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ANALYSIS OF FEEDER SEGREGATION AND ITS IMPORTANCE FOR RURAL ELECTRIFICATION

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Abstract: ***Separation of technical infrastructure of agriculture consumers from non-agriculture consumers is called rural feeder segregation. In a water-constrained scenario where oversupply of power to agricultural farmers may aggravate the already grave groundwater situation and also aggravate financial distress of power utilities (already at 1.5 per cent of GDP), power supply to agriculture sector needs to be controlled. In any case, agriculture power needs could be fulfilled through a daily six to eight hour reliable supply, depending on the season. If all rural consumers are connected on the same feeder (wires that emerge from sub-stations and carry electricity to transformers for distribution to consumers), power supply to non-agriculture consumers, including households, schools and dispensaries also get switched off when agriculture supply is not needed. It is because switching off is done from the sub-station from where the feeder is supplied. Some utilities have, therefore, segregated agriculture and non-agriculture feeders and have thus attempted to provide 24x7 power supply to the non-agriculture consumers. This has generated increased ability to generate livelihoods, and resulted in significant socio-economic benefits in rural areas. There are eight states which are at various stages of implementing feeder segregation schemes. These are Rajasthan, Gujarat, Andhra Pradesh, Haryana, Punjab, Karnataka, Maharashtra and Madhya Pradesh. Results show that prior to feeder segregation more than 80 per cent consumers in both Gujarat and Rajasthan complained of low voltage problems which came down to just 6 per cent post segregation. More than 80 per cent domestic and over 50 per cent agriculture consumers complained of frequent power outages which reduced by half in both these states.***

I. INTRODUCTION

Aadalabad is a 33/11 kV substation in Baghpat dist. of UP west. The existing network for the same is shown below in with the help of single line diagram in fig.1.

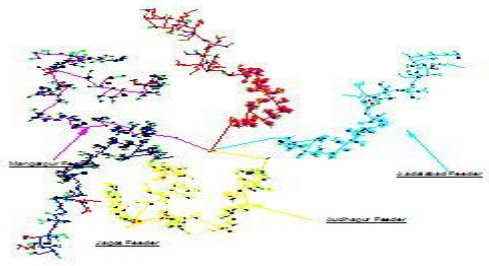

Fig.1 Existing Network of Aadalabad 33/11 kVSubstation

In the proposed work one new feeder will be layed on which all domestic loads from the exixting feeder have to be shifted. Some new transformers on the new feeder has to be proposed. Also the distribution transformers from the existing feeder to the new feeder are also proposed to be shifted which are used for domestic load in the existing case. Also some new distribution transformers have to be proposed on the existing feeders for the aggriculture load.

For this proposed work we have taken only two 11 kV feeders for simplicity. The single line diagram of the same has been shown in fig. 2.

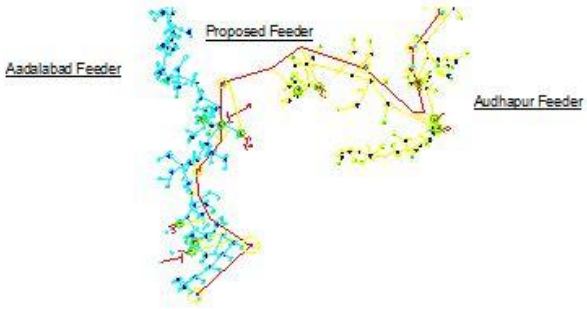

Fig.2 Proposed network of 33/11 kV Aadalabad 33/11 kV Substation.

VR and losses of the existing feeder:

33/11 KV Substation	Feeder Name	Load (KVA)	Effective Length (KM)	Conductor Type (ACSR)	VR % at Tail End	VR % at Tail End in Horizon	Losses (LUs)	Losses in Horizon years (LUs)
Aadlabad	Mangatpur	1617	8.5	Weasel	4.62	5.11	1.003	1.223
	Kautana	1526	10.4	Weasel	5.30	5.85	1.085	1.322
	Aadlabad	1498	12.2	Weasel	6.12	6.76	1.230	1.499
	Audhapur	1421	14.0	Weasel	6.68	7.37	1.272	1.551
	Jagos	1365	7.3	Weasel	3.35	3.69	0.613	0.747

