Dump Power

This term is used in hydroplants and it shows the power in excess of the load requirements and it is made available by surplus water.

Firm Power

It is the power which should always be available even under emergency conditions.

Prime Power

It is the power which may be mechanical, hydraulic or thermal that is always available for conversion into electric power.

Cold Reserve

It is that reverse generating capacity which is not in operation but can be made available for service.

Hot Reserve

It is that reserve generating capacity which is in operation but not in service.

Spinning Reserve

It is that reserve generating capacity which is connected to the bus and is ready to take the load.

FIXED COST

Initial Cost of the Plant

Initial cost of the plant, which includes :

(a) Land cost

(b) Building cost

(c) Equipment cost

(d) Installation cost

(e) Overhead charges

Rate of Interest

It is the difference between the money obtained and the money returned and may be charged as simple interest or compound interest.

Depreciation Cost

It takes into account the deterioration of the component over a period of time.

OPERATIONAL COST

The elements that make up the operating expenditure of a power plant include the following costs :

(a) Cost of fuels.

(b) Labour cost.

(c) Cost of maintenance and repairs. 169 Plant Economy

(d) Cost of stores (other than fuel).

(e) Supervision.

(f) Taxes.

Cost of Fuels

In a thermal station fuel is the heaviest item of operating cost. The selection of the fuel and the maximum economy in it use are, therefore, very important considerations in thermal plant design. It is desirable to achieve the highest thermal efficiency for the plant so that fuel charges are reduced. The cost of fuel includes not only its price at the site of purchase but its transportation and handling costs also. In the hydroplants the absence of fuel factor in cost is responsible for lowering the operating cost. Plant heat rate can be improved by the use of better quality of fuel or by employing better thermodynamic conditions in the plant design.

The cost of fuel varies with the following :

(a) Unit price of the fuel.

(b) Amount of energy produced.

(c) Efficiency of the plant.

Labour Cost

For plant operation labour cost is another item of operating cost. Maximum labour is needed in a thermal power plant using coal as a fuel. A hydraulic power plant or a diesel power plant of equal capacity require a lesser number of persons. In case of automatic power station the cost of labour is reduced to a great extent. However, labour cost cannot be completely eliminated even with fully automatic station as they will still require some manpower for periodic inspection, etc.

Cost of Maintenance and Repairs

In order to avoid plant breakdowns maintenance is necessary. Maintenance includes periodic cleaning, greasing, adjustments and overhauling of equipment. The material used for maintenance is also charged under this head. Sometimes an arbitrary percentage is assumed as maintenance cost. A good plan of maintenance would keep the sets in dependable condition and avoid the necessity of too many stand-by plants.

Repairs are necessitated when the plant breaks down or stops due to faults developing in the mechanism. The repairs may be minor, major or periodic overhauls and are charged to the depreciation fund of the equipment. This item of cost is higher for thermal plants than for hydro-plants due to complex nature of principal equipment and auxiliaries in the former

Cost of Stores (Other Than Fuel)

The items of consumable stores other than fuel include such articles as lubricating oil and greases, cotton waste, small tools, chemicals, paints and such other things. The incidence of this cost is also higher in thermal stations than in hydro-electric power stations.

Supervisions

In this head the salary of supervising staff is included. A good supervision is reflected in lesser breakdowns and extended plant life. The supervising staff includes the station superintendent, chief engineer, chemist, engineers, supervisors, stores incharges, purchase officer and other establishment. Again, thermal stations, particularly coal fed, have a greater incidence of this cost than the hydro-electric power stations.

The taxes under operating head includes the following : (a) Income tax

(b) Sales tax

(c) Social security and employee's security, etc.

ECONOMICS IN PLANT SELECTION

After selection of type of drive (such as steam, gas diesel or water power) which depends on availability of cheap fuels or water resources, further selection of the design and size of the equipment is primarily based upon economic consideration and a plant that gives the lowest unit cost of production is usually chosen. In case of all types of equipment the working efficiency is generally higher with larger sizes of plants and with high load factor operation. Also, the capital cost per unit installation reduces as the plant is increased in size. However, a bigger size of plant would require greater investment and possibilities of lower than optimum, load factor usually increase with larger size of the plant.

Steam Power Plants

In case of steam power plants the choice of steam conditions such as throttle pressure and temperature, is an important factor affecting operating costs and is, therefore, very carefully made. As throttle pressure and temperature are raised the capital cost increases but the cycle efficiency is increased. The advantages of higher pressures and temperatures is generally not apparent below capacity of 10,000 kW unless fuel cost is very high.