

Evaluation of Cyprus' Electricity Generation Planning Using Mean-Variance Portfolio Theory

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Abstract

This paper utilises Mean-Variance Portfolio (MVP) theory, originally developed for financial portfolios, to evaluate the planned electricity generation mix for the country of Cyprus. The current generation mix, which consists entirely of oil, was found to be highly inefficient, exposing the country to unnecessary price risk and higher costs. Results show that if 60% of the oil in the generation mix is replaced with natural gas, the cost of electricity generation will be reduced by 30% and the variability of the cost will be reduced by 15%. The addition of a 10% share of wind to the oil-gas portfolio was found to reduce the overall risk by up to 8%, without imposing any extra cost. The potential diversification into coal was deemed to be doubtful due to its sensitivity to the price of carbon dioxide (CO₂) and its environmental impact.

Keywords: Mean-variance portfolio, electricity generation, energy policy, Cyprus.

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