



READY RECKONER FOR ELECTRICAL INFRASTRUCTURE



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INTRODUCTION

Gujarat International Finance Tec-City ("GIFT") is being developed as a global financial and IT / ITeS hub in the state of Gujarat, a first of its kind in India. GIFT has been planned as a city with next class infrastructure and real estate including commercial high rises business districts, quality residential housing, retail and recreational spaces. The GIFT city is located on the bank of the river Sabarmati and is about 12 KMs from Ahmadabad Airport, and 8 km from Gandhinagar.

GIFT is expected to be above or at par to the all other international financial districts in terms of scale, scope and quality of infrastructure and real estate. GIFT will encompass an area of 886 acres with a total Built-up area ("BUA") of around 64 million square feet.

To develop and implement the Project, Government of Gujarat has established Gujarat International Finance Tec-city Company Ltd ("GIFTCL").

Part of the GIFT Project is planned to be developed as Multi Services SEZ to be developed as International Finance Service Centre. Development of SEZ would be undertaken by GIFT SEZ Limited, a 100% subsidiary company of GIFTCL.

GIFTCL and GIFT SEZ Ltd would undertake development of various infrastructure components like internal roads, water supply, solid waste management, sewerage, storm water drainage, landscaping, ICT Systems, District Cooling, power distribution etc. GIFTCL will provide required infrastructure up to Building level in each of sub enclave as per the requirement of development. GIFT Power Company Ltd. has incorporated as 100% subsidiaries of GIFTCL for power distribution.

PURPOSE

Purpose of this ready reckoner is to unify the electrical system throughout the GIFT City for cluster development and end users.

This ready reckoner is developed to cover following main aspects of GIFTCL.

- a) Power supply requirement
- b) Installation and design Practice for consumer
- c) Technical requirement for service equipment
- d) Maintenance of power quality

Ready reckoner is a single source document that is adopted across the GIFT City for development and O&M of Electrical infrastructure. Note: Design details of this ready reckoner are applicable upto the 122 meters height building. For buildings with height more than 122 meters new version of ready reckoner shall be issued.

PREFACE

This publication is produced by:

THE GIFT POWER COMPANY LIMITED

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This ready reckoner provides guidelines for developer/ co-developer to build infrastructure in-order to provide reliable power up to the end-users/ occupier of the units. This ready reckoner refers to standards as below.

Gujarat Electricity Regulatory Commission (GERC)

Electricity supply code and Related Matters Regulations

The Indian Electricity Rules, 1956 (as amended up-to date)

National Building Code of India with latest amendment

Code of Practice for Fire Safety of Buildings (General): Electrical installations

This ready reckoner should be treated equivalent to:

THE GIFT CITY ELECTRICAL REGULATION

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1 DEFINITIONS:

“CODE”

The National Building Code of India adopted by this regulation or a subsequent and similar Code adopted by this Regulation.

“IE REGULATION”

The Indian electricity rules, 1956 (with all up to date amendments)

ADOPTION OF “THE NATIONAL BUILDING CODE” Except as varied by this Regulation, **National Building Code**, is hereby adopted as part of this Regulation, and a violation or contravention of the Code is a violation or contravention of this Regulation.

In the event of any conflict, explicit or implied, between the provisions set out in the Code and the Regulation, the provisions set out in this Regulation shall prevail. In such case it is responsibility of the person amending modification to maintain reliability of the system.

“AUTHORITY”

Designated employees are authorized to conduct inspections and take steps to administer and enforce these requirements in line with the regulation.

The details of any construction which are not specifically dealt within this regulation shall be performed to the satisfaction of a designated employee, which authority shall be reasonably exercised by the designated employee. Designated employees are hereby authorized to determine whether equipment, techniques, conditions, circumstances and all other matters meet the standards

and requirements of this regulation or are otherwise acceptable.

“DEVELOPER”

A persons or entity, to whom the development rights have been granted by GIFTCL / GIFT SEZ, GIFT City.

“ELECTRICAL CONTRACTOR”

Individual whom holds Electrical Contractor’s License in line with the requirements of the IE regulations and performing electrical work.

“Unit holder/ Transferee”

A person or the entity, who owns, manages or is in possession of land or a building to which this ready reckoner applies.

“ACT”

The Electricity Act, 2003 (Act 36 of 2003);

“Diversity factor”

The ratio of the sum of the individual maximum demands of the subdivisions of the system to the maximum demand of the complete system.

“Demand factor”

The ratio of the maximum demand of a system to the total connected load of the system. Since demand load cannot be greater than the connected load, the demand factor cannot be greater than unity. Those demand factors permitted by the NEC (for example, services and feeders) must be considered in sizing the electric system (with few exceptions, this is 100%); otherwise, the circuit may be sized to support the anticipated load.

“LOAD FACTOR”

The ratio of total number of units (kWh) consumed during a given period to the total number of units (kWh) which may have been consumed had the Contract Demand / Sanctioned Load been maintained throughout the same period subject to the availability of power from GIFT POWER COMPANY and shall usually be expressed as a percentage;

“APPLICANT”

A person who makes an application for supply of electricity, increase or reduction in the contract demand / sanctioned load, change of name, disconnection or restoration of power supply or termination of agreement, as the case may be, in accordance with the provisions of the Act and the Rules & Regulations made there under;

“AUTHORISED REPRESENTATIVE”

An officer or person discharging functions under the general or specific authority of GIFT PCL.

“COMMISSION”

The Gujarat Electricity Regulatory Commission.

“CONSUMER”

Any person who is supplied with electricity for his own use by the GIFT POWER COMPANY LIMITED (GIFT PCL) and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of GIFT POWER COMPANY LIMITED.

“Connected load”

The sum of the continuous ratings of the power-consuming apparatus connected to the system or any part thereof in watts, kilowatts, or horsepower

“DEDICATED DISTRIBUTION FACILITIES”

Such facilities, not including a service line, forming a part of the distribution system of the GIFT POWER COMPANY, which are clearly and solely dedicated to the supply of electricity to a single consumer or a group of consumers on the same premises or contiguous premises;

“DISTRIBUTING MAIN”

The portion of any main, with which a service line is, or is, intended to be, immediately connected;

“DISTRIBUTION SYSTEM”

The system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and point of connection to the installation of the consumers;

“ELECTRICITY”

Electrical energy generated, transmitted, supplied or traded for any purpose, or used for any purpose except the transmission of a message;

“ELECTRICAL INSPECTOR”

A person appointed as such by the Government under Sub – Section (1) of Section 162 of the Act and also includes Chief Electrical Inspector;

“ELECTRICITY SUPPLY CODE”

The “Gujarat Electricity Regulatory Commission (Electricity Supply Code & Other Conditions of Supply) Regulations, 2005, as specified by the Commission or as may be specified;

“GOVERNMENT/ State Government”

Government of Gujarat having jurisdiction under the Act;

“HARMONICS”

A component of a periodic wave having a frequency that is

an integral multiple of the fundamental power line frequency of 50 Hz causing distortion to pure sinusoidal waveform of voltage or current, and as governed by IEEE STD 519 – 1992, namely “IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems” and corresponding standard as may be specified in accordance with Clause (c) of Sub – Section (2) of Section 185 of the Act;

“HIGH TENSION OR HT”

High Tension or HT/ High Voltage refers to the voltage greater than 440 V and lesser than 66 kV.

