



“Dedicated Feeder for Agriculture”

A flagship scheme under Krishi Road Map (Rainbow Revolution)

Present Scenario and Significance

Reliable and assured power supply is sine qua non for agriculture. Bihar is faced with severe scarcity of electricity due to negligible generation capacity and almost total dependence on central sector allocation of power. The power sector in Bihar caters to widespread rural population including rural domestic and commercial consumers apart from significant agriculture connections used for irrigation purpose. Presently Bihar utilizes only 5.83% of total energy toward agriculture services as compared to 38% utilization by Haryana which is highest in India and 20.3% being the national average. The per capita consumption of Bihar stands at niggardly 122.11 units which is the lowest, as compared to national average of 778.71 units. Given the grim scenario, Bihar is attempting to address to these issues through separation of rural feeder for agriculture and non-agriculture consumption. The main objective is to provide assured and quality supply of power for agriculture purposes during specified hours selectively through dedicated agriculture feeders and to supply to the other rural loads in the remaining period in a rotational manner. The initiative while attempting to measure and control power supply exclusively for irrigation also aims at improving reliability of power supply to rural consumers including Agro based rural industries.

Projected Requirement and availability of Power

Scenario of total demand of power for Agriculture Sector and projected demand of power (as per 17th EPS report) of Bihar, owing to Rainbow Revolution along with projected power availability is as shown below:

Year	Projected Power requirement (in MW) for Agriculture Sector	Projected total requirement of Power (in MW)	Projected availability of Power (in MW)
2012-13	215	4041	1867
2013-14	401	4585	2590
2014-15	641	5222	3015
2015-16	995	5957	5314
2016-17	1476	6750	8032
2017-18	1855	7597	8935
2018-19	2191	8385	9314
2019-20	2637	9181	9314
2020-21	3190	9982	9314
2021-22	3852	10760	9314

Vision

"To energize irrigation pump sets and cater to the requirements of agro based industries by providing adequate reliable power for meeting the agriculture requirements in a time bound manner to achieve desired agriculture growth and enhancement in agro based industries".

Presently, rural feeders are of mixed nature, supplying to agriculture as well as domestic/ other rural loads and making it difficult to supply quality power for agriculture purposes, given acute scarcity of power. Moreover, a common

supply through mixed feeder to various rural households, industries and the irrigation pump sets suffers from the drawback of frequent interruptions and breakdowns affecting power supply to rural sector altogether and also conducive to higher AT&C losses.

A recently released Planning Commission document, "Faster, Sustainable and More Inclusive Growth : An Approach to the 12th Five Year Plan", says "the separation of agricultural feeders" in the country will enable villages to get "24 X 7 three-phased power for domestic uses, schools, hospitals and village industries".

Feeder segregation signifies supply separately to rural households and irrigation pump sets. It will enable utility to rotate supply selectively as and when needed. It will also help to undertake proper energy audit for locating the causes giving rise to high AT&C losses.

Salient feature of the Scheme

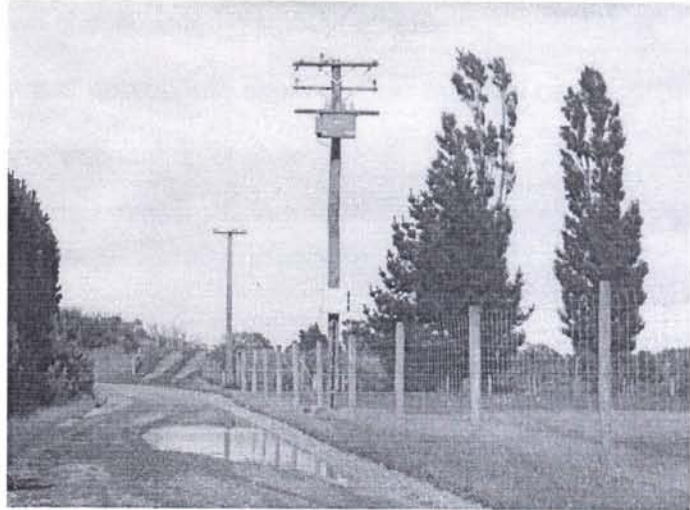
The scheme shall cover the following three main components:

