# RURAL ELECTRIFICATION

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Sri Lanka consists of about 25,000 villages, of which a little over 2,000 have so far been electrified. This amounts to about 8 percent of the villages and 5 percent of the rural population. The Ceylon Electricity Board is solely responsible for the construction of rural distribution lines and electrifies about 250-300 villages a year, catering for about 10,000 rural households. Against this spread of electrification, over 30,000 new households come into existence each year due to population increase. Thus, the number of households remaining unelectrified is increasing over time. Where electricity is not available, the alternative source of energy for lighting is kerosene and for industrial motive power diesel or kerosene. It is thus reasonable to assume that with the ever increasing price of petroleum products, the urge to electrify more households each year will be greater.

### History

Until the early 1960's rural electrification (RE) was mainly undertaken by the village councils. Funds were set aside from the councils own resources and supported by grants and loans from the Central Government. The Government first made provision for RE in 1955-56 under the Reserve Extension and Renewal funds of the Department of Government Electrical Undertakings (D.G.E.U.) The qualifying criterion for village electrifications then was a 20 percent annual return. (annual revenue as % of capital cost) if funds were obtained through loans; and a 12 percent return if funds were generated from its own resources. In 1961, a rural electrification project called the "fifty village scheme" was started, the financing was to be Rs. 3.26 million of the D.G.E.U's own funds and Rs. 1.73 mn from the PL 480 Loan. This was subsequently withdrawn after utilisation of Rs 400,000 and after the United States Government withdrew the PL 480 loan facility. For these schemes the annual rate of return was fixed at 5 percent. In 1968 a RE Project called the "Five Hundred Village Scheme" was started by the Government, for schemes that were to be approved by the Minister of Irrigation Power and Highways. The criterion for acceptance of schemes was fixed at a 12 percent return. This procedure was adopted until 1976, except that in addition to the 500 villages already selected, special schemes were approved by the Minister which came up to the criterion of 12 percent.

In 1976 these criteria were revised to 5 percent annual return on overall cost and 12 percent return on LT line cost, as at that time most schemes could not come up to the criterion of 12 percent on overall cost. The reason was that construction costs had gone up drastically each year while the tariff had remained constant since 1972. From the end of 1976 the "Decentralised Budget" (DCB) funds were used for rural electrification as well. The procedure was for an MP, after identifying the desired RE Scheme to transfer the required funds from his DCB allocation to the CEB. After the DCB funds were allocated to the CEB, the Central Government's grant to the CEB for RE got progressively reduced after 1976. The table above shows how the funding of rural electrification took place.

**FINANCING OF R.E. SCHEME**

**No. of RE Financial Provision Rs. Million**

| | Schemes executed. | Grant, Govt. | DCB | CEB | Total | Total Expenditure. |
|---|---|---|---|---|---|---|
| 1972 | 59 | — | — | 4.5 | 4.5 | 5.08 M |
| 1973 | 66 | 12.0 | — | 18.5 | 30.5 | 6.37 M |
| 1974 | 101 | 10.0 | — | 19.5 | 29.5 | 9.30 M |
| 1975 | 116 | 10.0 | — | 10.8 | 20.8 | 12.84 M |
| 1976 | 168 | 15.0 | 9.1 | 17.5 | 41.6 | 18.47 M |
| 1977 | 166 | 5.0 | 31.4 | 20.0 | 56.4 | 23,83 M |
| 1978 | 272 | — | 67.7 | — | 67.7 | 34.76 M |
| 1979 (Up to Aug.) | 281 | 20.0 | 62.82 | — | 82,02 | 52.2 M |

### Costs

One of the major hinderances to rural electrification is the high cost of construction. This has a direct bearing on the financial return and it has become almost impossible to find any scheme giving an overall return of more than 4 percent (For example, a quarter ml. single-phase extension would require about 30 houses of average consumption to be connected to give a return of about 12%. Even in the fairly suburban areas these criteria would be hard to meet).

The actual costs of a rural electrification are two-fold (a) capital costs and (b) recurrent costs. (See table below).

The capital costs to the CEB is the cost involved in bringing electricity to a RE scheme and includes costs of extending transmission and distribution lines and constructing sub-stations for this purpose. The capital costs borne by the consumer are the costs of the service main necessary to supply the premises and the costs of internal wiring of the premises.

The recurrent costs to the CEB are those arising out of operation and maintenance of the scheme and include the cost of energy. The recurrent costs to the consumer would be the cost of interest and loans raised to meet the cost of the service connection, internal wiring and his monthly bill of electricity consumption.

