Siemens PTI in Turkey to Deliver Results of Technical Due Diligence Analysis of Distribution Companies

In Turkey this May, Siemens PTI and other colleagues from Siemens presented the results of a technical due diligence (TDD) assessment of two distribution companies (Baskent and Sedas) that the government of Turkey is offering in concession to the private sector. The assessment was carried out on behalf of a prospective investor that was considering submitting a bid for these distribution companies. As part of its current privatization program, the government of Turkey is expected to offer in concession the distribution systems of up to 21 regions in that country.

The project team for this engagement was comprised of Siemens AG AS UT (leader), Siemens PTI, and Siemens Turkey. The Siemens PTI team included Dr. Ramón Nadira, Mr. Carlos Dortolina, Dr. Nelson Bacalao and Mr. Juan Carlos Ledezma (all from the Houston office). Mr. Ahmed Gall (Project Manager), Mr. Barrie Englishby, and Mr. Serdar Celik, all with Siemens AG AS UT, and Mr. Aydin Altunordu of Siemens Turkey were also key contributors in this effort.

The scope of the TDD included developing independent estimations of Capital Expenditures (CapEx), Operating Expenditures (OpEx), and losses (both technical and non-technical) for the two distribution companies for the life of the concession (30 years). The scope also included a review of the Asset Management Plan (AMP) for both distribution companies.

Siemens developed a tailor-made Microsoft® Excel-based model for estimating the CapEx and technical losses. The model performs the following tasks:

- Based on load growth, it forecasts:
  - The number and capacity of all required MV/LV transformers.
  - The length and configuration of LV circuits.
  - The length and configuration of MV feeders.
  - The number of switching elements.
The number of service drops.
- The length of subtransmission lines.
- It calculates the expected technical losses in the distribution network.
- It estimates the required capital expenditures for system expansion and for replacing aging assets, the latter based on age histograms.

Formally, the CapEx model implements what is commonly known as a hybrid bottom up approach (see Figure 1). In this approach, the individual components of the CapEx – rather than the overall level of required capital expenditures – are estimated by means of benchmarking (or comparative) analysis. The advantage of this approach is that it is relatively less time-consuming than a full bottom up approach. The disadvantage is that it requires a great deal of detailed benchmarking information.

The CapEx model was designed to make maximum use of the available information, which was aggregate in nature. That is, available data included total number of transformers, total conductor length, and total residential load, rather than the corresponding breakdown by asset type, customer class, etc. Further, the model is able to capture the inherent differences in distribution construction and customer densities in the various provinces of the region. Figures 2 and 3 illustrate the methodology implemented in the CapEx model.

Figure 1 - Top Down and Bottom Up Approaches for the Estimation of CapEx and OpEx
On the other hand, the OpEx analysis was conducted by means of a tailor-made Microsoft® Excel-based model that implements a top down (benchmarking) approach (see Figure 1). As such, the OpEx model compares the value of a number of representative KPIs (or Key Performance Indicators) for the target
utility (Baskent and Sedas in this case) against the values of a sample of comparable – or peer – utilities. Further, benchmarking analysis is based on the premise that “similar” distribution systems will have comparable expenditures (on a per unit basis). Siemens has successfully applied this benchmarking methodology to many utility companies in many countries around the world.

The specific Key Performance Indicators selected in this case were the following:

(i) **Distribution Network A, O&M Expenditures per (Equivalent) Customer**: Defined as the ratio of the total annual distribution network administrative and O&M (Operations and Maintenance) expenditures (excluding any depreciation charges) divided by the total number of equivalent customers. By using “equivalent customers” rather than customers it is possible to compare the performance of distribution utilities with widely different customer densities.

(ii) **Customer Density**: Customer per kilometer of medium voltage network.

(iii) **Retailing A, O&M Expenditures per Customer**: Ratio of the total annual retailing administrative and O&M expenditures (excluding any depreciation charges) divided by the total number of customers.

(iv) **Number of Customers per Employee**: This indicator is simply the ratio of the total number of system customers to the total number of employees.

The OpEx methodology is depicted in Figure 4, where the main inputs are the historical data and values from the CapEx model which are then benchmarked against the KPI targets. The main outputs from the OpEx model are forecasted labor and non labor costs, as well as forecasts of O&M, Retailing, and A&G (Administrative and General) expenditures.

![Figure 4 - OpEx Estimation Methodology](image)

The final component of our work scope involved reviewing the existing asset management plans and the asset management processes of the target distribution companies. The objective of the review was to assess whether the needs of all stakeholders were properly considered and incorporated into the long-term operation, maintenance, and development of the system assets. This review also focused on
determining whether the asset management plans and processes provided for an optimum balance – or trade-off, if you will – of the classical operational objectives of the utilities, that is, quality of service, cost to customers, and profit. These objectives are clearly in conflict.

During the presentations, our client was focused intensely on obtaining a clear understanding of the basis of our analysis and results, since these results were a key input to their financial model. Siemens was successful in demonstrating that our analysis was very sound. All in all, the client was very vocal regarding their satisfaction with the depth and thoroughness of the analysis performed by Siemens.

Finally, it is important to mention that as a direct result of this project involving the Baskent and Sedas regions, our client is reportedly considering assigning the analysis of the next two regions in the privatization process to Siemens.