- (i) Feeder separation;
- (ii) Location of Distribution transformers of appropriate capacity close to irrigation pump sets;
- (iii) Assets mapping, associated GPS survey and overall strengthening and improvement of the distribution network;

According to a conservative estimate, the dedicated Agriculture feeder program of Government of Bihar would cover drawing of 968 of 11 KV new feeders of 55925 km line and installation of 1,46,269 of distribution transformers primarily for energization of 19,29,000 pump sets till FY 2021-22.

Salient aspects of the scheme are:

- Installation of new 11 KV feeders in techno-economic manner crisscrossing the agriculture terrain;



- Installation of HVDS and up-gradation of associated distribution network;
- Installation of distribution transformers of appropriate capacity near the load centre;
- Installation of energy meters for proper accounting of energy;
- Renovation of associated service lines;

Key benefits

- Uninterrupted electric supply to agriculture consumers through dedicated agriculture feeders;
- Uninterrupted quality power supply to domestic rural consumers. By providing better quality and uninterrupted power supply, there would be over all development of rural economy that will improve standard of living, quality of life leading to over-all socio-economic development;
- Flattening of load curve in judicious way thereby reducing the cost of power purchase and desired management of grid;
- All the feeders will be equipped with bulk system energy meters;
- Better energy accounting for agriculture consumption;
- Strengthening of upstream distribution sub-systems;
- Reduction of AT&C losses;
- System strengthening by improving the infrastructure;
- Improved voltage profile for rural domestic consumers;
- Chances of adding illegal connection and theft of energy will be reduced;

Learning experiences

The states like Andhra Pradesh, Gujarat, Haryana, Punjab, Karnataka, Maharashtra and Rajasthan have gone in for dedicated feeder for agriculture. A team of officers have visited Punjab, Haryana and Maharashtra to take stock of the benefits reaped by these states as well as their learning experiences in respect of planning and execution of the scheme.

The approach followed for segregation of feeders varies across states in terms of planning process, cost, time-frame for implementation, system design and local contextual issues prevalent in various states. These states have broadly followed two main approaches in rural feeder segregation scheme for agriculture.

- (i) Physical segregation i.e. construction of new 11 KV dedicated feeders to ensure separate supply to agricultural and other rural consumers involving comparatively higher

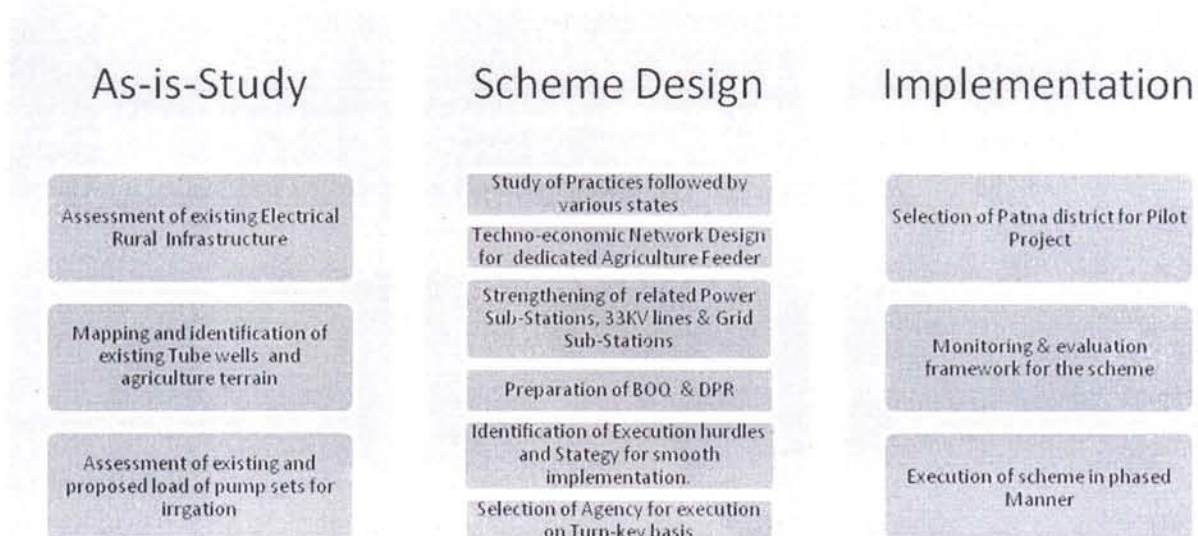
capital expenditure up-front. This approach has proved to be useful in managing future load growth and ensuring reliable quality power.

