# M/S GOKUL FOUNDATION

**NR. G.R.S.L, STATE HIGHWAY NO.41,**
**SIDDHAPUR - 384151**
**HT Consumer No. : 29250**

# ENERGY CONSERVATION AUDIT REPORT
# DATED – JUNE 2023

## AUDIT CONSULTANT


AATMAN
CORPORATION
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# CERTIFICATE

*This is to certify that M/s. Aatman Corporation has completed Energy Conservation Study (Energy Audit) for M/s. Gokul Foundation At Siddhapur on June 2023 under the clause 3. Government order no.* **GHU/99/31/GUE/1196/9018/K1** *dated* **5th October, 1999**.

*Company Seal*

*Authorized Signature*

***Aatman Corporation. Ahmedabad***

# Details of Consumer

- Name of Consumer : M/S GOKUL FOUNDATION
- Name of Consumer as per bill : M/S GOKUL FOUNDATION
- Name of Contact Person : MR. G L SUTHAR
- Address : SIDDHPUR, GUJARAT.
- Phone No : +91
- Contract Demand : **250 KVA**

- Purpose of Consumer : **Commercial**

- Consumer Service No : **29250**

- Name of Suppliers office : **UGVCL**
- Period of Audit : **June 2023**
- Date of Submission Report :
- Proposed annual Energy Saving in terms of

| | | |
|---|---|---|
| [A] Units | : | 22,250 |
| [B] Rupees | : | 2,12,500/- |
| Proposed investment | : | 1,45,000/- |

**Remarks:-**

# C O N T E N T S

# Acknowledgment


- We are very much thankful to Team of *M/S GOKUL FOUNDATION*

for assigning this opportunity to contribute in their endeavor of Efficient Energy Management. We are also thankful to technical staff for coordination and co-operating us during Energy Audit Study.

Energy Audit Team

## Executive Summary

| Sr. No. | Area of Energy Conservation Measure | Anticipated Annual Saving in Kwh | Anticipated Annual Saving in Rs. | Anticipated Investment in Rs. | Pay Back Period in Months |
|---|---|---|---|---|---|
| 1. | Replacement of existing borewell with new energy efficient one | 5250 | 52500 | 45000 | 10.0 |
| 2. | Cleaning and proper maintenance of solar panel and accessories | 13140 | 131400 | Nil | Immed |
| 3. | Change temperature settting from 18 to 24 at auditorium | 700 | 7000 | NIl | Immed |
| 4 | Upgradation of APFCR for better power factor rebate | 2160 | 21600 | 100000 | 36.0 |

## Implementation Schedule

| Sr. No | Area of Energy Conservation Measure | Proposed Implementation schedule |
|---|---|---|
| 1 | Replacement of existing borewell with new energy efficient one | |
| 2 | Cleaning and proper maintenance of solar panel and accessories | |
| 3 | Change temperature settting from 18 to 24 at auditorium | |
| | Upgradation of APFCR for better power factor rebate | |

**For, M/S GOKUL FOUNDATION.** **For, AATMAN CORPORATION.**

## 1.0 General

Globalization has made tremendous changes in the world & concept of Energy Conservation left behind by doing Energy Audits. Energy saved is Energy Generated the global mantra now in this world. Energy is essential to life & its conservation has become as absolute necessity. The requirement of energy has gone up in last few years & would touch unimaginable preparation of population explosion & improvement of living standards.

**Energy Audits mean lot of things & common meaning are:**

- Using less Energy in particular application
- Finding ways to purchase particular form of energy at lower cost. This is usually accomplished by negotiation with energy providers.
- Shifting to different energy resources at lower costs.
- Using "Free or Renewable" energy sources that considered being more desirable, or less undesirable, with regards to non-efficiency concerns such as availability and pollution. Conservation of Water, Fuels & Materials, as well as energy sources.
- Considerable efforts are required by all sectors of society. Constant R & D is also required towards improving the Thermal Efficiency of the building, Electrical equipment, Industrial process, Heating & Cooling equipment.
- A lot of experience knowledge and hard work required for energy conservations. The most important is that everyone has to keep himself with the latest and emerging technologies to incorporate in industry.