Table.1 VR and losses of the existing feeder

VR&Loss(Existing Fdr After FS):

33/11 KV Substation	Feeder Name	Load (KVA)	Effective Length (KM)	Conductor Type (ACSR)	VR % at Tail End	VR % at Tail End in Horizon of 5 years	Losses (LUs)	Losses in Horizon of 5 years (LUs)
Aadlabad	Mangatpur	1294	8.5	Weasel	3.70	4.08	0.642	0.782
	Kautana	1221	10.4	Weasel	4.24	4.68	0.694	0.846
	Aadlabad	1198	12.2	Weasel	4.90	5.41	0.787	0.959
	Audhapur	1137	14.0	Weasel	5.34	5.90	0.814	0.993
	Jagos	1092	7.3	Weasel	2.68	2.96	0.392	0.478

Table.2 VR&Loss of Existing feeder after feeder segregation

VR&Loss (New FS):

33/11 KV Substation	Feeder Name	Load (KVA)	Effective Length (KM)	Conductor Type (ACSR)	VR % at Tail End	VR % at Tail End in Horizon of 5 years	Losses (LUs)	Losses in Horizon of 5 years (LUs)
Aadlabad	Feeder-4	629	13.4	Rabbit	2.01	2.22	0.142	0.174
	Feeder-5	584	12.8	Rabbit	1.78	1.97	0.117	0.143
	Feeder-6	390	11.0	Rabbit	1.02	1.13	0.045	0.055

Table.3 VR & Loss of new feeder.

In addition to the feeder separation work, the type of new conductor taken is rabbit. As a result the resistance losses will also be reduced to a great extent.

II. CONCLUSION

With the help of this proposed work there will be uninterrupted power supply to the agriculture consumer through the dedicated electrical feeder. Also there will be uninterrupted loss less and improved quality power supply to the domestic consumer. Flattering of load curve will be in judicious way. There will be better energy accounting for agriculture for the agriculture consumption. Reduction in AT&C losses will be a big advantage. System strengthening will be an additional advantage. Improved voltage profile for rural domestic consumer will be available.

REFERENCES

[1] The Other Side of India's Electricity-Groundwater Nexus. The Disruptive Impact of Tube Well Irrigation on Rural Development in Western India www.iwmi.org/iwmi-tata/apm2012 West Bengal, India. Energy Policy, 35: 6413–30.
[2] Mukherji, A., Shah, T. and Banerjee, P.S. 2012. Kick-starting a second green revolution in Bengal. India: Economic and Political Weekly, 47(18): 27–30.
[3] Nair, N. 2012. HVDS for agricultural power supply: Does it make economic sense? Anand: IWMI-Tata, unpublished report.
[4] NPCL. n.d. High Voltage Distribution System for agricultural pumps - A Case Study. Ministry of Power, GoI.
[5] Planning Commission. 2007. Report of the Expert Group to Review the Issue of Groundwater Ownership in the Country. New Delhi: Government of India.
[6] Rajput, R. and Saharan, P. 2011. Assessing the quality and quantity of rural power supply in villages of Punjab. Anand: IWMI-Tata Program, unpublished Internship report.
[7] Shah, T. 1993. Groundwater markets and irrigation development: Political economy and practical policy. Bombay: Oxford University Press
[8] Shah, T. 2009. Taming the anarchy: Groundwater governance in South Asia. Washington D.C.: RFF Press.
[9] Shah, T. and Mehta, M. 2012. Transformation of Gujarat's electricity utility: Lessons for Revitalising a bureaucratic service delivery agency. Anand: IWMI-Tata Program, Water Policy Research Highlight# 6.
[10] Shah, T. and Verma, S. 2008. Co-management of electricity and groundwater: An assessment of Gujarat's Jyotirgram scheme. Economic and Political Weekly, 43(7): 59–66.
[11] Sinha, A. and Gupta, V. 2011. Study of rural power supply scenario in Madhya Pradesh. Anand: IWMI-Tata Program, unpublished Internship report.
[12] Srivastava, M. and Desai, U. 2011. Assessing the quantity and quality of rural power supply under Uttar Gujarat Vij Co. Ltd. Anand: IWMI-Tata Program, unpublished Internship report.
[13] Zomers, A.N. 2001. Rural electrification. Ph.D. Thesis, University of Twente, Twente University Press.

