 percentage points after 2010; more than 70% of Sudan???s population was lacking access to electricity at that time . Table 1 below represents statistical facts about Sudan???s electricity access rate from (2000 ??? 2019).

Sudan's current electricity situation is pretty fragile; electricity access rate is very low, grid electricity quality is poor, power outages are very frequent, the national grid covers only a small fraction of the country, and the ???


47% of the country's rural population is currently connected to the electric grid (IEA et al, 2020). Sudan faces many energy development challenges brought about by high electricity subsidy ???



The Renewable Energy Master Plan (2019???2033), produced by the government, includes an additional generation capacity of 13,454 MW by 2033, including an aggregate solar capacity of 1920 MW [].Furthermore, the Government of Sudan aims to increase electricity access through grid-connected rooftop solar PV and set a national target of 9000 units with capacities ???

1 ? WASHINGTON, D.C.??? In a continued effort to expedite the build out of a resilient and reliable electric grid, today the U.S. Department of Energy (DOE) announced a $28.7 million investment in a more resilient and equitable energy system to protect Florida communities and businesses against extreme weather events.

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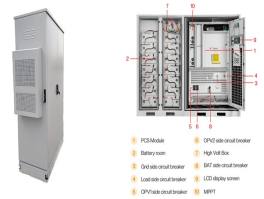

Fuel-cycle emissions intensity associated with the electricity generation in Sudan. The factors are computed using the life cycle emissions intensity corresponding to fossil fuels uranium and biofuels fuel-cycles weighted by the respective shares of all fuels/technologies in ???

South Sudan reportedly facing a deficit of approximately 170 MW, one of the nations with the lowest electricity access rates globally. According to state-owned utility South Sudan Electricity Corporation (SSEC), over 90% of the ???

The Off-Grid Energy Challenge is a key element of the Beyond the Grid subinitiative of Power Africa, a - U.S.  Mauritania, Senegal, Somalia, South Sudan, Zambia Applications will only be considered if they: ??? Are African-owned and passports or other government-issued IDs showing citizenship are submitted o Majority of shareholders, ???


What exactly is the Grid utility? A utility grid is a commercial electric power distribution system that takes electricity from a generator (e.g., a fossil fuel boiler and generator, a diesel generator, a wind turbine, a water turbine, and so on), transmits it over a certain distance, and then distributes it to consumers via a distribution system.

Coupling SunGate's existing stand-alone solar work in South Sudan (over 2 MW across over 200 sites) with the capacity and experience built from this initial pilot project, the SunGate team is now uniquely qualified and quite motivated to scale energy access solutions across the country. To that end, SunGate has secured initial agreements with two state ???


Potential of Solar Energy Integration into the Electricity Mix The potential of solar energy in South Sudan is huge and is estimated at approximately 6.9 GJ/m2/year with an average of 8 hours of sunshine per day. There is currently no data on the exploitation of solar energy for the on-grid

electricity generation system in the country.

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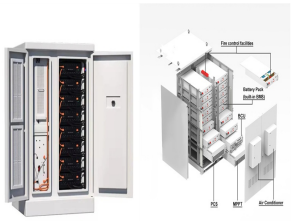

*Integrate renewable energy in the power system of the Sudan with a target of 20 per cent by 2030 including Wind energy ??? 1,000 MW (grid connected); Solar PV energy ??? 1,000 MW (on- and off -grid); Solar CSP technology - 100 MW (grid connected); *Waste to Energy: -80 MW (grid connected); Biomass Potential - 80 MW (grid connected); Small

South sudan grid-scale energy storage As South Sudan emerges from the wreckage of civil war, its leaders are beginning to build the nation'"s electric sector from the ground up. With only a handful of oil-fired power plants and crumbling poles and wires in place, the country is striving for a system that runs primarily on renewable energy and

The project will also establish the policy and regulatory frameworks for encouraging private investments in grid-connected wind energy. This includes supporting the ministry of water resource and electricity (MWRE) in the development of pro-renewable energy policies and regulations as, Sudan Grid Code, Feed-in-Tariff law, Power Purchase Agreement, and ???

