

BENCHMARKING RESULT OF NEA OWNED HYDROPOWER PLANTS GREATER THEN 2MW USING DEA MODEL IN NEPAL

Abstract—This paper evaluates the relative efficiency of hydropower plants owned by Nepal electricity authority (NEA), using basic DEA model and ranks the hydropower based on super efficiency model. Performance of hydropower plant which are greater than 2MW were analyzed for the fiscal year 2018 and 2019 using the various parameter as input and output. The objective of this study is to benchmark group for the inefficient one, provides rank to each hydropower finding Technical efficiency, Overall efficiency and Scale efficiency of each hydropower for the study period and provide an easy guide for decision makers by comparing performance for two years. Basic DEA model involves the input CCR model and BCC model which was used for finding the Overall efficiency and Technical efficiency and super efficiency model was used for ranking. 14 hydropower plants owned by NEA were selected for the analysis with 4 input parameter as total installed capacity, operation and mentainance cost, current number of employee and plant tripping and 4 output parameter as Annual energy generated, energy generated in dry, winter peaking capacity and summer peaking capacity.

The mean technical efficiency was found to be 96.9% and overall efficiency was found to be 78.6% with scale efficiency of 80.34% and mean super efficiency value of 98.40% with Marsyangdi of highest rank being most efficient and panauti with rank 14 with efficiency score of 21%, for the considered period.

Index Terms—DEA, BCC model, CCR model, DMUs, NEA, super efficiency,slack, Peer, Technical efficiency, Overall efficiency, Scale efficiency