The Brazilian electricity sector has presented different changes, from the deverticalization of companies to the creation of the regulatory body responsible for regulating the sector (ANEEL). However, ANEEL separately investigates the performance of the segments that make up the electricity system, disregarding the existing relationships in this supply chain. The present work aims to propose a new model for analyzing the efficiency of the links of the Brazilian electrical system, considering the dimensions of cost, productivity and quality. In order to represent the complexity of the electrical system, a *Network Data Envelopment Analysis* (NDEA) model was used, considering each link of the chain as a stage, to identify the impacts between the processes and the causes of inefficiency. These stages of the network were evaluated to verify the performance of the companies in each segment and to validate the model, the results were compared with classic AED models used by ANEEL.