

Optimal Tariff Period Determination

Cost of electricity generation is closely related to system demand. In general, the generation cost is higher during system peak period, and vice versa. In Hong Kong, power system usually reaches its daily loading peak in the daytime during operating hours of commerce and industry, and drops to the cave after midnight (see figure 1). The loading requirement is also seasonal related in which summer load is higher than winter load (see figure 2).

One of our objectives in tariff setting is giving signal to customers the time variant cost of supplying electricity. Since the costs of supply vary continuously, the ideal would be charging in real-time rate. However, this may not be practical due to metering and billing constraints, the cost involved and also because most customers would not understand this form of pricing.

A more cost-effective solution would be periodic rate. Hours are grouped into a practical number of rating periods. Following constraints are necessary in the rating period selection process in order to ensure an acceptable compromise between implementation limitations (billing, metering), true cost reflectivity, and customer acceptance.

(a) 2 seasons – winter and summer

(b) 3 (possibly 4) rating periods per season – critical peak, peak, shoulder and off peak

Within the stated constraints, the tariff period selection process entails determining optimum break points between the 2 seasons, as well as the 3 or 4 rating periods, from a cost reflectivity point of view. Breakpoints are also expected to be different depending on the characteristics of system load e.g. day or night peak, summer or winter peak. All these are needed to be taken into account in the rating period selection process.

Problems raised:

1. What is the best method to determine the optimal break points?
2. What is the ideal period setting?

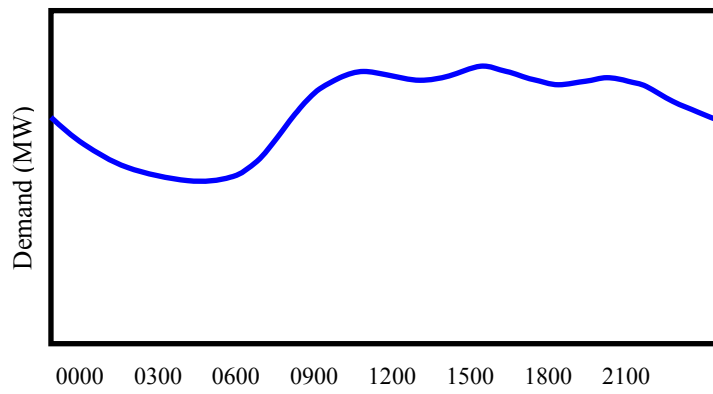


Figure 1. Typical Daily Demand Profile

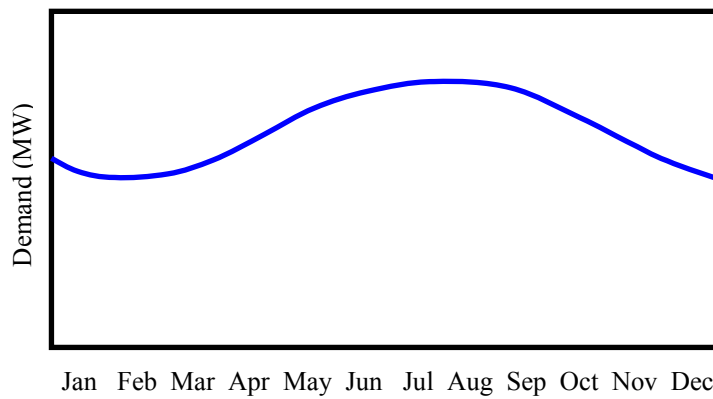


Figure 2. Typical Annual Demand Profile