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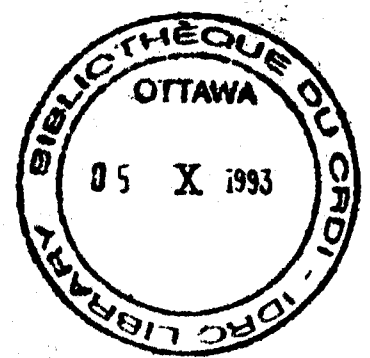
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STUDY OF
DECENTRALISED ENERGY OPTIONS IN THE RURAL SECTOR
OF INDIA

Submitted to:
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NEW DELHI

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INTRODUCTION

Rural electrification has expanded rapidly during the last three decades of planning in India. In the initial stages, the emphasis was on village electrification rather than electrification with definite productive objectives. Since 1969 or so, the emphasis has been on the productive aspects of rural electrification, and electrification of villages per se has become a corollary to the electrification of pumpsets/tubewells. From a mere 21,000 pumpsets in 1951, the number has increased to more than 5 million today, a staggering development by any standards. The rural electrification programme is implemented by the State Electricity Boards. The Rural Electrification Corporation is now financing a major part of this programme in almost all states, though a proportion of expenditure on rural electrification in each state, is met from the State's own resources. The REC, therefore, is in a unique position to give a direction to the programme.

While the number of villages electrified reached 332,000 and the number of pumpsets to over 5 million by 1982-83, the costs of extending rural electrification are progressively increasing. Firstly, among the villages not yet electrified, more remote villages remain to be taken up. Extension of the network to such villages implies comparatively higher capital costs. Secondly, the villages remaining to be electrified, include the more backward areas in the various states/districts, and in these areas, the expected rate of load development is much less than the areas already electrified. Thirdly, even in the "electrified" villages, the load development has been below expectations in a majority of cases. Under the present definition of an electrified village, a village is treated as "electrified" as soon as the network is extended to the village, irrespective of the number of actual electric connections in the village. Though the capital costs of the rural electrification network have been incurred by the concerned State Electricity Board, its actual utilisation by the villagers has not developed at a commensurate rate in many electrified villages. There are also problems (e.g. extension of electrification to huts with thatched roofs), which stand in the way of such utilisation. Fourthly, many of the states suffer from power shortages to varying degrees. In some states, there are long waiting lists for connections, especially tube wells and pumpsets. Extension of electrification in a situation of power shortage, leads to a higher degree of unreliability in the power supply to existing consumers.

OBJECTIVES OF THE STUDY

It is clear from the above preamble that extension of the present grid system of rural electrification, may not be the most cost effective way of meeting the needs of rural consumers. The primary objective of this study is to work out the real economic costs of centralised rural electrification and also to examine other alternatives to meet the energy needs of rural consumers. We propose to examine not only decentralised power supply systems including photovoltaics, but also decentralised "Energy" systems such as biomass and wind etc. The need for this is obvious because:

- i) Of the present power shortages; and because
- ii) Where decentralised energy can effectively and economically meet certain rural energy needs that are at present met by rural electrification, it should be considered as an alternative for the future.

The approach of the study would in fact be to develop an integrated energy policy which could most economically meet rural energy needs. In this integrated approach, centralised rural electrification will also have a part, because it may well turn out that it is the most economical method of meeting some of the energy needs in areas where the network has already expanded significantly.

The present rural tariffs (especially for pumpsets/tubewells) in almost all states are considered to be heavily subsidised. This naturally tilts the scale against the development of alternative energy systems, including decentralised power. During the study, the tariff policy in rural electrification will also be reviewed. The question of suitable financial incentives for any or all of the alternative sources (if cost-effective), will also be examined.

METHODOLOGY

We propose to conduct detailed field studies in a few selected states, though the policy conclusions are expected to be valid for the country as a whole. The proposed states are Himachal Pradesh, Haryana, Orissa, Karnataka and Gujarat, but this choice may be altered and finalised at the time of commencing the study.

Himachal Pradesh in the Northern region consists entirely of hilly terrain; Haryana in the Northern region and one state in each of the other regions, has thus been included to provide a representative sample. In these states, the present/expected loads, would be studied in detail in representative districts.

The sample of representative districts would be so selected that they include remote areas apart from relatively well developed districts, so that there is no bias introduced in the selection process. Detailed data will be collected from these districts, and their rural distribution networks will be studied in detail. Assuming different load projections for the future (say, till 1995 or 2000), the real economic costs of alternative ways of meeting the energy needs, will be evaluated. As mentioned earlier, this will include decentralised power (such as mini/micro hydel sources) as well as alternative energy sources.

In the calculation of costs, the economic costs associated with reliability will also be considered.

OUTPUT

The output of the study is expected to provide:

- a. An evaluation of the real economic costs of the present centralised system of rural electrification, under varying conditions met in different parts of the country.
- b. An evaluation of the (expected) costs of expanding the centralised rural electrification system, to meet the needs of the remaining villages/rural consumers of all categories, based on a representative sample of regions.
- c. Estimation of the costs of meeting different rural needs by alternative systems such as decentralised power/other decentralised energy sources for the sample areas mentioned above.
- d. Suggestions and proposals regarding evolution of an integrated energy policy for the rural sector, in which the centralised system of rural electrification as well as the other alternative energy sources (including decentralised power) will have a part; the objective being to meet the emerging rural needs at minimum total economic cost to the country.