## 1.1 Introduction

Gokul Foundation Trust was established on 17 August, 2009 with a pious spirit of service-only to the society at large in view of career development of aspirants. Professionally, keeping pace with global standards for higher education and industry of next century with an aim that education-only can play the most significant roles in realizing these dreams, are core motives of Shri. Balwantsinh C. Rajput.

The traditional to professional fields of studies in disciplines of Engineering & Technology, Nursing, Paramedical, Commerce & Management, Science, Law, Arts, Humanities and Social Sciences, Computer Science & Applications, Skill & Vocational Development, Training and AYUSH (Ayurveda) Studies are crystal clear aims of the knowledge creator and nurture center named as Gokul Foundation Trust. This charitable trust bears its key responsibilities to impart, facilitate and manage educational institutions for raising the standards of living. Legislative assembly at government of gujarat on march 23, 2018 has passed Gokul Global University as State Private University vide act no. 4 of 2018, it is popularly governing various faculties for research, post graduate, graduate and diploma courses and programs, and certification approved by professional councils, recognized by UGC and MHRD, the Government of India under the aegis of Gokul Foundation Trust.

The multi - disciplinary state private University offers career oriented programs at all levels i.e. UG, PG and Doctoral degrees across diverse streams, namely, Engineering, Law, Commerce, Nursing, Paramedical, Ayurveda, Science, Arts, Humanities & Social Sciences, Physiotherapy, ITI Learning in GGU is not just about books and classrooms but also about overall personality development and honing special skills. It provides an environment conducive to teaching and learning adequately supported by innovative academic and research programs and practices. The University campus is well developed having all the latest facilities and modern amenities to support high quality education.

The academic blocks are well equipped with fully furnished lecture halls, tutorial rooms, computer center, labs, library, seminar rooms, conference halls, etc. to facilitate conduct of courses in a befitting manner. The campus has facilities like hostels, canteen, cafe coffee day, stationery shop, medical room, transport and student activity center.

A skill development center has been established with appropriately designed labs and class rooms for effective teaching and hands on practice. The University has all round vigil and security, and the main gate is manned by security staff to facilitate the visitors to reach their desired spots in the university. GGU has excellent sports facilities both for outdoor and indoor games to help students attain the physical fitness and overall personality development.

## 1.2 Electrical System Profile

- Power Supply : 11 kV
- Power Supply Company : UGVCL
- Consumer Service No : 29250
- Contract Demand : 250 KVA

