Non Implemented Case Study– Energy Conservation Measure

Measure
Switching of the transformer by shifting the load to other transformers
Equipment
Electrical Systems
Industry / Sector
Buildings
Year of Implementation
-
Cost Benefit Analysis
◊ Type of Measure: House-keeping
◊ Annual Energy Savings: 9000 kWh
◊ Actual cost savings: Rs.0.40 lakh
◊ Actual investment : Marginal
◊ Payback: immediate
Implementation Highlights
▱ Very simple measure ▱ The plant has not implemented the measure due to: ☾ The energy saving potential is too low. ☾ Involvement of man power in changing over the load to other transformer. ☾ Fear of moisture trapping in the transformers during the monsoon. ☾ Frequent operation of isolation switch will reduce the life of the switch.

Summary	Transformer load management and switching of the unnecessary transformer will avoid the no load losses of the transformers

Background

One of the office buildings has two wings. The building receives power at 11 kV and stepped down to 433 V by two transformers of 1000 KVA each. Both transformers are operated in parallel. Transformer #1 supplies power to left wing of the building while transformer two supplies power to right wing. A bus coupler isolates both the transformers. The load on the transformers are:

Load on transformer # 1

Minimum load : 80 kVA
Maximum load : 250 kVA
Average load : 200 kVA

Load on transformer # 2

Minimum load : 50 kVA
Maximum load : 200 kVA
Average load : 150 kVA

It can be seen that both the transformers are under loaded.

Proposal:

In view of large capacity of the transformers and low loads on the transformers, it was suggested to take the entire building load on one transformer and switching of one transformer.

It was also suggest that to avoid moisture entry, transformers can be switched off on cyclic mode (Change the operation of the transformer on every alternate day). By switching of one transformer the no load losses in the transformer can be avoided.

Techno-economics:

No load losses	: 1.25 kW
Operating hours	: 7200
Annual energy savings	: 9000 kWh
Annual cost savings	: Rs. 0.40 lakh
Investment required	: Marginal
Payback period	: Immediate

Principle

Switching off the under loaded transformers by tranfering the load to other transformers will avoid the no-load losses provided the transformer operated at its best operating efficiency. i.e. operate the transformers in the range of 30-40% transformer capacity.