The Standard Construction Costs for 1979 are as follows.

**CONSTRUCTIONS COSTS — 1979 R.E. WORKS**

| | | 1 ph. | 2 ph. | 3 ph. | 33 kV | 11kV | HT |
|---|---|---|---|---|---|---|---|
| | (PER/KM) | 64,600 | 71.600 | 787,00 | | 78,00 | 72,200 |
| 7/110 | (-PER/AL) | 103,360 | 114,560 | 125,900 | 7,102 | 124,800 | 115,520 |
| 7/134 | (-PER/AL) | 108,00 | 121.600 | 84,500 | | 102,600 | 96,800 |
| | (-PER/KM) | 67,500 | 76,000 | 135,200 | 7/161 | 164,160 | 154,880 |

| 33/LT | S/S | 11/LT |
|---|---|---|
| 61,300/- | 50 | 46,600/- |
| 70,000/- | 100 | 54,600/- |
| 84,800/- | 150 | 71,200/- |
| 125,200/- | 250 | 105,500/- |
| 154,800/- | 400 | 129,800/- |
| 175,000/- | 500 | 156,500/- |

### Benefits

Electrifying rural areas is in general, a loss to the CEB, even if the initial capital cost of the scheme is given as an outright grant to the CEB. The revenue from that RE scheme is not enough to meet the operations and maintenance cost. However, the Government gains mainly by way of the reduction in the subsidy of kerosene and diesel resulting from the changeover, to electricity and also by way of the BTT and taxes imposed on the sale of materials used in RE work. The consumer gains by way of an overall reduction in his energy bill. The surplus monetary benefits to the Government and the consumer are very much greater than the loss to the CEB and therefore it is clear that even though RE is not profitable to the CEB, it is economically profitable to the Government.

From a Government point of view the social benefits of rural electrification can broadly be summarised as follows:

(a) It discourages population converging in the cities and thus relieves housing and other associated urban problems.

(b) It provides an environment about equal in confort and convenience to that enjoyed in the cities and this encourages rural welfare.

(c) It encourages the establishment of factories in the rural areas where cheap labour and raw materials for particular industries are available.

(d) It provides power and incentives to develop cottage industries.

(e) It helps raise the standard of living in rural areas by providing additional employment opportunities for people living in rural areas.

(f) It provides electricity for lift irrigation, especially in the arid zone.

(g) It helps increase agricultural production by farm mechanization and intensive cultivation.

Even though these are significant benefits socially, since they are unquantifiable, it is not easy to give them a value in a cost-benefit analysis. In the survey done by Tata consulting engineers, these benefits have come out in terms of increase in labour productivity, extension of work

period, possibility of more effective mass media, and greater social benefits.

**Future Rural Electrification**

The Central government last year felt that the cost of constructing electricity lines is far too great to be met to the DCB and, hence, decided to request the Asian Development Bank (ADB) to finance a rural electrification project. The ADB in turn appointed Tata Consulting Engineers to formulate such a project. Consequent to this, a RE project of 1,150 villages will be financed jointly by the ADB and OPEC. The foreign cost of this project is 15.3 million dollars (to be financed by the ADB, (9.3 M.US $) and OPEC (6 M. US $), and the local component of 16.5 million dollars will be given by the Central Government, on a grant basis to the CEB. The proceeds of the loan, too, will be given as a grant to the CEB by the Government.

The project will commence towards the end of 1980 and be completed towards the end of 1983 or the beginning of 1984. It consists of 210 KM of 11 kV and 670 KM of 33 kV Transmission Lines 5,140 KM of 415 V distribution lines and 910 consumer substations catering to 57,500 consumers.

The Tata Consulting Engineers further point out that there is no financial return on RE but only an economic return by way of saving in kerosene to the Government and thus justified the electrification on the internal economic rate of return (IERR). The 1,150 villages have an IERR greater than 16 percent. The consultants further showed that there is an operating loss to the CEB of rupees 44 million over the (1980-84) period and the CEB has requested the Central Government to give this amount as an outright grant per year to the CEB.

The perenial problem that any government faces in the provision of Rural Electrification is to decide whether the chanelling of development funds are best utilised for this purpose. One has to decide whether channelling this amount of money for other basic requirements like fertilizer, would give a better cost benefit ratio and be more beneficial to the masses. However, with the income disparity between the urban and rural population fast closing, there has been a marked increase in demand for rural electrification in recent times.