A Presentation on

FEASIBILITY STUDY AND IDENTIFICATION OF FEEDERS UNDER SHORAPUR SUB-STATION FOR LOSS REDUCTION

For:

By:

OBJECTIVE

- Inspection of Shorapur Sub Station
- Selection of Feeders
- Conduct feasibility study

- to take up distribution management and energy conservation as a business activity

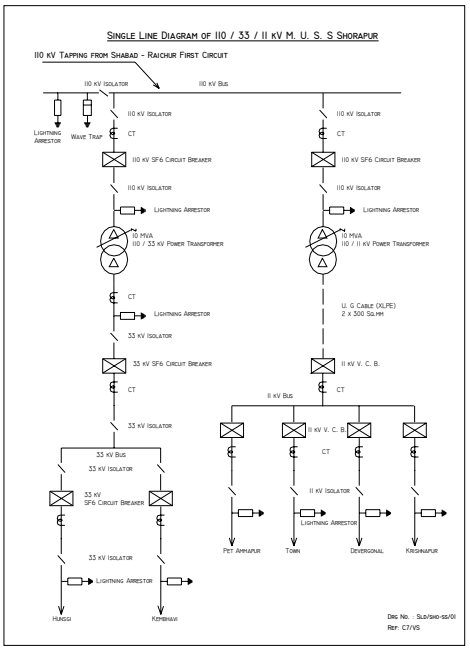
CRITERIA FOR SELECTION OF FEEDERS

- Feeders delivering approximately 50 - 100 MU of Energy per annum
- Feeders having Irrigation pump-sets as major load

EXISTING SYSTEM

Shorapur MUSS

ANNEXURE - I



Energy sent out from Shorapur sub-station - MU

55.48 MU

110/11-kV

30.30 MU

F1 12.4 F2 10.2 F3 7.7 F4

From R. Kollur 0.73 MU

110/33-kV

15.30 MU 9.88 MU

33/11-kV Hunsgi

15.29 MU

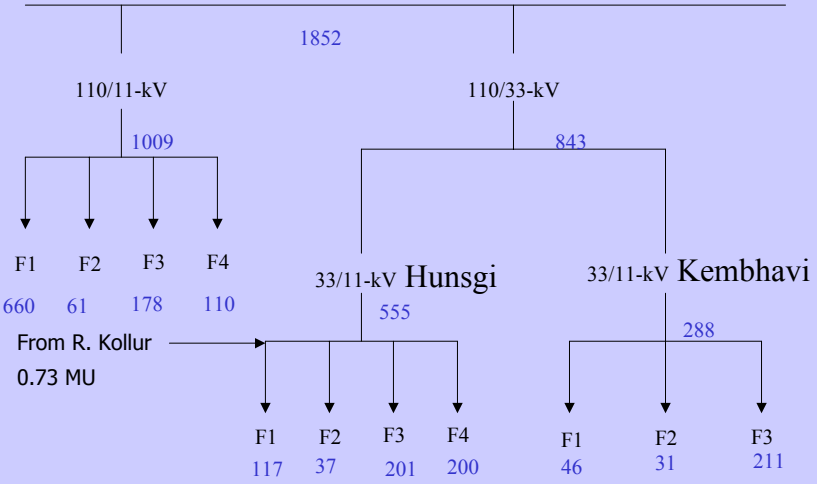
F1 4.0 F2 4.24 F3 F4 7.04

33/11-kV Kembhavi

9.59 MU

F1 5.2 F2 1.02 F3 3.37

Feeder wise IP-sets at Shorapur sub-station



TECHNICAL ANALYSIS

METHODOLOGY

- Selection of feeders for analysis
- Estimate losses for the selected feeders

  - Simulating the feeder by a software package

- Estimation of total distribution losses

TECHNICAL ANALYSIS (Cont'd)