“HT CONSUMER”

A consumer who obtains supply at HT;

“INSTALLATION”

The whole of the energy consuming electrical fittings including electric equipment, machines, apparatus, gadgets, devices, etc. installed / erected within a premise associated with a point of supply of a consumer, duly wired & connected to the GIFT POWER COMPANY’s power supply system;

“LICENSED ELECTRICAL CONTRACTOR”

An electrical contractor licensed by the State Government for the purpose of carrying out electrical works;

“LOW TENSION OR LT”

Low Tension or LT/ Low Voltage refers to Voltage not exceeding 440 volts;

“LT CONSUMER”

A consumer who obtains supply at LT;

“MAXIMUM DEMAND”

In kW or kVA, as the case may be, shall mean an average kW/kVA supplied during consecutive 30/15 minutes (depending upon the type of meter being used) period of maximum use where such meter with the features of reading the maximum demand in kW/kVA directly, has been provided; ;

“METER”

Meter refers to an equipment used for measuring, indicating and recording electrical quantities like energy in kWh or kVAh, maximum demand in kW or kVA, reactive energy in kVARh etc. including accessories like Current Transformer (CT), Voltage Transformer (VT) / Potential Transformer (PT) / Capacitor Voltage Transformer (CVT) etc. where used in conjunction with such meter;

“OVERHEAD LINE”

An electric line, which is placed above the ground and in the open air but does not include live rails of a traction system;

“OCCUPIER”

The person in occupation of the premises where electric energy is used or is proposed to be used;

“PERSON”

Shall include any Company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person;

“POINT OF SUPPLY”

The point at the outgoing terminals of the GIFT POWER COMPANY's cut outs fixed in the premises of the

consumer; Provided that, in case of HT Consumers, the point of supply means the point at the outgoing terminals of the GIFT POWER COMPANY's metering cubicle placed before such HT Consumer's apparatus;

Provided further that, in the absence of any metering cubicle or, where the metering is on the LT side of the HT installation, the point of supply shall be the incoming terminals of such HT Consumer's main switchgear;

"PREMISES"

Includes any land, building or structure;

"REGULATIONS"

Regulations prescribed or as may be prescribed by the Commission under the Act;

"RULES"

The Rules prescribed or as may be prescribed under the Act;

"SANCTIONED LOAD"

Load in Kilo watt (kW) / Horse Power (HP) mutually agreed between the GIFT POWER COMPANY and the consumer;

"SERVICE LINE"

Any electric supply line through which electricity is, or is intended to be, supplied-

(a) To a single consumer either from a distributing main or immediately from the GIFT POWER COMPANY's premises;
or

(b) From distributing main to a group of consumers on the same or contiguous premises supplied from the same point of the distributing main;

"STREET"

Includes any way, road, lane, square, court, alley, passage

or open space, whether a thoroughfare or not, over which the public have a right of way and also the roadway and footway over any Public Bridge or Causeway;

“TEMPORARY SUPPLY”

Supply of electricity for a temporary period, not exceeding two (2) years, as may be agreed between the GIFT POWER COMPANY and the applicant or as may be modified from time to time by GERC, in prevailing tariff order;

“VOLTAGE”

Difference of electric potential measured in volts between any two conductors or between any part of either conductor and the earth as measured by a suitable voltmeter and is said to be

“Low”, where the voltage does not exceed 250 volts

“Medium”, where the voltage does not exceed 650 volts;

“High”, where the voltage does not exceed 33,000 volts;

Under normal conditions however, subject to the percentage variation allowed by the Indian Electricity Rules, 1956 until the introduction of any Regulations for the same under the provisions of the Act;

“SUBSTATION”

Any grouping of switchgear and transformers located near a source or user.

2 GIFT POWER INFRASTRUCTURE:

2.1 POWER DISTRIBUTION IN GIFT

2.1.1 Entire Power Network of the GIFTPCL is divided into two parts

2.1.1.1 Main Receiving Station at centralized Location

2.1.1.2 Individual Zonal Switching stations

2.1.2 At present the GIFTPCL main receiving station receive power at 66kV from GETCO receiving station.

2.1.3 66kV / 33kV substation is developed by GIFTPCL to serve the electrical load requirement of consumers in GIFT city.

2.1.4 From the main Receiving Station there will be a 66kV or 33kV cable transmission system to various switching stations located in various zones identified.

2.1.5 From main receiving station and 33kV switching station 33kV ring will be developed which will be feeding plot wise power requirement. Power will be distributed to the entire city at 33 KV up to the building package level, wherefrom the same will be taken up and distributed further to the points of consumption.

2.2 UTILITY TUNNEL

2.2.1 Power distribution in GIFT city is underground. Network of all HT cables, LT cables and IT / Fibre optic cables shall be carried through utility tunnel.

2.2.2 Utility tunnel is an underground passage developed by GIFTCL to house utility lines such as electricity, water, etc.

2.2.3 All 33 kV switching panels units will be installed in utility tunnel, assigned HT room.

2.2.4 Building Electrical system will be connected by 33 KV cables through Utility tunnel.

2.3 VOLTAGE LEVEL

2.3.1 Except where otherwise previously approved, the GIFT PCL, shall give power supply on the following systems, namely

2.3.2 Low Voltage(LV) –

Alternating current, 230 Volt single phase, 50 cycles;

Alternating current, 400 Volt three phase, 50 cycles

2.3.3 High Voltage (HV) –

Alternating current, 33000 Volt three phase, 50 cycles

Alternating current, 11000 Volt, three phase, 50 cycles (for construction purpose only)

2.4 SYSTEM OF SUPPLY

2.4.1 Except where otherwise previously approved, the classification of the supply system shall be as follows:

2.4.2 Abstract of GERC Electricity supply code and Regulations

a) 230 V - Single Phase

- For all installations (other than motive power) up to & inclusive of 6 kW of Contracted Load.
- For motive power installations other than agriculture not exceeding 2 HP in the aggregate.

b) 400V - Three Phase

- For all installations (other than motive power) exceeding 6 kW Up to 100 kW of Contracted Demand

- For motive power installations exceeding 2 HP Up to 125 HP in the aggregate subject to maximum demand not exceeding 100 kW
- c) 11KV Three Phase
 - For all installation with Contract Demand exceeding 100kVA and up to 4000KVA for construction purpose only (If developer needs connection on 33 kV voltage level, it may be available)
- d) 33 kV Three Phase
 - For all installations with Contract Demand exceeding 100kVA and up to 4000 kVA and above.

3 QUALITY OF ELECTRIC SUPPLY

The parameters which decide the quality of electric supply are:-

3.1 Voltage & Frequency

3.1.1 Neutral voltage shall not exceed 2% of the supply voltage and earth resistance should be maintained below 1 Ohm.

3.1.2 Voltage variation tolerance band for different voltages are as under:

3.1.2.1 In the case of Low voltage, +6% and -6%

3.1.2.2 In the case of High voltage, +6% and -9%, and

3.1.2.3 In the case of Extra high voltage, +10% and -12.5%

3.1.3 Frequency variation shall not be permitted beyond +/- 3% of 50 Cycles.

3.1.4 Equipments shall be suitable for operation on a supply voltage with the variation in supply voltage, frequency and combined voltage and frequency of $\pm 10\%$, $\pm 5\%$ and $\pm 10\%$ respectively.

3.1.5 The GIFT PCL may refuse to permit or apply conditions and/or tests for the connection of equipment in the following categories if it is considered that, by such connection the supply to other customers would be adversely affected -

- a) Equipment which could cause excessive fluctuation of voltage on the Distributor's system as a result of its large or fluctuating demand, e.g. Non linear load control such as variable speed motors, gas discharge lighting, arc furnaces, welding machines, X-ray units, frequently-started large motors, etc.
- b) Equipment which could cause excessive distortion of the wave shape of the supply system voltage, e.g. rectifiers, frequency converters, load control devices using thyristors or saturable reactors, etc.

