

**Analysis of Infrastructure for Energized Irrigation (AIEI) under
Unnat Maharashtra Abhiyan (UMA)**

Field visit Report

Visited Degaon Substaion and identified the Agriculture feeder at this substation. Traced LT network of one branch.

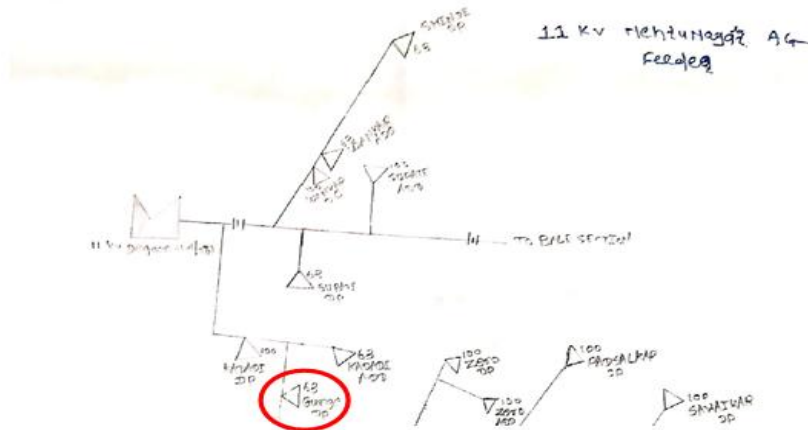


Fig.: Nehrunagar Feeder diagram

Identified one Distribution Transformer (DT) ; specifically, **Gunge Distribution transformer** having 100KVA



Fig: Gunge DT

1. The voltage, current readings at the selected DT
 $V_{RY}=403V$ $V_{YB}=405 V$ $V_{BR}=401 V$ $I_R=56.7A$ $I_Y=53.2 A$
 $I_B=54A$

2. Also noted GPS readings at each pump using mobile.

The GPS locations of the some of the pumps are given below,



3. The pump power measurements are as follows,
1)10HP 2)5HP 3)7.5HP 4)7.5HP 5)7.5HP 6)5HP 7)5HP 8)5HP



Fig: Pump Meter



Fig : Pumps at the site

4. The farmers complaint about voltage problems.

5. The connected load= 90 to 95 KVA.
6. The energy meter readings at the start of each month are attached in the pdf file named 'msedcl log sheet 1 year'.
7. The Multiplicative factor = 400 (noted at substation)

Analysis:

The energy consumption by each farmer on average:

M.F.=400

Energy reading at start of year Feb 2019

P.F. = 0.84 I = 170 A KWH = 8816 (obtained from log sheet)

Energy=KWH*M.F. = 8816 * 400 =3,526,400

End of year P.F. = 0.87 I = 164A KWH = 18966

Energy= KWH*M.F. = 18966*400=7,586,400 KWH

The connected load and number of farmers on the feeder. (**total farmers = 8**)

Following readings noted at selected DT

$V_{RY}=403$ $I_R=56.7$ P.F. =0.85

$P = \sqrt{3} V_L I_L \text{Cos } \phi = 33640.90 \text{ Watt}$

The energy consumption at pumps by subtracting the estimated energy loss on LT, HT and DT: 8%, 4%, 2% respectively

LT loss = 2691.272

HT loss = 1345.636

DT loss = 672.818

The energy consumption per farmer = (total energy on feeder – loss)/no. of farmers
=90HP

Total energy =66600*8=532800

Energy consumption per farmer=528092/8 = **Rs. 66011.5**

To find infrastructure cost per farmer on average:

Completed the LT network roughly using some approximations by asking wireman or MSEDCL lineman / office about length of LT lines on selected DT and number of farmers.

Pole Mounted Distribution Transformer Sub-Station 100KVA, 11/0.433 Kv On 9 Mtr Rsj
Pole = 3,14,184

Used the costs given to for various grid components in 'Analysis of cost of energy supply.pptx' on slide 6 to find total cost of HT network, and divide by number of farmers on feeder. The same is done for LT network, except dividing by no. of farmers on LT network and not on feeder.

Cost data for 33/11KV substation = $1,49,13,764 / 8 = \text{Rs. } 18,64,220$

Cost of LT network pole mounted distribution transformer substation 100KVA, .433KV on 9meter RSj pole = $3,14,184 / 8 = \text{Rs. } 39273/-$

Total Infrastructure Cost = $18,64,220 + 39273 = \text{Rs. } 19,03,493/-$

ALCC of infrastructure costs using NPV analysis as done in the workshop = **Rs. 5999/-**

Total annual expenditure per farmer:

Total annual cost per connection:

Annual O&M cost + ALCC of infra cost from (16) + cost of energy [energy from (12) as per in assignment, and cost/kWh from workshop pptx]

$$= 2842 + 5999 + 66011.5 = 74852.5 + 7418 = \text{Rs. } 82270.5/-$$

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