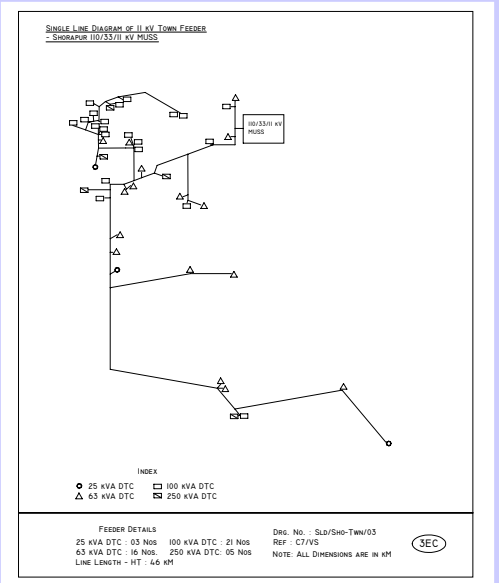
CRITERIA FOR SELECTION OF FEEDERS

HT Feeders

- Based on energy consumption
- Number IP-sets connected to feeder

LT Feeders

- Based on the capacity of the DTC



TECHNICAL ANALYSIS - HT Feeder

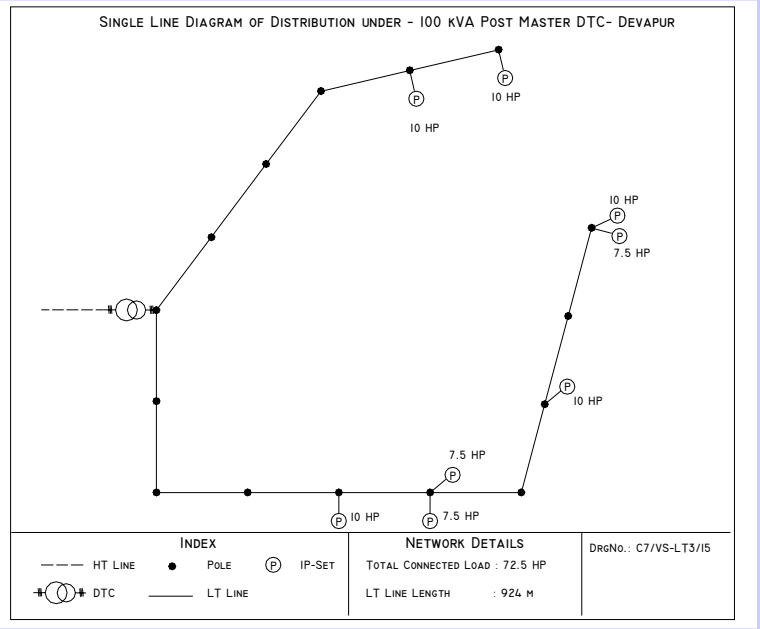
FEEDERS SELECTED FOR ANALYSIS

Feeder Name	Energy Cons'n	IP-sets
	MU	Nos.
Shorapur Town	10.2	061
Hunsgi	7.04	200
Parasanahalli	3.37	211

TECHNICAL ANALYSIS - HT Feeders

FINDINDS FROM THE ANALYSIS

Feeder Name	Load	Losses (Percent)	
	kW	kW	(%)
Shorapur Town	2,846	842	(29.5)
Hunsgi	1,942	587	(30.2)
Parasanahalli	0,938	142	(15.1)
Average	1,908	523	(27.4)



TECHNICAL ANALYSIS - LT Feeders

FINDINDS FROM THE ANALYSIS

DTC Capacity	Load	Losses (Percent)	
	kW	kW	(%)
63 kVA	35	03	(09.0)
100 kVA	70	12	(17.7)

TECHNICAL ANALYSIS - HT Feeders

CONCLUSION

Feeder	Load	Losses (Percent)	
	kW	kW	(%)
Average	1,908	523	(27.4)
For 11 feeders	20,988	5,753	

Note: Anticipated results

HT Losses include losses in LT network

DESIGN OF UP-GRADATION

Shorapur MUSS

DESIGN OF UP-GRADATION

METHODOLOGY

- Analyze the results of load flow studies
  - given by software package
- Redesign the network
  - techno-economically viable using different options

DESIGN OF UP-GRADATION

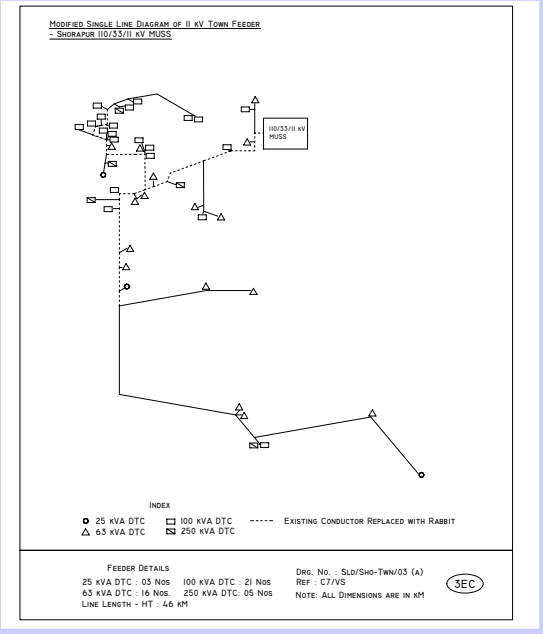
OPTIONS FOR HT FEEDERS

- Bifurcation of feeders
  - w.r.t load and line length
- Re-conductoring of feeders
  - re-conductoring of major/trunk lines

DESIGN OF UP-GRADATION

OPTIONS FOR LT FEEDERS

- LT less system
  - small capacity DTC feeding 1/2 IP-sets
- Less LT system
  - re-conductoring of major/trunk lines



TECHNICAL ANALYSIS - HT Feeders, MODIFIED

FINDINDS FROM THE ANALYSIS

Feeder Name	Load	Losses (Percent)	
	kW	kW	(%)
Shorapur Town	2,292	273	(11.9)
Hunsgi	1,612	176	(10.9)
Parasanahalli	0,778	101	(13.0)
Average	1,560	183	(11.8)

Note: Options considered for HT feeder - Reconductoring & LT feeder - Less LT system