3.2 Power factor

3.2.1 Consumers obtaining three phase supply shall maintain an average power factor above 90% in respect of their installation.

3.2.2 GIFT PCL shall not commence power supply to any applicant requiring motive power load of 2 KW or more unless his installation is provided with adequate power factor corrective equipment like the shunt capacitor.

3.3 Harmonics

3.3.1 The consumer must keep harmonic currents below the limits specified in the IEEE Standard 519-1992 'Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems'.

3.3.2 Users having loads with high harmonic content and fluctuations shall have inbuilt appropriate harmonic mitigation technique. UPS load with Harmonic content more than permissible limit shall have isolation transformer.

4 GENERAL REQUIREMENT FOR SUPPLY

4.1 Power Distribution philosophy

Some salient points for consideration in designing Electrical network of building by Developer & GIFT PCL:

4.1.1 GIFT PCL shall provide HT network up to switching Panel in utility tunnel.

4.1.2 Access from utility tunnel to building electric room should be clearly defined in mutual agreed path keeping in view prudent practices of power distribution.

4.1.3 Electrical Infrastructure shall be based on type of consumers in the building. There will be mainly three type of consumer mix:

4.1.3.1 High tension consumer : Only Consumer with contract demand more than 100 KVA and independent HT and LT network for the consumer is feasible in building.

4.1.3.2 Low tension consumer mix: All Consumers with contract demand less than 100KW/125HP in the building.

4.1.3.3 HT and LT consumer mix: Independent network for HT consumer not feasible due to HT and LT consumer in same building. In such case HT and LT both consumers will be fed power through same network of building, as independent distribution

infrastructure is not possible for each HT consumers in such building. HT consumer shall pay transformation losses as per GERC guideline. Any change in consumer category will be based on approval from GERC.

4.1.4 GIFTPCL shall assign two numbers of feeding points for each building plant HT feeder.

4.1.5 In case of standalone (separate single consumer in premises with demand more than 100KVA and separate transformer and LT network for such consumer only) Summation CT arrangement shall be provided for metering of HT consumption and there shall be only one metering point.

4.1.6 In case of common network for building consumers with demand less than 100KW shall be considered as LT consumer of respective tariff and consumers with demand more than 100KVA shall be considered as HT consumer of respective tariff as per purpose of use of power defined in tariff.

4.1.7 An independent and well ventilated electrical service room shall be provided on the ground level/ highest floor area of first basement with direct access from outside or from the corridor for the purpose of termination of electrical supply from the licensees' (GIFTPCL) service and alternative supply cables. The doors provided for the service room shall have fire resistance of not less than 2 Hrs.

4.1.8 Developer is responsible to develop complete electrical infrastructure of building from his point of supply to the unit holder/ transferee/ occupier point

of supply. Scope includes supply, install and commissioning of HT panel, transformer, LT panel, power factor correction arrangement, harmonic filters, earthing arrangement, etc. as per approved drawings of GIFT PCL.

4.1.9 Adequate circuit breakers shall be provided at the appropriate location. Maximum allowable distance of breaker from the field equipment/transformer is 20 meters.

4.1.10 Metering equipment shall be provided by GIFT PCL for HT and LT all type of customers.

4.1.11 If floor wise metering is required then, developer shall provide redundancy in LT distribution up to floor level, than it should be arranged in such way that single metering point arrangement condition should be complied, means changeover should be arranged in incoming source of each floor level distribution system. However, If vertical power distribution from transformer to floors is through cables then all meters will be installed on ground floor, developer have to provide separate space for meter installation and provide direct access to metering room.

4.1.12 No diesel generators will be allowed for backup power to developer.

4.1.13 If failure is at unit holder/ transferee/ occupier point of supply, load is transfer to alternate feeding point. Infrastructure should be designed for uniform distribution of the load in such condition. Transformer should not be overloaded at the same

time alternate point should be available for feeding power to unit holder/ transferee/ occupier.

4.1.14 Backup power arrangement is provided by GIFT PCL and in case of grid failure. GIFT PCL can provide backup power LT Panel of common area at voltage level of 415 Volts from centralized backup source as per developer demand for critical loads. Backup power will be available in 1 minute. Developer have to pay capital cost (capex) and operation and maintenance (opex) cost separately as per backup power demand. If developer want to provide backup power to various tenants of floor, then there shall be separate busduct for same having independent control for all outgoing of busduct and it should be feed from critical panel.

4.1.15 Developer/unit holder/ transferee/ occupier shall make necessary arrangement for segregation of emergency load as per contract demand of backup power and control his consumption within the assigned capacity required in case of GRID failure in network. System to changeover should be SCADA controlled in case of GRID failure. Control of changeover system shall be with GIFT PCL. At the time of GRID failure, Developer shall provide acknowledgement signal of segregated load within 3 second.

4.1.16 GIFT PCL will provide GRID failure & GRID restoration signal by soft signal for common area of building, Developer shall have provision for accepting that

soft signal and have to provide acknowledgement for the same.

4.1.17 Developer has to ensure that maximum allowable instant loading on backup system shall be 30% of total backup demand and remaining 70 % of backup demand shall apply after 30 Sec. of initial loading.

4.1.18 Developer has to ensure that at the time of GRID failure, only Critical load shall be charge (On) Non-critical load shall be automatically switched off. At any incident, if consumer/building increase their power consumption from their committed limit (for Normal & Backup) power will be Tripped (automatically by switching panel Relay) for that consumer/building. Developer has to ensure that APFC (any capacitor bank) shall be switched-off at the time of GRID failure and it switching shall be done automatically through PLC or BMS. In case of grid failure condition, if backup power system get leading power factor due to the developer's/consumer's load, then this may lead to failure of backup power supply and that failure will be the developer's responsibility. Hence consumer need to ensure no leading power factor from their connected loads during back up power supply. This is applicable for all the Developers/Consumers who have opted for HT backup as per previous scheme.

4.1.19 Developer should design network to keep emergency fire system and UPS network independent from normal network. Independent network shall be there to feed UPS load.

- 4.1.20 Developer shall provide necessary facilities for voice and data communication and transfer of on-line operational data to Load control centre of GIFT PCL such as voltage, frequency, status of breaker position and other parameters as prescribed by the GIFT PCL.
- 4.1.21 Modern buildings use large number of electro-mechanical, electronic devices, which for their proper operation and protection require quality electric supply.
- 4.1.22 Developer is responsible to maintain quality of electrical supply within his premises. It is responsibility of developer to provide specific additional equipments like Voltage correctors, isolation transformers, filters, protection, surge protection, UPS, etc. as necessary to improve performance.
- 4.1.23 Emergency power supplying distribution system for critical requirement for functioning of fire and life safety system and equipment, shall be planned for efficient and reliable power and control supply to the following systems and equipment where provided: (NBC-2016, clause 4.2.1, point 27, Pg no 22)
- 4.1.23.1 Firefighting pumps;
- 4.1.23.2 Pressurization and smoke venting; including its ancillary systems such as dampers and actuators;
- 4.1.23.3 Fireman's lifts (including all lifts).

- 4.1.23.4 Exit signage lighting; (if not have independent backup)
- 4.1.23.5 Emergency lighting;
- 4.1.23.6 Fire alarm system;
- 4.1.23.7 Public address (PA) system (relating to emergency voice evacuation and annunciation);
- 4.1.23.8 Magnetic door hold open devices; and
- 4.1.23.9 Illumination for the firefighting pumps and panels and for security room.