**Electricity Bill Analysis**

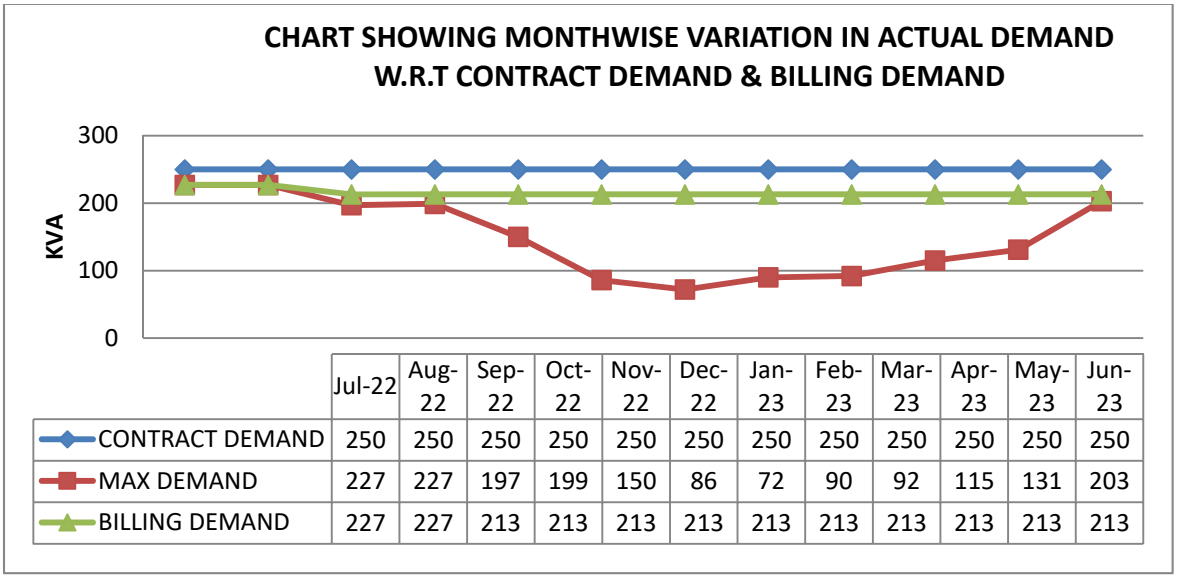
| Sr. No. | Month | Max Demand (KVA) | Energy (kwh) | TOU Kwh | P.F. (Cos Ø) | Total Bill Amt. (Rs.) | Energy Charges Rs./kwh |
|---|---|---|---|---|---|---|---|
| 1 | Jul 22 | 227 | 33896 | 12349 | 0.935 | 294721 | 8.69 |
| 2 | Aug 22 | 227 | 28316 | 10329 | 0.955 | 255164 | 9.01 |
| 3 | Sep 22 | 197 | 25967 | 9722 | 0.955 | 234957 | 9.05 |
| 4 | Oct 22 | 199 | 28925 | 10733 | 0.938 | 258084 | 8.92 |
| 5 | Nov 22 | 150 | 11353 | 3936 | 0.887 | 123456 | 10.87 |
| 6 | Dec 22 | 86 | 10560 | 3977 | 0.941 | 116729 | 11.05 |
| 7 | Jan 23 | 72 | 9591 | 3989 | 0.924 | 110881 | 11.56 |
| 8 | Feb 23 | 90 | 9230 | 3969 | 0.920 | 109554 | 11.87 |
| 9 | Mar 23 | 92 | 11811 | 4720 | 0.927 | 129569 | 10.97 |
| 10 | Apr 23 | 115 | 16208 | 6192 | 0.935 | 164231 | 10.13 |
| 11 | May 23 | 131 | 21084 | 7829 | 0.932 | 209176 | 9.92 |
| 12 | Jun 23 | 203 | 26512 | 9527 | 0.928 | 254257 | 9.59 |
| **Average** | | **149** | **19454** | **7272** | **0.931** | **188398** | **10.14** |

**Observation:**

Average Monthly Electricity bill of *M/S GOKUL FOUNDATION.* Rs. 1,88,398/- month and Average Unit Consumption is 19454/- Month. Actual Max. Demand & monthly consumption varies due to change in demand. The Avg. Energy charges is Rs. 10.14/- kwh, which include Max. Demand Charges TOU charges, FPF & Government duty charges.

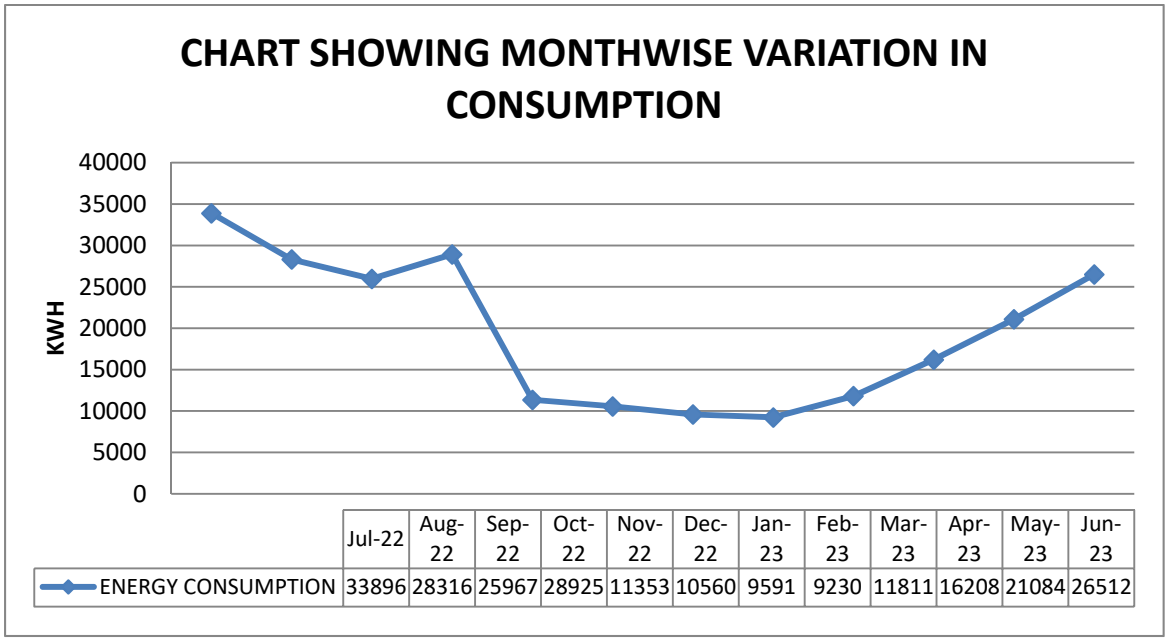
The System Average Power Factor during whole year is maintained 0.931. where scope is there to improve and reduce the demand also.

