

**REGULATION AND ECONOMICS
OF THE
ELECTRICITY SUPPLY
INDUSTRY IN MAHARASHTRA
THE STUDY OF A PUBLIC UTILITY**



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by
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A C K N O W L E D G E M E N T S

This thesis was prepared under the guidance of Professor V.M.Dandekar, at the Gokhale Institute of Politics and Economics. I consider myself very fortunate in having Professor Dandekar's guidance and the benefit of the library of the Institute. Professor Dandekar gave me advice and helped me at every stage of the work. I will ever remain grateful to him for this.

I owe sincere thanks to Mr R.P.Aiyer of the Federation of Electricity Supply Undertakings of India. Mr Aiyer is associated with the electricity industry for over a generation. In the initial stage of my study of this subject I could consult him on some of the intricate problems of the industry.

Though I depended most on the library of the Gokhale Institute, I also benefitted by the facilities I was given in the libraries of the Bombay University, Maharashtra Legislative Council, the Times of India, the Tatas (Bombay House), the BEST and the Weekly Commerce. I am thankful to the authorities who readily extended these facilities.

The thesis being primarily data-based, I had to collect data on a very extensive scale, though, as it is the experience of many researches, I could use only a part of them. At the instance of Shri S.V.Bhave, the

then Chairman of the Maharashtra State Electricity Board, the Board passed a resolution advising the departmental heads to give me the information I wanted. The Maharashtra Government Secretariat too gave information when it was not available at the Board. What I could not get from these sources I had to collect through some of my friends in the Planning Commission's research section. Lastly, data had to be collected from individual licensees by issuing a questionnaire and by correspondence and personal contacts. In data collection I had varied experiences some of which depressed me but many of which were highly encouraging. I am thankful to all who helped me by giving information.

Professor B.G.Iyer of the Chinai College of Commerce and Economics helped me in deriving the equations in Chapter IV. Mr. Shekhar Nevgi prepared the blue prints of the charts. Miss Veena Kulkarni and Mr K.P.Aiyer typed for me the first draft of this thesis. The final copy was prepared by Mr Manohar Ukidve. Their sincerity in this work has much to do with mutual esteem and regard.

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NOTES

(1) Some Equivalents

kw (kilowatt) = 000 Watts	kw = 0.8 kVA
mW (megawatt) = 000 kW	HP = 0.746 kW
gW (gigawatt) = 000 mW	Anna = $\frac{1}{16}$ th of a Rupee
tW (terawatt) = 000 gW	Rupee = 100 Paise

(2) Some abbreviations

CEA, Central Electricity Authority

CWPC, Central Water and Power Commission

ES Act, Electricity Supply Act, 1948

ESIC, Energy Survey of India Committee

GOI, Government of India

IE Act, Indian Electricity Act, 1910

Kcal, Kilo-calorie

mt, million tonnes

NCAER, National Council of Applied Economic Research

OECD, Organisation for Economic Cooperation and Development

OEEC, Organisation for European Economic Cooperation

RBI, Reserve Bank of India

REC, Rural Electrification Corporation

(3) Statistical Supplement

Some statistical tables which were too big to be given here are brought together in a separate statistical supplement. They contain essential primary data about licensees which, in the future, may not be possible to collect. These Tables are the following: 6.2 (Technical and Financial data Circa 1954-55), 6.3 (Cost and Revenue, Circa 1954-55), 6.6 and 6.9 (General and Technical Data, 1960-61 and 1969-70), 6.7 and 6.10 (Cost and Revenue, 1960-61 and 1969-70), 9.30, 9.31, 9.32 and 9.33 (Capital Base, Circa 1954-55, 1960-61, 1964-65 and 1969-70).

Technical Terms

Availability Factor, ratio (%) of that part of the generating capacity that is available for use to the total capacity.

Block Tariff, a tariff in which the price is based on a diminishing series of rates per kWh, applying to successive blocks (of fixed sizes) of kWh supplied during a prescribed period.

Bulk Licensee, a licensee authorized to supply electricity to other licensees for distribution by them.

Bus bar, a metal rod having a number of screws by which connection may be made to different electric machines or circuits.

Connected Load, the sum of the rated inputs of the consuming apparatus installed on a consumer's premises for connection to the system of electric supply. In assessing the installed load for tariff purposes, apparatus serving only as standby to apparatus of like nature is usually omitted.

Diversity Factor, the ratio (%) of the sum of the maximum demands of the several consumers or loads to their maximum simultaneous demand.

Energy Losses, every apparatus and circuit used in power supply involves loss of energy arising from the dissipation of heat in the circuit. These losses are divided into iron loss and copper loss. The iron loss is almost constant as a constant voltage is maintained while the equipment is in service, and is independent of the load that is carried. The copper loss is directly proportional to the square of the current which in its own turn is dependent upon load carried or energy supplied.

High Tension High Voltage, generally a voltage of 650 or more.

Load, generally demand for power. Technically, it is power going through or taken from an electric circuit or machine under given conditions.

Load Curve, a curve showing power, kilovolt-amperes or current plotted to a base of time. If preceded by a time adjective, e.g. daily, this indicates the extent of the base line.

- Load Factor**, the ratio of the number of kwh supplied during a given period to the number of kwh that would have been supplied had the maximum demand been maintained throughout that period; usually expressed as a percentage.
- Main**, an electric line in a distribution system, from which smaller lines go off in different parts.
- Maximum Demand**, the highest value of the power, kilovolt amperes, or other quantity such as the current taken within a demand assessment period. In some cases for tariff purposes the M.D. is measured during part only of the demand-assessment period, e.g. during prescribed winter months and/or prescribed hours of the day.
- Peak**, a relatively high salient of a load curve.
- Plant Factor**, the ratio (%) of the average load to the total plant capacity.
- Power Factor**, The power at any instant is the product of the pressure and current at that instant, and if all these instantaneous powers are summated, their average value over any period gives the true or effective power (watts or kilowatts, kw). When the R.M.S. (Root Mean Square) values of pressure and current are multiplied together, this product is called the apparent power (volt-amperes). The ratio (%) of true power and apparent power is called the power factor.
- Promotional Tariff**, a tariff in which increased consumption reduces the overall mean price per kwh.
- Standing Charge**, a general term covering fixed charge, kilowatt charge and kVA charge.
- Thermal Efficiency**, the relation between the work done by an engine in a given time and the heat (in the form of its mechanical equivalent) given to it by the steam used or the coal, oil etc. burned.
- Two-part Tariff**, a tariff comprising a standing charge and a unit charge.
- Volt-ampere (VA)**, the unit used for measuring the power in an Alternating Current = 1 v. x 1 ampere.
- Watt (W)**, the unit of measuring power generating capacity.
- Watt-hour (Wh)**, the unit of measuring power = power generated by 1 Watt unit over 1 hour.