

Chapter XI  
**APPENDIXES**

# A Technique for Estimating the Allowable Cost of Storage Devices

Computing the amount which can be spent on storage equipment requires a careful comparison of the life-cycle costs of systems with and without storage devices. It is possible, however, to compute the approximate amount which can be spent on storage with the following simple algorithm:

$$C_s = (N_c f_c / k_1) (E_d - E_c / \eta_s - M)$$

where

$C_s$  = the installed cost of storage capacity (in \$/kWh)

$N_c$  = the average number of storage cycles per year

$f_c$  = the fraction of the storage capacity used in an average cycle

$k_1$  = the effective cost of capital (see chapter IX)

$E_d$  = the cost of energy available when storage is discharged (\$/kWh)

$E_c$  = the cost of energy available for charging storage (\$/kWh)

$\eta_s$  = the efficiency of the storage equipment

$M$  = the average annual operating cost of the storage device (\$/kWh of energy stored)

If the storage is not owned by the utility, then the costs  $E_c$  and  $E_d$  represent the rates charged for electricity during peak and off-peak periods. If the systems are owned by a utility,  $E_c$  would represent the cost of energy provided by a baseload plant used to charge storage and  $E_d$  would represent the cost of energy provided by a peaking plant. The allowable cost of storage calculated in this way is illustrated for a variety of different assumptions in figure XI-A-1.

Figure XI-A-1.— Permissible Cost of Storage Equipment as a Function of Energy Prices During Storage Charge and Discharge