## Max. Demand Pattern




| | Jul-22 | Aug-22 | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Jan-23 | Feb-23 | Mar-23 | Apr-23 | May-23 | Jun-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTRACT DEMAND | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| MAX DEMAND | 227 | 227 | 197 | 199 | 150 | 86 | 72 | 90 | 92 | 115 | 131 | 203 |
| BILLING DEMAND | 227 | 227 | 213 | 213 | 213 | 213 | 213 | 213 | 213 | 213 | 213 | 213 |

## Energy Consumtion Pattern




| | Jul-22 | Aug-22 | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Jan-23 | Feb-23 | Mar-23 | Apr-23 | May-23 | Jun-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENERGY CONSUMPTION | 33896 | 28316 | 25967 | 28925 | 11353 | 10560 | 9591 | 9230 | 11811 | 16208 | 21084 | 26512 |

## 2.0 Performance evaluation of utility

**2.1.1 Transformer:** Transformer is static device, which transfer electrical energy volts from higher volt to lower volt & vice versa. There are two types of losses in transformer [a] No load losses (Iron losses), which is constant & [b] Variable losses i.e. Copper losses, which varies at square of load on Transformer & temperature. According to IS 2026:1962, gives Transformer losses. It is generally recommended to keep loading on Transformer between 45 to 50 %.

*M/S GOKUL FOUNDATION* has sanction HT load of 250 KVA from UGVCL. The supply in coming Voltage is High Tension at 11 KV.

**Transformer with losses:** When as actual Transformer is put on load, there are Iron losses in the core and copper losses in the windings & these are not entirely negliable. Even when the Transformer is on No load, the primary in put current is not wholly reactive. The primary in put current in no-load condition has to supply [A] iron loses to core i.e. Hysteresis losses [B] Very small amount of copper losses in primary (there being no cu losses in secondary as it is open). Hence the no load primary input current is not $90^0$ behind voltage but lags it by an angle

The no load primary current $I_0$ is very small as compared to full load current. It should be about 1 % of full load current. As no load primary current is very small, No load primary copper losses are negliable small, which mean that no load primary input is practically equal to the iron losses in the transformer.

## Transformer Details:

| *DESCRIPTION* | *TR* |
|---|---|
| **RATING IN KVA** | 750 |
| **MAKE** | SKP TRANSFORMERS |
| **HV/LV VOLTAGE** | 11000/433 |
| **HV/LV AMPS** | 39.38/1000 |
| **% IMPEDANCE** | 5.15 |
| **VECTOR GROUP** | Dyn11 |
| **FREQUENCY** | 50 HZ |
| **TYPE OF COOLING** | ONAN |

- **Efficiency of 750 KVA ONAN type Transformer:**

  - **Percentage Loading :**

Actual loading of transformer : 235 KVA…….. (a)
Rated KVA of transformer : 750 KVA…….. (b)
Loading of transformer : [(a/b) × 100)]
: [(235/ 750) × 100]
: 31.33 %

