PREDICTION OF LONG TERM NATURAL GAS CONSUMPTION USING LINEAR REGRESSION MODEL

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Overview

Prediction of natural gas consumption of a country is very essential for its logistics and workflow for future. Long term natural gas consumption prediction is also very important for management of efficient logistic in the power and energy sector. It is an advancement process for a country or a city to know the future natural gas consumption and it can improve its future utilization and transportation, especially when transporting gas via pipelines. The transportation demands to be well organized depends on consumption that will happen in the future. Knowledge of future long-term natural gas consumption can also help to improve the workflow of city's heating systems that bank on natural gas as its energy source. This is why, the prediction of long term natural gas consumption from other known techniques are very important. The approaches for predicting of long term natural gas consumption can be categorized according to various criteria such as time scaling, using methods, covered area and others. Large proportion of natural gas consumption is used for buildings heating [1]. This is why, gas consumption is widely depending on weather conditions. The other important point is that gas consumption should be on time. There are different models for prediction of natural gas consumption can be found. Time series modeling is important for some cases. The basic model is to use linear prediction (LP) where observed variables are used as regressors [2]. The autoregressive models have been successfully used for this problem [3] and its generalizations autoregressive moving average [4] and auto regressive integrated moving average (ARIMA) [5] is also an effective tool.

Methods

In this paper, linear regression model is proposed for prediction of long-term natural gas consumption. The model is performed based on the characteristics of natural gas consumption data for last several years in Dhaka, Bangladesh. Data is gathered and analyzed on daily and monthly basis in this city. The data is collected from Petro Bangla and Energy & Mineral Resources Division (EMRD), Bangladesh. Important parameters are identified from the data and the model is structured according to the correlation that is found from data. The model is performed for forecasting of long term natural gas consumption in Bangladesh. According to area of covered, the prediction is covered a city, several cities, the whole country or continent [1].Linear regression is a linear approach for modelling the relationship between a scalar dependent variable y and one or more independent variables x [6]. In linear regression, the relationships are modeled using linear predictor functions whose unknown model parameters are estimated from the data. Such models are called linear models [7]. In this study, time is considered as independent variable, and natural gas consumption is dependent variable. It is found that there is a proportinal relationship between time and gas consumption. This relation is used to predict long term gas consumption.

Results

The results of this study indicate that the consumption of natural gas is increasing with time. The consumption of gas is rapidly increasing from last 5-10 years and the prediction results for next several years will be highly

increased. It also compares actualized values with predicted consumptions. Another observation is that regression method gives successful results in all types of analysis such as weekly, monthly & yearly analysis. Specially, prediction of long-term consumption is provided better results compared to short term.

Conclusions

The result of this paper shows that linear regression model is able to predict long-term natural gas consumption in Dhaka city, Bangladesh. It is shown that the model's traits are beneficial on prediction ranges by comparing similarly structured models and compared to other models found in literature this model presents better results for long term basis. This fact contributes that applying method for prediction on highly populated city i.e. Dhaka where natural gas consumption is very essential. In future, the concluded outcomes would be used to predict more accurate in the next studies.

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