4.1.24 Power supply to these systems and equipment shall be from normal and backup power sources with changeover facility. Developer has to take backup power connection from GIFT PCL as per backup power policy. Developer must take backup power connection equivalent to their fire and life safety equipment load as mentioned in clause 4.1.23.

4.1.25 During any Emergency/ Fire/mishap condition, normal load bus should be isolated from any power source by remote operation, and only emergency fire and life safety panel shall be charged.

4.1.26 Developer has to ensure that while taking backup power, developer have to single PT signal combined to all LT incomer from main LT panel.

4.1.27 The power supply to the panel/distribution board of these fire and life safety systems shall be through fire proof enclosures or circuit integrity cables or through alternate route in the adjoining fire compartment to ensure that supply of power is reliable to these systems and equipment. It is to be

ensured that the cabling from the adjoining fire compartment is to be protected within the compartment of vulnerability. The location of the panel/distribution board feeding the fire and life safety system shall be in fire safe zone ensuring supply of power to these systems. Cables for fire alarm and PA system shall be laid in metal conduits or armoured to provide physical segregation from the power cables.

4.2 Clear demarcation of boundary of control for GIFT PCL and Developer

Developer shall keep following guidelines in view at the time of designing electrical infrastructure. These guidelines are defining area of control and responsibility to carryout O&M of all the assets and restoring of power supply up to defined area on case to case basis as follows;

- 4.2.1 GIFT PCL is responsible for development and integration of the external infrastructure related electrical system. Developer is responsible development and integration of the electrical system for building internal requirement and external infrastructures linked with building.
- 4.2.2 GIFT PCL will install 33 kV switching panel and lay 33 kV cable in utility tunnel to supply electrical power to building. The developer / user shall be responsible to pay the applicable service connection charges with applicable security deposit and monthly regular electricity charges.

- 4.2.3 GIFT PCL shall lay cable from switching panel to HT panel of building substation according to path assigned/approved by GIFT PCL, Developer has to pay service connection charges for 33 kV connection.
- 4.2.4 In case of HT consumer GIFT PCL shall be responsible for O&M of assets and restoration of supply, up to point of supply (up to HT metering point). Predominantly located inside GIFTCL utility tunnel/GIFT PCL substation.
- 4.2.5 If point of supply is in ground level near transformer/in common metering room, developer shall arrange necessary wiring to extent point of supply up to the unit holder/ transferee/ occupier premises. In such cases GIFT PCL shall not be responsible for O&M of assets and restoration of supply up to point of supply. GIFT PCL would be responsible for O&M of assets and restoration of power supply till HT metering point only.
- 4.2.6 If developer wants point of supply on each and every floor than on request of developer GIFT PCL may install meters on every floor, but GIFT PCL shall not be responsible for O&M of any assets and restoration of supply inside premises. Developer shall be solely responsible for O&M of assets from HT incoming panel to floor level LT metering points and restoring power in case of fault in network between HT incoming points to metering point. In case of any fault in tariff meter or tariff metering equipment shall be resolved by GIFT PCL.

- 4.2.7 Developer is responsible for designing electrical infrastructure based on consumer mix of building. It is his responsibility to arrange independent metering for measuring energy consumption of each consumer as per the prudent practices of power distribution. GIFT PCL shall do necessary arrangement for metering of energy consumption of each consumer/building as per tariff.

5 CUSTOMER'S INSTALLATIONS

Developer shall consider following guidelines for projection of load for the building.

5.1 Electrical Load criteria's

- 5.1.1 Developer of any building or plant needs to submit electrical load with basis of calculation of load for all type of loads at the time of submission of DPR. GIFT PCL will validate the load for construction and permanent use submitted by developer. GIFT PCL will validate the load based on minimum loading per square meter for all type of load as per following table 1: (ref. ASHRAE, MEW/R-6/2010, IEEE 241/1990):

Table 1: Electrical Load calculation Factors

Type of load		W/SQM	Demand Factor	Diversity Factor
Lighting	Residential	As per Design	40%	2.5
+Power	Commercial		80%	1
IT load		As per Design	80%	1.5
AHU		As per Design	70%	1
For Cooling		As per Design	70%	1

Lift	As per Design	75%	1
Ventilation	As per Design	35%	1
Life Safety panel	As per Design	50%	1

5.1.2 Latest version of NBC guidelines for considering diversity of different type of load for different purpose can be considered in finalising power demand.

5.1.3 This is considered as minimum load requirement basis for sizing of electrical infrastructure components and rest operational philosophy of infrastructure.

5.1.4 Based on above calculation projection of power demand will be finalised.

5.1.5 The detailed load calculations need to be provided for an exception from above mentioned load.

5.1.6 Developer shall calculate power requirement for cooling load considering chilled water supply connection from GIFTCL's District cooling system.

5.1.7 Finalising electrical load shall be first criterion. Load list shall be validated by GIFTCL.

6 Service equipments

- a. Based on validated electrical load and general guidelines in clause 4, developers should design infrastructure for the building.
- b. GIFTCL has fixed following technical parameters for finalising sizes of HT Panel, transformer, switchgear, LT panel, capacitor panel, etc. for linear and non linear load.

6.1 HT panel

6.1.1 33 kV HT panel shall be GIS of (SF6 Gas Insulated) type panel. GIS Panel will reduce the space requirement by

60%, reduce the maintenance cost, more effective in basement area having humid environment, less probability of getting flash and high life cycle of panel. HT panel shall have Circuit breaker with central mounting arrangements and CT PT arrangement at bottom, relay and control cubical in top section of panel. Minimum IP rating for any HT switchgear enclosure shall be IP 4X. HT switchgear should not be installed outdoor.

6.1.2 Minimum Provision for overcurrent, earth fault relay, motorized breaker charging, anti-pumping relay, IDMT relay, trip circuit supervision, and remote trip relay reset and battery bank for panel auxiliary power.

6.1.3 Breaker sizing should be fulfilling make, break and thermal rating.

6.1.4 Switchgear (and its protective device) shall have breaking capacity not less than the anticipated fault level in the system at that point. System fault level at a point in distribution system is predominantly dependant on the transformers size and reactance. Developer should not operate transformer/Generator in parallel with system.

6.1.5 HT panel should have provision of redundant incoming power supply.

6.1.6 HT Panel's SCADA/BMS I/O list shall be submitted to GIFT PCL, provision of remote trip, ON, OFF and complete status of breaker shall be made available in BMS/SCADA panel. All relay shall have provision of 'Trip Relay Reset' from remote operation. Signal to be replicated.

- 6.1.6.1 Acknowledgement Signal for unit holder/ transferee/ occupier
 - 6.1.6.1.1 Grid incoming Healthy
 - 6.1.6.1.2 Grid incoming Fail
 - 6.1.6.1.3 Emergency system in ON
 - 6.1.6.1.4 Over consumption by unit holder/ transferee/ occupier in emergency
 - 6.1.6.1.5 Grid incoming restored
 - 6.1.6.2 List of parameter to be monitored
 - 6.1.6.2.1 Power consumption
 - 6.1.6.2.2 Power factor
 - 6.1.6.3 Command from GIFT SCADA to breaker at
 - 6.1.6.3.1 Point of supply
 - 6.1.6.3.2 Open breaker
 - 6.1.6.3.3 Trip breaker
 - 6.1.6.4 Acknowledgement Signal for SCADA from unit holder/ transferee/ occupier system.
 - 6.1.6.4.1 System emergency distribution corrected
 - 6.1.6.4.2 Trip at the unit holder/ transferee/ occupier main breaker
- Developer/unit holder/ transferee/ occupier is responsible to replicate these signals at unit holder/ transferee/ occupier point of supply using BMS/SCADA system. Utilizing this signals for automatic operation and control of his system in integration with GIFT PCL system.
- 6.1.7 There will be summation CT installed inside HT Panel for metering of complete building.
 - 6.1.8 Once permanent power supply is released at HT Panel incoming; the panel will be sealed by GIFT PCL and developer has to keep that seals intact else the case will

be treated as power theft and shall be liable for punishment/penalty as per provision in relevant ACT.

