

Estimation of technical losses in CESC area corresponding to 2004/05

[Sponsor: CESC Ltd, Kolkata]

Executive summary

In April 2004, CESC Ltd, Kolkata, approached TERI to undertake study of the T&D (transmission and distribution) losses in its franchise area corresponding to the year 2004/05.

Objective of the study

With the setting up of regulatory commissions, it has become necessary to have actual and realistic assessment of T&D losses in the utilities to assist the commissions. Keeping in view this aspect and pursuant to a specific advice of the regulatory commission, CESC Ltd engaged TERI to carry out the study. The findings of the study will also help CESC Ltd to prioritize and take necessary action. The last exercise in this respect was undertaken in 2001 by TERI on behalf of CESC Ltd, which was based on identified representative samples.

Scope of work

Estimation of voltage-wise total and disaggregated (technical and non-technical) energy losses in CESC system based on complete (100%) 132 kV (kilovolts) and 33 kV system up to and including all associated substations at 132/33 kV and 33/11/6 kV for EHT (extra high-tension) and HT (high-tension) losses. In case of primary distribution voltage level 10 nos DTs (distribution transformers) covering all the consumers fed from the said DT were taken as a sample.

Methodology adopted

Approach for total energy losses

(a) 132 kV and 33 kV network

Based on the discussions held with CESC, it was decided to undertake the energy audit study for 61 days, that is, from 28 February to 30 April 2005. The initial readings for 33 kV and above network was taken on 28 February and intermediate and final readings were taken on 31 March and 30 April 2005, respectively. The difference between input and output readings/aggregated sales at 33 kV and above voltage level gives the net energy lost at that level during the period of study, that is 61 days.

(b) 6 kV/LT network

Similarly, in the case of 6 kV and the LT (low-tension) system, the period of meter readings was taken as 59 days. The difference of the initial and final meter readings under



each element gives the total energy loss in each section of distribution line, including the transformers.

Approach for technical loss estimation

The technical energy losses of the identified network were estimated by simulating the system on a computer corresponding to the average summer peak load conditions. However, in the case of LT system, power losses were worked out by $I^2 R$ method. The LF (load factor) and the LLF (loss load factor) both for 11/6 kV and 400 volts were worked out from the daily load curves of the feeders.

Approach for commercial loss estimation

The difference of the total energy loss as obtained from energy audit and the technical energy loss computed from load flow study gives the commercial energy loss.

Results

The technical losses in the CESC system worked out from the Computerized Load Flow Studies are updated to take care of losses occurring in pressure coils of meters, fuses, busbars, switchgears, capacitors, etc. CESC have computerized billing system. Computation and monitoring of T&D loss is a routine function in CESC and is done monthly on an ongoing basis.