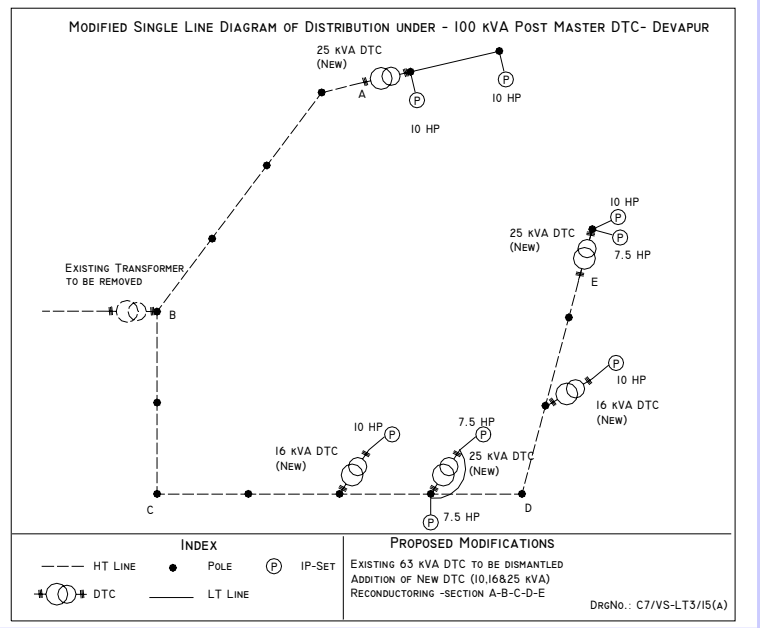
TECHNICAL ANALYSIS - HT Feeders MODIFIED

CONCLUSION

Feeder	Load	Losses (Percent)	
	kW	kW	(%)
Average	1,560	183	(11.8)
For 11 feeders	17,160	2,013	

Note: Anticipated results

HT Modified losses include losses in LT network



TECHNICAL ANALYSIS - LT Feeders MODIFIED

FINDINDS FROM THE ANALYSIS

DTC Capacity	Load	Losses (Percent)	
	kW	kW	(%)
63 kVA	33	01	(3.0)
100 kVA	61	02	(3.3)

FINANCIAL ANALYSIS

Shorapur MUSS

PROJECTED COST ESTIMATE

Cost estimate for 3 feeders:

	Qty	UnitCost Lakhs	Amount Lakhs
HT re-conductoring	: 81.7	: 0.55	:044.94
New DTC	: 568	: 0.55	:312.40
LT - HT conversion	: 76.5	: 0.30	:022.95
Total investment			: 380.29
Average investment per feeder			: 126.76
Net Investment for 11 feeders in Rs. Lakhs			**: 1,394.39**

PROJECTED SAVINGS & PAYBACK

(For network up-gradation only)

Present energy flow : 55.6 MU

Modified energy flow : 42.8 MU

Anticipated savings : 12.8 MU / annum

Estimated energy usage : 3600 hours / annum

Savings in Rs. Lakhs : 321.12

Net Investment for Up-gradation : 1,394.4 Lakhs

Payback in Years : 4. 4

PROJECTED INVESTMENT & PAYBACK

(For IP-sets replacement only)

Pump set Replacement Calculations		
Number of Existing pumps	1852	Nos
Existing Average HP Rating	7.5	HP
Running Hours	3600	Hr
Total Consumption	37.3	MU
Existing Efficiency	20	%
Quantity of Pumps replaced	50	%
Modified Average HP Rating	5	HP
Number of Pumps replaced	926	Nos
Efficiency of new pumps	40	%
Modified Consumption	31.1	MU
Savings in MU	6.2	MU
Investment Calculations for Pumpset replacement		
Number of Pumps to be replaced	926	Nos
Cost of each Pump	20,000	Rs.
Total Investment	185	Lakhs
Energy savings due to pump replacement	6.2	MU
Energy savings @ 2.5 Rs/kWh	155.4	Lakhs
Payback period	1.2	years

PROJECTED INVESTMENT & PAYBACK

(For Network up-gradation & IP-sets replacement)

Investment for Network Upgradation	1394.4	Lakhs
Investment for pumpset replacement	185	Lakhs
Total Investment	**1580**	**Lakhs**
Savings due to pump replacement	155.4	Lakhs
Savings due to Network upgradation	321.1	Lakhs
Total Savings	**477**	**Lakhs**
Payback Period	**3.3**	**Years**

CONCLUSION

- The study reveals that a financially attractive solution for loss reduction exists in this area
- the avg. losses in the feeders is estimated around 15.9 MU (27.4 %) & this can be reduced to 4.73MU, for revised energy flow of 42.8 MU. The saved energy of 12.84 MU sold to KPTCL at Rs. 2.50 will generate a revenue of 321.12 Lakhs Per year
- the investment for the project would be about 1,394.4 Lakhs with a simple pay back of 4.4 Years.

CONCLUSION (Cont'd)

- the payback period of 4.4 years is acceptable, with only network up-gradation attempted.
- By attempting only IP-sets replacement (50%) with energy efficient models, the payback period of about 1.2 years can be achieved
- The payback period can be reduced to 3.3 years by combining network up-gradation & IP-sets replacement.