6.2 Transformer

- 6.2.1 Loading & sizing of transformers shall be such that complete switch-over of load can be possible in single command from BMS/SCADA
- 6.2.2 Dry type transformer should be provided, if transformer is inside the building.
- 6.2.3 Power transformer of proper ratings and design must be selected satisfy the minimum acceptable efficiency at 50% and full load rating.
- 6.2.4 Developer has to submit GTP, GA & QAP of transformer to GIFT for approval before procurement. Transformer shall be designed and manufactured as per IEC 60076-1 and must be rated for Class F1 under fire behaviour.
- 6.2.5 Performance testing of transformer has to be carried out at OEM premises and one representative from GIFT PCL would be attending the performance inspection of transformer at OEM Plant. Developer has to give the notice of all such inspection min 10 days in advance. Inspection cost of GIFT PCL representative will be levied from Developer.
- 6.2.6 Transformer capacity shall be sized for maximum demand with 60% loading under normal running condition and up to full design loading, in case of transformer failure condition.
- 6.2.7 Overall arrangement shall be there to have complete changeover of load on healthy transformer under transformer failure condition.

6.2.8 Combination of sizes of transformer shall be selected so as to optimise the loading & maintain the optimum possible redundancy of system.

6.2.9 Dry type transformer shall be with on-load tap changing facility.

6.3 Switch-gears

6.3.1 Panels, transformers, cables, wires, cable trays etc manufactured by “SYSTEM HOUSE/SYSTEM PARTNER/CHANNEL PARTNER/CONSORTIUM/JOINT VENTURE” will not be acceptable by GIFT PCL.

6.3.2 All necessary arrangement should be made for remote operation, control and monitoring of switchgear provided at point of supply. Panel shall have minimum two incomers with one bus coupler with required number of transformer outgoings.

6.3.3 Minimum IP rating for any switchgear enclosure is as follows:

HT system: IP 4X	For Indoor switchgear
IP55	For outdoor switchgear
LT system: IP54	For indoor
IP42	For higher rating bus bar chamber
IP55	For outdoor

6.3.4 For calculation of short circuit rating of bus-bars, breakers, panel's etc. developer should take base MVA from GIFT PCL.

6.3.5 BMS/SCADA monitoring & control shall be possible up to DB level inside developer premises.

6.3.6 Complete electrical infrastructures will be sized for 120% of total building connected load to serve the future load growth if any.

6.3.7 Bus-bar sizing calculations of switchgears shall be submitted to GIFT PCL for validation.

6.4 LT Panel

6.4.1 All LT side incoming breaker shall be 4 pole type. In making sequence breaker neutral should make first and in breaking sequence breaker neutral should break last.

6.4.2 The entire LT breakers shall be microprocessor based and shall have provision of ON, OFF & Trip from Remote location. All switchgear above 63 A shall be four pole break type, All LT switchgear above 630 A shall be Air circuit breaker.

6.4.3 LT panel should have minimum clear of 1500 mm in front side and 750 mm in remaining three sides. In case of 2 side panel it should have 1500mm clearance on both front and rear side and 750 mm on other two sides.

6.5 Capacitor panel

6.5.1 APFC should be designed, to prevent leading PF in case phases are unbalanced.

6.5.2 APFC shall have inbuilt relay with minimum pick up current rating with provision of switching between banks so as to achieve long life of capacitor bank. APFC Panel Should be sized to maintain average monthly power factor in greater than 0.90 lag. Panel should have BMS provisions for data collection.

6.5.3 Capacitor bank shall have inbuilt relay for controlling capacitor bank switching, bank shall be preferably in multiple of 8 steps so as to maintain power factor correction based on different load conditions.

6.5.4 Kindly refer below example for KVAR consideration .

Supplying kW = 650 kW

$$\text{Original P.F} = \cos\theta_1 = 0.8$$

$$\text{Final P.F} = \cos\theta_2 = 1$$

$$\theta_1 = \cos^{-1}(0.8) = \mathbf{36.87};$$

$$\tan \theta_1 = \tan (36.87) = 0.75$$

$$\theta_2 = \cos^{-1}(1) = 0^\circ;$$

$$\tan \theta_2 = \tan (0^\circ) = 0$$

Required Capacitor kVAR to improve P.F from 0.8 to 1

$$\text{Required Capacitor kVAR} = P (\tan \theta_1 - \tan \theta_2)$$

$$= 650\text{kW} (0.75 - 0)$$

$$= \mathbf{487.5 \text{ kVAR}}$$

6.6 HT Cable

6.6.1 33 kV grade XLPE insulated PVC sheathed armoured Aluminium cable shall be 3 core earthed grade. The cable shall conform to IS 7098 and shall be FRLS cable

6.6.2 HT Cable shall be treated to be free from fire thought-out length with fire resistant paint added to this at all entry exits through out walls/structures etc fire proof sealing shall be done.

6.6.3 Cable tagging shall be provided in each and every branch, node and throughout length of cable tray so as to facilitate maintenance of cables

6.6.4 Minimum spacing between HT cables of same voltage level shall be equivalent to diameter of that cable.

6.6.5 Minimum spacing between HT & LT cables shall be 300mm.

6.6.6 There should be no straight joints in HT cable inside the building.

6.6.7 Standard sizing of HT cable are 3 Core, 185, 240 or 300 sqmm. HT cable should be of size higher than the maximum expected current consumption. Selected HT cable shall withstand 25KA fault level within the system for 1 sec.

6.7 LT cable

- 6.7.1 Minimum spacing in LT cable shall be '1d' where 'd' is diameter of cable.
- 6.7.2 LT cable shall be sized for 120% of connected load.
- 6.7.3 Additional 25% spare space provision for cables shall be provided during cable tray sizing at initial stage to accommodate last time additions in the design.
- 6.7.4 Cable supplying power to non-linear loads shall have whole neutral conductor viz. 4 Core LT cable shall be used considering
- 6.7.5 4 core stranded Aluminium/Coppered conductor XLPE insulated FRLS cables/wires to be used. 6sqmm and below only copper conductor cable/wire to be used. Standard sizes of conductors to be used are 10, 25, 70, 120, 240, 300 sqmm. All cable/wires shall be FRLS type.

6.8 Metering equipment

- 6.8.1 Metering class for HT side is 0.2S and for LT 0.5S. with minimum Burden of 10 VA
- 6.8.2 There shall be dedicated entry/exit for GIFT PCL from outside premises to reach to metering equipment with lock and key in custody of GIFT PCL
- 6.8.3 Developer may have separate entry/exit for housekeeping reading and supervision of the metering equipment
- 6.8.4 Any kind of damage or transposing with metering equipment shall be treated as power theft and the penalty/ levies will be laid on the consumer as per GERC/CERC and statutory acts.

