Energy storage for load shifting morocco

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Electrical power is a major factor for the social and economic development of the countries. The consumption of electrical energy will reportedly be doubled in 2040 (IEA, 2018), where comes the need to install new electrical infrastructure.

In Morocco, electricity demand (ED) is experiencing an average increase of 6-7% annually, and the expected electricity consumption in 2030 is 95 TWh. Currently, Morocco consumes 37 TWh for an installed capacity of 9GW. The electricity production field has made it possible to meet 86% of the national ED, and the difference is compensated via the Moroccan Algerian (MA) and Moroccan Spanish (MS) interconnection ().

In Morocco, where air conditioning is very widespread, the seasonal peak takes place in summer. Electricity consumption also varies significantly on the scale of a day: As we can see from the data collected for the ED, there are two-peak consumption per day; Midday peak: this one reflects the launch of the economic and industrial works. Evening peak: begins at around 19h, corresponds to the increase in household consumption and coincides with the end of economic activity.

The main contribution made in this paper is to consolidate a low-carbon energy mix by promoting renewable energies integration into the power grid by:

Modeling and predicting monthly ED in Morocco by 2025

Propose a flexible and low carbon demand model by promoting the contribution of renewable energies within the power grid by 48% in 2025

The remainder of this paper is organized as follows: section 2 describes the problem and presents the data. In section 3, the regression model was studied and a 2025 ED forecasting scenario was elaborated. The proposed algorithm is analyzed in section 4, and the results are presented in section 5. The last section summarizes the results and draws conclusions.

Figure 1 presents the evolution of ED in Morocco from 2000 until 2017. First, the figure shows a slight increase during the first seven years. Then a strong increase is observed since 2007. This may be due to several factors, direct and indirect, such as the increase in the exploitation rate of electronic equipment, climate change, and the acceleration of growth dynamics and modernization.

Monthly ED in Morocco (2000-2017)

Modelling monthly electricity demand

Annual ED in Morocco (1971-2017)

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