Sudan, is needed to meet energy demand during this hard period. The economic situation is technicalstill very weak, so the power sector must encourage solar energy important in term ofapplication in the infancy stage often due to the power tofactors for sustainability 10]. The Sudanese Energy and Mineral Ministry policies should


Recently, the Sudanese Ministry of Energy and Oil announced the successful implementation of the SVC (Static Var Compensator) system at the Sinkat station. This advanced system is integrated into the national grid and is expected to increase the transmission of electrical energy from Atbara to Port Sudan by 25%.

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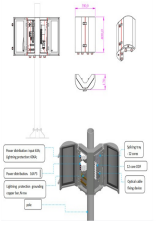
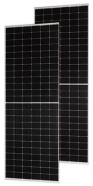
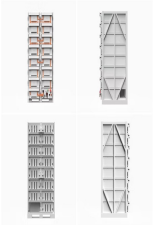



The utility dismantled the old grid, and the upgraded system is proceeding slowly in phases.  South Sudan's utility recently completed technical evaluations for a 20-megawatt solar farm and




deployment of Solar energy in Sudan. The rest of the paper is organized as follows: section 2 explains the main  connected load is connected to the utility grid as reported in [5-7] Figure 1





OverviewElectricity generationPrimary sourcesOrganisationIssues between Sudan and South Sudan following its independence


Solar energy currently makes up less than 0.1% of Sudan's energy supply; but there is immense potential because there is an average of 8.5 to 11 hours of sunshine per day [Citation 46]. Figure 6 compares solar energy generation in Sudan and other African countries from 2015 to 2019, and shows that Sudan is not capitalising on its potential.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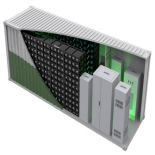

Grid-connected power generation from wind farm introduced. Indicators: Capacity of wind power installed Introduction of renewable energy policies and regulations. MWh of power generated by grid-connected wind energy. 1.1 Megawatts of installed grid-connected wind power. 1.2 - Number of

wind farms operating in Sudan.

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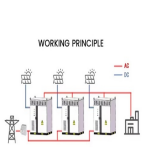
United States African Development Foundation (USADF) and Foundation for Youth Initiative are excited to request proposals for the USADF Off-Grid Energy Challenge. Proposals of up to US$250,000 in grant funding ???



Energy self-sufficiency (%) 88 73 Sudan COUNTRY INDICATORS AND SDGS TOTAL ENERGY SUPPLY (TES) Total energy supply in 2021 Renewable energy supply in 2021 57% 0% 43% Oil Gas Nuclear Coal + others Renewables 16%0% 84% Hydro/marine Wind Solar Bioenergy Geothermal 63% 66% 61% 0% 20% 40% 60% 80% 100%



County Road 227, Sudan, TX 79371: Utility: RWE Renewables Americas, LLC (56215) Latitude, Longitude: 34.03821, -102.66524: Generation Dates on File: Dec 2018 to Sep 2024:  Grid Voltage: 230.00 kV Energy Storage: No * Data obtained from the 2023 EIA 860 Report. Generator WT1 Details Operating December 2018. Technology: Onshore Wind Turbine: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The utility dismantled the old grid, and the upgraded system is proceeding slowly in phases.  "We need all these sources of energy in our sector." South Sudan's utility recently completed technical evaluations for a 20-megawatt solar farm and 35 megawatt-hour battery storage system planned outside of Juba. The African Export-Import

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Sudan Energy Transition and Access Project (P176711) July 14, 2021 Page 1 of 9 Public Disclosure Authorized Project Information Document (PID)  on-grid to SEDC, 14% connected to stand-alone diesel-based isolated grids and 8% to stand-alone solar PV systems (with batteries). This means about 20 million people are without access to electricity.

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A rate of 0.015 $/kWh was used as the typical cost of grid electricity in Sudan based on grid utility prices in January 2022 and the report on average usage [6]. The parameters for COE are shown in Table 1. Equation (1) is used to calculated the COE [43]: n It +Mt +Ft t=1 (1+r)t Et t=1 (1+r)t COE = n (1) where It represents the investment cost

The country's public utility, the South Sudan Electricity Corporation (SSEC), started operating the first section of the capital city of Juba's rehabilitated distribution network in November 2019. Replacing Juba's 11 kV power lines, the government of South Sudan, has also rolled-out a network of 33 kV lines to connect an additional 20,000

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