- **Loss Calculation :**

Copper Loss at %loading (A) : (%loading) $^2$ × Full load losses (IS)
: $(0.313)^2$ × 8625
: 513.49 Watts
No load losses (B) : 1425 Watt (IS)
Total losses (A+B) : 2271.78 Watt

- **Efficiency :**

Transformer Output : % loading x Rated KVA x Power factor

: 0.313 x 750 x 0.95

: 223.25 KW

Efficiency : [Output / (Output + Losses)] × 100

: [223.25 / (223.25 + 2.27)] × 100

: 98.99 %

**This is near to acceptable limit.**

## Advantage of Amorphous Core Transformer:

- **Reduction in No Load Losses:** Compared to conventional Transformer in amorphous metal, switching is accomplished with very low energy loss as due to its superior hysterics properties & very low thickness of material. This will reduce 80% no load losses & reduction in operation Cost.
- **Better Short Circuit Strength:** The unique feature of the Transformer is the rectangular winding made from copper sheet. As a result of the construction the axial component of Short circuit forces are almost eliminated. Special compacting & epoxy bonding between the layers makes the entire coil as one homogeneous mass, which has better withstanding capability of the radial component of short circuit forces as compared to conventional winding arrangement. The use of copper sheet makes almost elimination of" Hot spots". Low maintenance cost. Compact structure and easy erection & commissioning cost.

**Iron Losses (No load losses) = Hysterics Losses + Eddy Current Losses**

Iron losses, the eddy current in the Transformer core material produces eddy current losses. They depend upon the thickness of the core material. Manufacturing the core into very fine thin sheet & laminating these fine sheets of the core. While Hysterics losses are the heat losses generated due to magnetizing & demagnetizing. The Higher the resistance observed by the core molecules in magnetizing & demagnetizing, the higher would be Higher would be heat loss (Hysterics loss). Consequently, no load Losses would be higher. Hysterics Losses can only be controlled by the core material, which has low amount of heat losses when its molecules experience magnetizing & demagnetizing cycle. For that, amorphous core material serves purpose.

## 2.1.2 Power Factor:

Normally Induction motors are characterized by power factors less than unity, leading to lower overall efficiency associated with plant electrical system. The impact of PF correction includes reduced Kva demands & hence reduced utility demand charged. It also reduced $I^2R$ losses in cable in upstream & reduces voltage drop in cables. It should be noted that Capacitor improve power factor from the point of installation back to generation side. The size of capacitor required for particular motor depends upon the no load reactive KVA drawn by motor.

**Adverse Effects of Over Compensation / Leading PF**

- Extra Power loss in Capacitors. Transformer losses Increased, which requires higher capacity than the required to supply the same Kw load.
- Overheating of the Cable & Switch gear that increases cable losses.
- The current would be higher which puts extra stress on the LT switchgear reducing the useful life of the switchgear & Cables.
- Voltage will increase at the point of common coupling of capacitors. So the higher the kvar, the higher voltage at the point of capacitors installation.

Observation :

Here there is power factor improvement chances and it can go upto 0.999 from present level of 0.93. Hence improvement through capacitor (APFCR). The rebate for the better power factor will be around INR 1800/- per month and hence annual saving will be INR 21600/-. With investment of INR 1,00,000/-. Hence the payback around 3 years. This will help to reduce the demand also hence saving in fix charges also.

## 2.1.3 Metering & Monitoring Status

**Roll of Proper Metering System:** A large amount of electricity being handled by electrical department in industry, even 1 % of electrical saving in losses would provide substantial financial benefits to utilities. To release the benefits, a systematic approach to install energy monitoring metering system at number of places. Development of comprehensive energy accounting system would enable quantification of loss in different segments of the system and their segregation. Proper and accurate meters, metering system and practice are essential for effective and correct energy accounting. It also gives the needs of the management Information's systems for adopting Continuous Energy accounting, which is the bonus to the management.

