Transformer Total Owning Cost (Loss Capitalisation)

Loss capitalisation factors A and B and total owning cost of a transformer from price, no-load and load losses, energy price, loading, discount rate and life.

Method: Loss capitalisation (total owning cost)

Input parameters

Unit system: SI

Parameter	Value	Unit
Purchase price	60,000	
No-load loss	1.1000	kW
Load loss at rated load	10.500	kW
Energy price (per kWh)	0.10000	
Average load ratio (rms load over rating)	50.000	%
Discount rate	7.0000	%
Life (years)	30.000	

Calculated results

Parameter	Value	Unit
Present-worth factor	12.409	
No-load loss factor (per kW)	10,870	
Load loss factor (per kW)	2,717.6	
Total owning cost	100,492	
Loss energy per year	32.631	MWh
Share of losses in owning cost	40.294	%

Notes for this case

• TOC = price + A·P₀ + B·P_k with A = c_e·8,760·PWF and B = A·k², k being the rms load ratio (load losses go with load squared). Utilities often set A and B by policy, including demand charges; enter those to compare offers.

Formula and method

$$TOC = C_0 + AP_0 + BP_k, \quad A = c_e \cdot 8760 \cdot PWF, \quad B = Ak^2$$

Variables

C_0	Purchase price	-
P_0	No-load loss	W
P_k	Load loss at rated load	W
c_e	Energy price (per kWh)	-
k	Average load ratio (rms load over rating)	-
i	Discount rate	-
n	Life (years)	-
PWF	Present-worth factor	-
A	No-load loss factor (per kW)	-
B	Load loss factor (per kW)	-
TOC	Total owning cost	-
E_L	Loss energy per year	J

$(AP_0 + BP_k)/TOC$	Share of losses in owning cost	-

Method and standards

Loss capitalisation.

Assumptions and limits

- Constant energy price and loading.

References

Loss capitalisation (total owning cost)

Report details

Report reference	FCC-0KD6-AKFX (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/transformers/transformer-total-owning-cost

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.