

ELECTRICITY DEMAND FOR SRI LANKA: *GM (1, 1)* FORECASTING APPROACH

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Electricity Generation and Forecasting is prerequisite to enhance industrialization, farming and residential requirement of a nation. It has great impact on both nation's economy and standard of living that can be achieved through new forecasting techniques, enhanced electricity generation methodologies and better electricity conservation techniques. Most of the countries are allocating significant amount for power generation and forecasting from their annual budgets. Much research work has been carried out to analyze and propose innovative methodologies for efficient electricity generation and forecasting. In our approach, Grey Model (1, 1) based on grey system has been used for forecasting results. Performance of the proposed technique has been compared with existing Auto regressive moving average forecasting model. Annual power generation and consumption data in Sri Lanka during thirty year period from 1983 to 2013 were used. Unexpected power demands with non-systematic behaviour patterns have motivated to use GM (1, 1) model for discussing results. MAPE (Mean absolute percentage error), MSD (Mean absolute deviation) and MSE (Mean squared error) accuracy testing result shows that GM (1, 1) is outperformed compared with model fitting and model forecasting. The results reveal that, power sector of Sri Lanka before 1995 was heavily dependent on the hydropower (1995: 51% (Total production)) electricity. However, after mid-2000s (2012: 27% (total production)) this situation has been totally changed because of the lower annual rainfalls. Furthermore, the electrical consumption rate of the country has been increased rapidly compared with production rate since 2008. Hence, government should intervene and alternative energy sources must be introduced to the national power grid as early as possible. Currently, CEB has already taken some necessary actions to minimize power consumption. They have planned to expand coal fire, fuel-oil and diesel fired thermal power generations in the next decade (2012: Hydro power: 27%, Thermal: 71%, Other: 2%). However, dependence on these important energy sources could manipulate Sri Lanka into unsustainable economical development path. Because of the tropical temperatures and the islands location, Sri Lanka blessed with several forms of natural and renewable energy source such as wind, solar and biomass energy sources. When we can give much attention for available resources, it is beneficial not only for Sri Lankan economy but also for nature.

Keywords: Auto regressive moving average, Electricity demands, Grey models, Model accuracy