**Observations:** Mostly LT 3 ph – 4 wire energy meters are at the most placed at the Main LT panel. These meters provided the Voltage/Current/Energy to monitor plant electrical equipment parameters at Main Panel. A hand held clip-on meter is also used for measuring the power consumption data. The total energy consumption is taken out on License meter only. As these reading are taken manually and calculating is laborious task and create errors. Installation of Microprocessor based instrumentation at load feeders and respective feeders helps complete monitoring the energy consumption. This meter provides kW, volt, ampere, PF, and cumulative energy consumption. This will also remove to maintain the logbook and necessary removal of electromechanical meters and their maintenance.

**Objectives of Energy Accounting**

- Identifications of high-energy consumption areas.
- Identification for losses due to equipments.
- Line losses caused by resistance of Conductor of cable.
- Weak and inadequate & UN planed networking.
- Transformer and regulator losses. [Copper & No load loss]
- Die electric losses in underground cables.
- Power factor losses due to poor power factor in downstream equipment.
- Inadequate reactive compensation at load points.
- Voltage droop & over load loss.
- Incorrect operation of machine
- Increasing the load by installation of excessive size of motors.

**Conclusion:** Any energy conservation goal will be successful only when all the employees in the office will involve. To full fill the task for energy accounting, Engineers are motivated for energy accounting scheme effectively & trained appropriately and encourage their support and give them awards for their energy saving initiative. It can therefore be seen that taking an Energy Audits will be extremely beneficial to all consumers whether it is Industries, Hotels or domestic consumers. Energy audit are one of those happy tasks which while leading to immediate improvement in the profitability and economic viability of the industries. It also benefit to the nation to use scarce resources more efficiently.

### 2.1.4 Time of Uses Charges

These are units generated at the time of peak hrs 7.0 am to 11 am in morning and 6.0 pm to 10 pm in evening. Consumer has to pay **45 paisa** for said units these are mostly recorded in the tri-vector meter. Try to reduce the use of major load like utility during peak hours.

### 2.1.5 Harmonics

**Major causes of Harmonics:** Devices that draw non-sinusoidal currents when a sinusoidal voltage is applied create harmonics. Frequently these devices develop that convert AC to DC. However in real life situation varies devices like, diodes, silicon control rectifiers, PWM system, Thyrister, Voltage & Current chopping Induction & Arc furnaces, are also deployed for various requirements and due to varying impedance characteristics. These non-liner loads caused distortion in voltage and current wave forms, which is of increasing concern indecent time. Harmonic occurs as spikes at interval which are multiples of the main supply frequency and these distorted the pure sine wave from of the supply voltage & current.

Harmonics are multiples of fundamental frequency of an electrical power system. Example The fundamental frequency is 50 Hz, and then the $5^{th}$ harmonic is 5 times that frequency or 250 Hz. Likewise $7^{th}$ harmonic is seven times of fundamental or 350 Hz and so on for higher order Harmonics.

Harmonics can be discussed in terms of Current and Voltage. A $5^{th}$ Harmonic current is simply a current flowing at 250 Hz on 50 Hz system. The $5^{th}$ Harmonic current flowing through system, Impedance creates a $5^{th}$ harmonic Voltage. Harmonic is expressed in Terms of Total Harmonic Distortion [THD]. When harmonic current flow in system they are known as ***"poor power quality" or "Dirty power"*** Other causes of

poor power quality includes Transient such as voltage Spike, Surges, Sags & ringing. Because they repeat in each cycle, Harmonies are regarded as steady state cause of poor quality power.

**Adverse Effects of Harmonics in System**

- Blinking of Incandescing light –Transformer Saturation.
- Capacitor failures – Harmonics Resonance.
- Circuit Breaker failure, heating of Switches gear & Cable – Inductive heating
- Electronic Equipment Failure – Voltage Distortion.
- Flickering of tub light & pre-matured failures – Transformer Saturation.
- Fuses blown of & tripping of MCBs – Inductive heating.
- Failures of Motors [over heating] – Voltage drop
- Neutral Conductor & terminal failure – Inductive heating
- Power Interference on Voice Communication – Harmonic Noise
- Overheating in Transformers – Inductive heating

**Solutions for Harmonics:** Distortion in Voltage and current waveform is not desirable in electrical network, because of their adverse impact on connected equipments. It is there for prudent to installed tuned harmonic filters close to loads generating harmonics current. Harmonic current are filtered at the source reliving the network from evil effect of harmonic. The harmonic filters are Capacitors bank connected in series with reactor. The required reactor value is calculated based on load & housed in cubical panel with suitable switch gear. The filter system injects required inductive Kvar to the network to improve power factor below the harmonic frequency and beyond harmonic frequency. Thus prevent amplification of harmonics.