- 6.8.5 All HT incoming and outgoing feeder should have 0.2S class CTs and SCADA & BMS communicable multifunction meter.
- 6.8.6 Main LT panel incoming and outgoing feeder should have 0.5S class CTs (if CT required) and SCADA & BMS communicable multifunction meter.
- 6.8.7 Common area of premises (Building/Block/Wing) shall be supplied from a common area LT panel through sub-distribution panel for common area load like lifts, water pumps, chilled water pumps, staircase pressurization, lobby lighting and power, staircases lighting etc (shall include all the load of building apart from tenant's load). This Common area LT panel shall have single GRID incoming through ATS switch. Incoming feeder of common area LT Panel shall have separate space for metering CT installation and sealing of that CT compartment.
- 6.8.8 For residential building, metering shall be done at Ground floor/first basement such that it is always accessible to the licensee or its representative.
- 6.8.9 For commercial building, if LT distribution is by LT Busduct, metering shall be at floorwise and if LT distribution is by LT cable, metering shall be at Ground floor/first basement.

6.9 LT sandwich Bus-duct

6.9.1 Bus Enclosure

- 6.9.1.1 Bus bar cross over shall be avoided and shall be suitably coordinated with transformer manufacturer and panel manufacturer by the contractor.

- 6.9.1.2 Silica gel Breather and space heater shall be provided as required.
- 6.9.1.3 The entire bus duct shall be designed for indoor/outdoor installation, with a dust and vermin-proof construction. Bus duct installations meant for outdoor application shall be of weather proof construction and shall have degree of protection better than or equal to IP-55. Outdoor portion of bus duct shall be provided with rain hood or IP-68.
- 6.9.1.4 Proper earthing should be provided on bus duct.

6.9.2 Bus Conductor

- 6.9.2.1 Sizing should be done as per 120% loading of conductor.
- 6.9.2.2 The temperature rise of conductor shall be as per IS: 8084. Also the temperature of the bus shall not exceed 250°C while carrying the specified short circuit current for one second when a fault occurs at the operating temperature.
- 6.9.2.3 The bus conductor shall be given a coat of matt black paint to facilitate heat dissipation. The bare conductor with above painting shall be designed to carry the 120% normal rated current without exceeding temperature rise as specified in IS:8084.
- 6.9.2.4 All the joints shall be tested for temperature rise to prove the adequacy of the design. The maximum temperature rise at the joints shall be less than the specified temperature rise for the bus bars.
- 6.9.2.5 Proper insulation should be provided for phase barriers such as non-hygroscopic insulating material i.e. fibre glass.

6.9.3 Wall Frame Assembly and Seal – off Bushing

- 6.9.3.1 Wherever the bus duct passes through the plant building wall, from indoors to outdoors, a wall frame assembly with seal-off bushings shall be provided to prevent any leakage of rain water, infiltration of dust and air temperature variations from indoors to outdoors. The wall frame shall be fabricated out of aluminium angles and sheet and shall be suitable for grouting in the wall. It shall be provided with flanges on both sides to receive the bus duct flanges. A suitable size breather shall be provided for the two sections of the bus-duct between the wall frame assembly.
- 6.9.3.2 The bus duct shall be equipped wherever necessary with seal-off bushings to prevent interchange of air at different temperatures. The seal-off bushings shall be flanged type. The insulator for wall frame assembly and seal-off bushings shall be of porcelain. Also the bushings shall be designed for thermal expansion/contraction due to temperature differential for outdoor/indoor use.
- 6.9.3.3 Fire barrier shall be provided between two floors in bus duct shaft.

6.10 UPS

- 6.10.1 The UPS system shall be true on line static type and the components of UPS shall isolate power line transients, frequency and voltage variations.
- 6.10.2 The UPS shall provide no-break power supply to the critical loads under normal conditions, during outages

in the input power and during failure / mal-operation of the main components of the UPS by switching the alternate supply.

6.10.3 For power distribution through UPS, there will requirement of battery room with sufficient ventilation, UPS system, UPS LT Panel, UPS rising main, main boards/ DBs wiring etc. Necessary space provisions in layout shall be made.

6.10.4 UPS shall comprise a solid state rectifier/ battery charger, battery VRLA/maintenance free, a solid state inverter, static switches and stand-by regulated AC supply as per approved Data sheet.

6.10.5 The three phase AC mains input is fed to the controlled rectifier (full wave bridge) via a matching 2 winding Delta-star connected Isolation transformer.

6.10.6 The downstream inverter converts the DC into a regulated AC. In the event of power sag or failure, the battery which is connected to the DC link circuit, is called up automatically, without any interruption, to supply to critical loads. On mains recovery, the rectifier resumes its function of supplying the inverter and charging the battery.

6.10.7 When a fault develops in the inverter or an overload occurs, the static switch automatically transfers the critical load to the stand-by AC supply, until manually reset.

6.10.8 Unit holder/ transferee/ occupier and Developer should select their UPS with minimum 1 hour battery backup.

Developers shall consider following guidelines in designing electrical infrastructure for quality & uninterrupted supply, backup power arrangement, best energy management and safety of equipment and human being.

7 Earthing design validation & installation guidelines with checks.

- 7.1** Preferably earthing mat with copper rods shall be provided for reducing the space requirements of no of earth pits
- 7.2** Soil Resistivity testing as per relevant standards has to be carried out to find the earthing resistance of soil based on the said test the earthing calculations shall be done.
- 7.3** There shall be separate earth pits for following. Type of earthings and separate layouts shall be prepared and submitted for review
- 7.4** Earthing Layout for Lightning Arrestor
- 7.5** Earthing Layout for Transformer Neutral & NER
- 7.6** Earthing Layout for UPS
- 7.7** General earthing layout with details for Electrical Panel Body, transformer body, motor body etc, LV Wiring, lighting & Power Circuits, BMS/PLC/SCADA etc ELV systems, Building Structure & cable trays.
- 7.8** Standard should be followed for earthing IS 3043, IEEE80, IEEE142 (Green Book).
- 7.9** Utmost priority shall be given for maintenance of earthing pits and design shall accommodate provision for future repairs of earthing pits.
- 7.10** Location of earthing pits shall be provided such that the maintenance of earthing shall be easily attended.

8 Surge & Lightning protection

The standard to be followed for surge arrester is IS: 15086 and IEC 62305 relevant latest NBC code.

8.1 Insulation co-ordination

8.1.1 Developer to submit detailed insulation co-ordination philosophy for HT & LT distribution network inside building.

8.1.2 Insulation co-ordination must consider local environment conditions and method of neutral earthing.

8.2 Surge arrester

8.2.1 Surge arrester shall be provided in incoming HT panel to bypass lightning surge or lightning impulse arriving in grid.

8.2.2 There shall be dedicated earthing

8.3 Lightning Protection

8.3.1 Direct lightning stroke protection calculations needs to be submitted for building premises and should cover at least 30% nearby exterior area.

8.3.2 There shall be overlapping on area protected by single lightning arrester. Each lightning arrester shall have at least 40 % overlapping for overall building premises.

8.3.3 Separate lightning counter for each lightning arrester shall be provided. There shall not be any breakages or joints in the lightning conductor carrying lightning strokes to ground.

8.3.4 There shall be adequate numbers of Down conductors for each conventional lightning arrester

as per NBC. Each down conductor shall be connected to dedicated earth pits as per NBC.

8.3.5 Earthing pits for lightning protection shall be connected in dedicated earthing grid/mat for lightning.

8.3.6 Building above 60 meter height should be protected against side splashing.

8.3.7 If the Lightning protection system (LPS) is of structural type, then the following material rods shall be considered for down conductors.

- a. Stainless steel
- b. Copper
- c. Copper bounded Steel. (Min copper coating of minimum 250 micron)

9 Installation of Cable

9.1 Cable Installation

9.1.1 Cable installations shall be in accordance with IS 1255 amended up to date. Cable shall be laid in ground, trenches, and cable trays and on walls as specified. Installation shall include all supports and clamps as required.