- (ii) Virtual segregation i.e. logical control through necessary technical interventions applied on the mixed rural feeders to provide single phase and three phase supplies during different time span. Although, it necessitates relatively lower capital infusion but calls for higher operational interventions leading to increase in losses due to unbalanced loading of various phases.

Activities involved in the scheme

- Survey of the existing network and infrastructure for preparation of DPR;
- Erection of 11 KV additional bays along with associated equipments;
- Erection of 11 KV dedicated feeders;
- Installation of distribution transformers of appropriate capacity;
- LT network through Aerial Bunched Cable;
- Proper isolation arrangement and formation of ring main system to improve maintainability and reliability;

The framework for the implementation of dedicated feeder for agriculture is depicted below:



Preliminary activities

- (i) Patna district selected for implementation of pilot project of dedicated feeder for agriculture.

- (ii) GPS Survey of the existing 11 KV lines emanating from 33/11 kV Power sub-stations, distribution transformers, connected LT network as well as disposition of agriculture consumers. The related data will be mapped on compatible software.
- (iii) Preparation of single line diagram with all the necessary attributes indicating the locations of 33/11 KV Power sub-stations, HT poles, locations of agriculture consumers and capacity of electric motors etc.
- (iv) Based on the aforesaid survey and load details, route of the proposed dedicated agriculture feeder of 11 KV line shall be determined based on techno-economic considerations.
- (v) The survey shall clearly indicate the locations where guarding for line crossing the roads and habitation areas are required;
- (vi) The existing and the proposed dedicated 11 KV line shall be duly mapped on Survey of India maps of appropriate scale.

Investment Profile

The Year-wise requirement of estimated fund for the feeder segregation scheme is given below:

Financial Year	Amount (Rs. Cr.)
2012-13	376.61
2013-14	565.85
2014-15	753.70
2015-16	942.38
2016-17	1130.79
Total for 12 th Five Year Plan (FY 2012-17)	3769.33
Total for 13 th Five Year Plan (FY 2017-22)	4601.11
Grand total for 12 th and 13 th Five Year Plan (Ten years)	8370.44

Dedicated Agriculture Feeder: Pre-implementation scenario

- Erratic Power Supply
- Dependency of farmers on monsoon for agriculture production;
- High usage of diesel pump sets leading to costly power for irrigation;
- Low profit margin for farmers;
- Lack of adequate electrical supply in rural area;
- Lack of transparency in energy accounting of rural areas;
- High AT&C losses;



Dedicated Agriculture Feeder: Post-implementation scenario

- Assured Power Supply;
- Assured low cost energy for agriculture consumers;
- Increase in per capita consumption of agriculture consumers;
- Improved quality of supply for rural consumers;
- Socio-economic development of the rural area;
- Reduction in usage of diesel operated pump sets thereby reducing pollution;
- Transparency in energy accounting of rural areas;
- Reduction in AT&C losses;