## ❖ MAIN LT :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (L)** | 410 | 408 | 410 | |
| **V (Ph)** | 237 | 235 | 236 | |
| **AMP.** | 258 | 293 | 253 | 68.7 |
| **KW** | 59.49 | 67.38 | 58.56 | |
| **KVAR** | 19.22 | 15.23 | 14.57 | |
| **KVA** | 61.83 | 67.99 | 61.66 | |
| **P.F** | 0.95 | 0.97 | 0.97 | |
| **%V** | 0.9 | 0.7 | 0.9 | |
| **%A** | 5.1 | 5.4 | 5.7 | |

- Above table mentions the main LT feeder electrical power measurement.
- Load in balance condition so far single phase load pattern at different premise.
- Power parameters alonwith power quality parameters like harmonics in voltage and current are within limit.
- Client has installaed solar roof top system at premise and hence controlling the demand as well.

## ❖ SOLAR 112.5 KW :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (L)** | 419 | 417 | 419 | |
| **V (Ph)** | 242 | 240 | 242 | |
| **AMP.** | 86 | 87 | 90 | |
| **KW** | 21.24 | 22.0 | 22.20 | |
| **KVAR** | 1 | 1 | 1 | |
| **KVA** | 21.50 | 22.1 | 22.50 | |
| **P.F** | 0.99 | 0.99 | 0.99 | |
| **%V** | 0.8 | 0.8 | 0.8 | |
| **%A** | 3.7 | 3.8 | 3.9 | |

- The client has installaed the solar system at roof top of the capacity of 112 KW.
- During measurement, we observed the generation in the range of 66 KW. Hence we recommend to check the routine maintenance of the system for improvement in generation apart from atmospheric issues.
- According to our experience the generation can go upto 75 to 80 KW average.
- Hence the saving will be around (15 kw improvement in generation for 4 hours a day and 365 days per annum and @6.0/- unit rate). INR 1,31,400/-.
- This is almost at Nil investment.

## ❖ NURSING BUILDING :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (Ph)** | 238 | 237 | | |
| **AMP.** | 8.8 | 18.3 | 0 | |
| **KW** | 2.1 | 4.29 | | |
| **KVAR** | 0.04 | 0.14 | | |
| **KVA** | 2.1 | 4.32 | | |
| **P.F** | 0.99 | 0.99 | | |
| **%V** | 1.0 | 1.0 | | |
| **%A** | 3.0 | 13.6 | | |

## ❖ ENGINEERING COLLEGE 1ST AND 2ND FLOOR :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (Ph)** | 237 | 235 | 234 | |
| **AMP.** | 19.5 | 22.1 | 14.6 | |
| **KW** | 4.38 | 5.1 | 3.27 | |
| **KVAR** | 1.1 | 0.58 | 0.27 | |
| **KVA** | 4.57 | 5.20 | 3.37 | |
| **P.F** | 0.95 | 0.97 | 0.97 | |
| **%V** | 1.1 | 2 | 0.9 | |
| **%A** | 21 | 18.7 | 18.2 | |

## ❖ ENGINEERING COLLEGE GROUND FLOOR :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (Ph)** | 237 | 236 | 235 | |
| **AMP.** | 18.6 | 26.7 | 76.5 | |
| **KW** | 4.25 | 5.57 | 18.45 | |
| **KVAR** | 0.57 | 2.46 | 1.40 | |
| **KVA** | 4.40 | 6.28 | 18.70 | |
| **P.F** | 0.97 | 0.90 | 0.99 | |
| **%V** | 1.1 | 1.0 | 0.9 | |
| **%A** | 16.2 | 15.3 | 10.9 | |