9.1.2 Sufficient space should be provided to maintain bending radius of Cable (15D for HT & 12D for LT N/W) 20% above the standard bending radii specified. All HT cable shall have 1-meter clearance from any building structure.

9.1.3 Buried cable up to 650/1 100 V shall have a minimum cover of 500 mm measured to the top of the highest cable.

9.1.4 Cables Laid in Underground Ducts shall be laid at a minimum depth of 500 mm, ducts shall be surrounded by at least 75 mm of sieved sand except at road crossings where it shall be 1m deep and encased on all sides by 150mm of concrete.

9.1.5 Conduit shall be galvanised heavy gauge solid drawn or welded screwed steel type and be in accordance with IS 9537 Part 2 or BS 4568.

9.1.6 Cable Installed in Cable Trunkings shall ensure that the size of the trunking is adequate for the number of cables to be installed together with 50% spare capacity and shall in any case be 50mm x 50mm minimum size.

9.1.7 All cable tray used shall be processed for hot dipped galvanizing/ powder coating. The sizing of the cable rack system shall provide a minimum of 25% spare capacity.

9.1.8 Cable trays of ladder and perforated types and the associated accessories such as coupler plates, tees, elbows etc., shall be fabricated from 14 gauge (2.0 mm thick) mild steel sheets. Cable tray covers shall be fabricated from 16 gauge perforated (1.60 mm thick) M.S. sheets.

10 Emergency and backup power requirement & segregation from total load.

10.1 Emergency Load

10.1.1 “Critical Load”

10.1.1.1 Lift Load (min. 50 % of lift)

10.1.1.2 Life safety panels

10.1.1.3 Unit holder/ transferee/ occupiers UPS system

10.1.1.4 Staircase pressurization panel

10.1.1.5 Emergency evacuation system

10.1.1.6 Ventilation panel

10.1.2 “Emergency Load”

10.1.2.1 Service lift

10.1.2.2 Life safety panels

10.1.2.3 Staircase pressurization panel

10.1.2.4 Emergency evacuation system

10.1.2.5 Unit holder/ transferee/ occupier should select their emergency system with 1 Hr battery backup.

10.1.3 Critical Load shall be restricted to 20 % of overall building load. GIFT PCL will provide the backup power to critical and emergency load from backup power source through same distribution infrastructure on chargeable basis

10.1.4 During any Emergency/ Fire/mishap condition, normal load should be isolated from any power source by remote operation, and only critical load should be charge.

10.1.5 If complete electrical system goes off in case any of Fire/mishap condition, backup/emergency power for fire and life safety system will be provided to developer as per the GIFT PCL backup power policy.

10.2 Changeover arrangement

10.2.1 Developer shall provide manual and remote changeover arrangement in case of transformer failure/grid failure/emergency/fire condition which should be discussed with GIFT PCL before implementation.

- 10.2.2** In case of Bus duct failure, the LT panel changeover should occur in a step-by-step manner and shall switch floor-wise in ascending or descending order, considering continues loading of supplying transformer.
- 10.2.3** Transformer failure, Emergency condition and Backup power switching plan should be prepared in coordination with GIFT PCL schemes.
- 10.2.4** Common area main LT panel and fire pump panel should have provision of two numbers of the incomer with automatic transfer switch. Further to that, common area main LT panel shall have provision for Second incomer for backup power with electrical and mechanical interlock between two incomers.
- 10.2.5** In case of GRID failure, backup power will be switchover in 1 minutes
- 10.2.6** Developer should manage load according to backup power requirement.
- 10.2.7** Developer should have a provision of load management/ load segregation from HT side by remote operation, to avoid over loading under the grid failure/ emergency conditions.
- 10.2.8** The system should be design on basis of typical SLD provided, unit holder/ transferee/ occupier/ floor occupant/ tenant shall be supplied from main LT panel and all common area load shall be supplied from a single common area panel.

- 10.2.9** Under the GRID failure condition, only critical load should be connected to backup power, non-critical & APFC load shall be switched off.
- 10.2.10** Sudden backup load should not be applied on backup GRID, it should increase gradually. Maximum sudden load should not exceed 10% of load demand.
- 10.2.11** Developer should have provision of gradual load application of critical load.
- 10.2.12** In case if any tenant wants backup power from LT DG set for fast changeover in case of grid failure, GIFT PCL will explore the requirement and criticality. Facility will be provided as per backup power network development policy of GIFT PCL.
- 10.2.13** At present, the capital cost for Backup Power arrangement is Rs. 16,050/- (Rupees Sixteen Thousand and fifty only) per kVA in DTA area and Rs. 13,600/- (Rupees Thirteen Thousand and six hundred only) per kVA in SEZ area. This cost may vary from time to time. The capital cost for Backup Power arrangement is non-refundable.
- 10.2.14** The expected life of LT DG set is approx. 15 years. The developer/consumer has to bear the capital cost of replacement of DG set.
- 10.2.15** At present, the O&M cost of DG set is Rs. 88/- (Rupees eighty eight only) per kVA per month in both DTA and SEZ Area. This cost may vary from time to time. This cost is exclusive of fuel consumption and energy consumption cost.

10.3 Redundancy of N+2 power supply for Life safety panels.

10.3.1 All Life safety panels (Service LIFT, Fire Fighting, staircase pressurization. terrace pressurisation, ventilation, smoke extract system, exhaust fan, basement jet fans, emergency lighting, etc) shall have power supply from two incomer power supply source with automatic changeover.

10.3.2 Facility for connection from substation to adjoining building to feed essential emergency load in that building, such as escape route lighting, fuel or sprinkler pumps, emergency communication systems shall be provided. Similarly, the essential emergency load switchboard of this building or building complex should be so as to be capable of receiving power for such loads from the adjoining building or building complex, when its own substation/DG sets shut off due to crisis conditions such as fire.

11 Harmonics protection design validation & installation guidelines with checks.

11.1 Standard

11.1.1 Developer must keep harmonic currents below the limits specified in the “IEEE Standard 519–1992: Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems” Users having loads with high harmonic content and fluctuations shall install appropriate correction equipment.

11.2 Harmonics Mitigation Technique

11.2.1 Harmonic shall be mitigated at harmonics creation source. As per any system requirements Variable Frequency Drives, SOFT starters, Power Electronic devices are required then harmonics mitigation shall be an in built feature.

11.2.2 Cable bus-duct etc supplying power to non linear loads shall have 4 Core viz. complete neutral conductor of same size as that of phase conductor and the earthing for such circuit shall not be connected separately preferably with UPS earthing.

11.3 Harmonic Measurement

11.3.1 GIFT PCL will measure harmonics at any point in the system hence developer to take the necessary precautions of standards to be followed

11.4 Harmonic Filters

11.4.1 Harmonics filtration shall be done inside equipments at conversion stage; if such technology is not possible then harmonic filters shall be used in supply as well as load end so as to completely filter the harmonics from system.

12 ENERGY CONSERVATION

Following are the major aspects to be considered for selection of equipment from energy conservation point of view guidelines to be followed from ECBC 2012 or recent standard

12.1 Power Distribution systems

12.1.1 Voltage Drop value shall be maintained as below

12.1.1.1 0.5% from transformer to main LT panel,

12.1.1.2 1% from Main LT panel to Main distribution board,

12.1.1.3 1.5% from Main Distribution Board to sub distribution board/Unit holder/ transferee/ occupier isolator.

12.1.2 Transformer losses should be within the limitation specified by ECBC.

12.2 Lighting Design

Lighting design to be done in such a way that it achieves the required visual comfort at working plane and is energy efficient. Developer should get approval of building Façade lighting for the ambiance, from GIFTCL planning team for day and night condition.

