

What are the challenges faced by Tunisia's electricity sector?

The Tunisian electricity sector faces three main challenges: high dependence on imported fossil fuels, distortive subsidies, and a weak financial performance at utility level. The upscaling of renewables in Tunisia offers the opportunity to meet the growing electricity demand, reduce the energy deficit, and foster economic development.

What is the energy mix in Tunisia?

In terms of the energy mix, fossil fuels dominated (Fig. 4-2), with natural gas accounting for 48%, oil for 41%, while biofuels and waste had in total a share of 10%, and wind and solar held a negligible 0.1% share (IEA, 2020a). The annual average growth rate of energy consumption in Tunisia between 1990 and 2018 was approximately 3%.

How much does electricity cost in Tunisia?

Electric grid In Thala, Tunisia, the cost of purchasing electricity from the grid is measured in euros per kilowatt-hour (EUR/kWh). For households with a monthly consumption ranging from 300 to 500 kWh, the cost per unit of electricity is approximately 0.063 US\$. This price reflects the tariff structure set by the local utility or energy provider.

What is the energy situation in Tunisia?

Overall, the Tunisian energy situation can be divided into three aspects: a large fuel import dependency, high fossil fuels use, and a vast fiscal deficit resulting from high subsidies (Dering et al., 2018).

What limiting Tunisia's energy transition?

At the system level, a number of other elements currently limit Tunisia's progress in the energy transition: subsidised electricity prices that contribute to the national fiscal deficit, energy market structures, hesitant support from institutional actors, and human resources barriers.

What is the energy consumption rate in Tunisia?

The annual average growth rate of energy consumption in Tunisia between 1990 and 2018 was approximately 3%. The generation fleet in Tunisia is composed of a significant number of gas turbines that operate in open cycle to meet the peak demand (Benedetti et al., 2013). Tunisia's installed capacity in 2019 reached 5,653 MW.

Energy Systems. Optimization, Modeling, Simulation, and Economic Aspects ... Fractional-order model reference adaptive control of a multi-source renewable energy system with coupled DC/DC converters power compensation ... 355 Short-term electric load forecasting in Tunisia using artificial neural networks. Rim Houimli; Mourad Zmami; Ousama Ben ...

2017. The objective of this work is to propose an optimization model to determine which configuration of Renewable Energy Systems (RES) is suitable (Wind Turbine - Battery, Panel photovoltaic - Battery or Wind Turbine - Panel photovoltaic - Battery) to power remote areas autonomously with well- defined levels of reliability and the most optimal economic costs.

In this study, the sizing of on-grid and off-grid renewable energy systems is conducted using the multi-objective optimization model proposed in Section 4.5. The simulations are performed for two EVCS points located in the provinces of Istanbul (with high traffic density) and Tekirdag (with low traffic density) in Türkiye.

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Commonly used MEMMG energy management optimization studies are model-based, [12] uses a Mixed Integer Linear Programming (MILP) model to centrally dispatch the MMG of an integrated hydrogen energy system. However, with a high percentage of DERs integrated into MEMGs, the dimensionality of the search space grows exponentially, thus ...

For this purpose, a combination of a geographic information system (GIS) and the multi-criterion decision-making (MCDM) method is used for this aim. Various factors are taken into consideration, namely climate conditions, environment, water resources and location. ... Terrapon-Pfaf J. Sustainable transformation of Tunisia"s energy system ...

This article delves into the nuances of renewable energy in Tunisia by examining RETs and identifying the various barriers hindering their implementation. Interestingly, the outcomes were perfectly in alignment with ...

Multi energy systems are inherently complex and structured systems. The intermittency of renewable sources, the technical constraints of the components, the dynamic variation of energy prices and energy loads are only some of the elements that make their management a difficult task. As a consequence, optimization tools for the evaluation of ...

FRIEDRICH-EBERT-STIFTUNG - SUSTAINABLE TRANSFORMATION OF TUNISIA"S ENERGY SYSTEM 2.1 THE ORIGINAL PHASE MODELS¹ The phase model for energy transitions towards renewa-bles-based low-carbon energy systems in the MENA coun-tries was developed by Fishedick et al. (2020). It builds on the phase models for the German energy system transfor-

The interdependency between Tunisia"s energy and water systems is evident, with water treatment serving as a notable illustration of ... These criteria have proven to be important in decision-making when choosing an optimal energy system. The multi-criteria aspect is considered a major tool when choosing a better energy system with quantitative ...

In recent years, renewable energy technologies (RETs) have become increasingly popular worldwide to achieve energy sufficiency, reduce reliance on conventional fuels, and mitigate their devastating environmental impact. Nonetheless, more appears to have stayed the same in emerging economies, such as Tunisia, as various barriers hampered the implementation of ...

Renewable energy systems have emerged as a viable option to mitigate the environmental impacts of traditional fossil fuels. However, the intermittent nature of these renewables, such as solar and wind, makes it challenging to ensure a stable energy supply using only one type. Therefore, combining more than a single technology offers significant advantages in ...

The multi-energy hybrid power systems using solar energy can be generally grouped in three categories, which are solar-fossil, solar-renewable and solar-nuclear energy hybrid systems. For different kinds of multi-energy hybrid power systems using solar energy, varying research and development degrees have been achieved. To provide a useful ...

This study explores the techno-economic feasibility of, both off-grid and on-grid, hybrid renewable energy systems for remote rural electrification in Thala City, located in the highest region of Tunisia, using wind and biomass ...

Due to their small dimension and isolated energy systems, islands face a significant energy supply challenge. In general, they use fossil fuels for electricity generation. Fossil fuels are a major source of CO₂ emissions, and they are very costly. The cost of electricity generation on islands is up to 10 times higher than on the mainland. This situation without a ...

Rekik S, El Alimi S (2024b) Prioritizing sustainable renewable energy systems in Tunisia: An integrated approach using hybrid multi-criteria decision analysis. *Energy Exploration & Exploitation* 42(3): 1047-1076.

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