## ❖ GGS BIULDING :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (Ph)** | 237 | 236 | 233 | |
| **AMP.** | 62.6 | 12.4 | 19.6 | |
| **KW** | 15.1 | 2.66 | 4.25 | |
| **KVAR** | 2.37 | 1.20 | 1.66 | |
| **KVA** | 15.20 | 3.60 | 4.60 | |
| **P.F** | 0.98 | 0.92 | 0.92 | |

| | | | | |
|---|---|---|---|---|
| %V | 1 | 1.0 | 0.9 | |
| %A | 6.8 | 10.5 | 12.4 | |

## ❖ GIRLS HOSTEL :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| V (Ph) | 236 | 235 | 234 | |
| AMP. | 36.0 | 28.9 | 59.7 | |
| KW | 8.50 | 6.60 | 13.49 | |
| KVAR | 0.04 | 1.72 | 0.61 | |
| KVA | 8.51 | 6.84 | 14.0 | |
| P.F | 0.99 | 0.96 | 0.99 | |
| %V | 1.0 | 0.9 | 0.9 | |
| %A | 5.1 | 5.6 | 2 | |

## ❖ HOSPITAL BUILDING :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| V (Ph) | 240 | 241 | 240 | |
| AMP. | 9.2 | 2.1 | 2.9 | |
| KW | 2.1 | 0.46 | 0.70 | |
| KVAR | 0.77 | 0.20 | 9.4 | |
| KVA | 2.2 | 0.51 | 0.70 | |
| P.F | 0.93 | 0.90 | 0.99 | |
| %V | 1.0 | 1.0 | 1.0 | |
| %A | 8.93 | 10.0 | 13.2 | |

## ❖ GPS SCHOOL :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *R* | *Y* | *B* | *N* |
| **V (Ph)** | 242 | 238 | 233 | |
| **AMP.** | 37 | 41.5 | 40.4 | |
| **KW** | 8.91 | 9.86 | 9.37 | |
| **KVAR** | 0.14 | 0.33 | 0.22 | |
| **KVA** | 8.93 | 9.90 | 9.45 | |
| **P.F** | 0.99 | 0.99 | 0.99 | |
| **%V** | 1.5 | 1.7 | 1.5 | |
| **%A** | 6.9 | 7.7 | 2 | |

## ❖ AUDITORIUM :

| *DESCRIPTION* | *MAIN* | | | |
|---|---|---|---|---|
| | *MAIN* | *AC 8.5 TR FRONT* | *AC 8.5 TR BACK* | |
| **V** | 406 | 388 | 388 | |
| **AMP.** | 238.6 | 79.9 | 83.7 | |
| **KW** | 142.0 | 45.47 | 48.16 | |
| **KVAR** | 87.1 | 28.53 | 28.4 | |
| **KVA** | 167.3 | 53.84 | 56.4 | |
| **P.F** | 0.86 | 0.84 | 0.85 | |
| **%V** | 0.7 | 0.6 | 0.6 | |
| **%A** | 0.9 | 1.3 | 0.4 | |

- During measurement at auditorium, it was observed that the temperature setting is at 18 deg. Cen. This we can set at 24 deg. Cen and the saving will be in the range of 5%.
- The saving will be in the rage of ( 100 hours per annum and power reduction will be @7.0 kw). INR 7000/- without investment.

## ❖ BOREWELL SUMP 20 HP :

| *DESCRIPTION* | *MAIN* |
|---|---|
| **V** | 399 |
| **AMP.** | 31.3 |
| **KW** | **18.56** |
| **KVAR** | 11.13 |
| **KVA** | 21.65 |
| **P.F** | 0.86 |
| **%V** | 0.6 |
| **%A** | 1 |

- Here the measurement mentions that the power consumption is higher than the rated one hence need to check the rewinding process and if possible replace with new higher energy efficiency borewell pump. The payback will be within One year.
- The saving will be INR 52500/- against invement of INR 45,000/-. Hence payback within year time.