12.3 Lighting Management and Energy efficiency

Energy efficient lighting fixture should be used while designing lighting.

13 Metering arrangement as per guideline of CEA and GERC for HT and LT consumers.

13.1 Meter

13.1.1 GIFTCL shall provide energy meter for all type of connection.

13.1.2 Meter standards shall be as per guideline of CEA and GERC.

13.1.3 Metering equipment shall be sized based on contract demand.

13.2 Sealing

13.2.1 Metering arrangement shall be duly sealed by authorised GIFTCL representative to make it pilfer proof.

13.2.2 GIFT PCL shall carry out sealing of meters and its accessories in presence of authorised representative of developer/consumer, and take signature of representative on checking sheet/sealing Performa.

13.2.3 Developer/Consumer shall ensure safety and condition of metering equipment and seals.

13.3 Power theft

13.3.1 Any case of pilferage of energy or misuse of energy shall be dealt as per provisions of EA-2003 and GERC notification.

14 Fire safety guidelines compliance.

14.1 Separate circuits for the firefighting pumps, lifts, staircase, corridor lighting and blowers for pressurizing system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Master switches controlling essential service circuits shall be clearly labelled.

14.2 The electric distribution cable/wiring shall be laid in a separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.

14.3 The substation shall have separate fire resisting walls/surroundings and shall necessarily be located at the periphery of the floor having separate access preferably from the escape staircase. The outside walls, ceiling and floor including doors and windows to the substation area shall be of 2H fire rating.

14.4 A substation or switch-station with oil filled equipment must not be located in the building.

14.5 Each life safety panel should have two incomers.

14.6 A substation area shall not be used as storage/dump areas.

15 Design Validation of Electrical Infrastructure

Based on validated electrical load and all above guidelines Developer shall prepare Electrical infrastructure design. Submit design documents as under to GIFT PCL for validation.

15.1 SLD & electrical infrastructure

15.1.1 SLD should be prepared at the beginning after considering of short circuit MVA from GIFT PCL.

15.1.2 System should have provision for critical load separation from remote operation of HT panel.

15.1.3 System should be design in such a way that, there should 2 normal buses and one critical bus for one set of LT consumers.

15.1.4 SIMULATION editable model along with SIMULATION generated reports of following analysis shall be submitted to GIFT PCL for approval.

15.1.5 All lift panel and life safety panel should have provision of 2 incomers. Fire lift shall be supplied from critical load panel.

**Table 2: List of submission from developer in
SIMULATION Model**

Sr No.	Particular	Submission for Review report & model
---------------	-------------------	---

1	Network Analysis	Short Circuit Analysis Load Flow Analysis Motor Acceleration Analysis Transient stability analysis
2	Arc Flash Analysis	AC Arc Flash Analysis for all HT, LT & ELV APFC etc Panel DC Arc Flash Analysis for UPS, Battery & battery charger panels
3	Protection devices	Relay co-ordination & selection analysis Relay sequence of operation
4	Cable Sizing	HT & LT Cable ampacity & Sizing
5	Distribution system Power Quality	Harmonic load flow analysis Optimal Capacitor placement Single-phase power distribution
6	Transformer	MVA sizing of transformer
7	Earthing	Earthing conductor sizing Electric shock protection

16 Validation of equipment rating, sizing and quality assurance plan:

16.1 GIFTCL will validate all equipments rating and drawings based on standards defined in above all clauses.

16.2 Developer shall submit soft as well as hard copy of each submission along with “Letter of Transmittal” in set of three copies signed and stamped by signing authority of developer; GIFTCL will review and issue comments based on the submitted documents along with “Letter of

Approval” which shall have codes indicating the status of approval.

16.3 Developer shall process for compliance of GIFTCL’s comments and resubmit the revised submission for approval with “Letter of Transmittal” as described in above point till receipt of final approval from GIFTCL

16.4 Based on final “Letter of Approval” received from GIFTCL for each infrastructure, developer shall submit the final co-ordinated drawing containing all infrastructure of building in along with walk through model of premises. Developer have to submit details of authorized person for breaker operation in building. Developer shall maintain line clearance book for sae operation.

Minimum space allocation for Electrical Equipment

After validation of Electrical infrastructure network by GIFTCL, Developer shall allocate space based on following guidelines.

17 Space allocation for electrical Utility

17.1 Developer shall place location of electric substation considering following criterion:

17.1.1 The substation location in Commercial, Social and Mixed Usage buildings shall be located preferably on the ground level or on first basement and shall have direct access from the outside of the building for operation and maintenance of the equipment.

17.1.2 All door openings from substation, electrical rooms, etc., should open outwards. Vertical shutters (like fire rated rolling shutters) may also be acceptable provided they are combined with a single leaf door opening outwards for exit in case of emergency. For

large substation room/electrical room having multiple equipment, two or more doors shall be provided which shall be remotely located from each other.

17.1.3 The floor level of the substation shall be at the highest point of the basement. (NBC-2016, clause 4.2.1, point 13, Pg no 20).

17.1.4 The transformer shall be a dry type installation with GIS breakers as HT switch gears and ACB or MCCB as medium voltage (MV) switchgear.

17.1.5 No services or ventilation shafts shall open into substation or switch room unless specific to substation or switch room.

17.1.6 In order to prevent storm water entering the transformer and switch rooms through the soak-pits, the floor level of the substation/ switch room shall be at least 300 mm above the highest flood water level that may be anticipated in the locality. Also, facility shall be provided for automatic removal of water. (NBC-2016, clause 4.2.1, point 5, Pg no 19).

17.1.7 Substation shall not be located immediately above or below plumbing water tanks or sewage treatment plant (STP) water tanks at the same location. (NBC-2016, clause 4.2.1, point 6, Pg no 19).

17.1.8 In case of cable trench in substation/HV switch room/MV switch room, the same shall be adequately drained to ensure no water is stagnated at any time with live cables. (NBC-2016, clause 4.2.1, point 28, Pg no 22).

17.1.9 Sufficient numbers of the de-watering pumps shall be provided at the probable flooding areas in a building so as to immediately drain the water into the drainage tank, thus avoiding the related equipment from water flooding.

17.1.10 There shall be vehicle movement access by main road up to substation room for any type of vehicle, for O&M purpose and shifting of equipment or material, at any time of the day.

17.1.11 Sufficient additional space shall be allowed in Substations and switch rooms to allow operation and maintenance and proper means shall be provided for isolating the equipment to allow access for servicing, testing and maintenance. Sufficient additional space shall be allowed for temporary location and installation of standard servicing and testing equipment. Space should also be allowed to provide for anticipated future extensions.

17.1.12 Substation shall be placed keeping shortest connectivity path with utility tunnel.

17.1.13 Electrical utilities like transformer, HT Panel, LT Panels & APFC Panels etc shall have clear entry and exits from outside of premises for personal as well as for equipments. There shall be clear space for removal, loading, unloading & Transformers and other equipments.

17.2 Electrical Substation Location & Space provision for the Data Centers in the buildings:

- 17.2.1** Developers shall assess the demand of users in the building, specially for requirement of Data center in any building.
- 17.2.2** In case of any consideration of data centers in the commercial buildings and Multi Uses Building, the details of the data centers shall be furnished to the Development authority.
- 17.2.3** Space provision for separate power distribution network shall be planned which need to be in complete isolation to the building electrical distribution network. Thus, additional space provision for all the electrical equipment installations shall be considered as per the details furnished for the data center.
- 17.2.4** All the related equipment shall be installed preferably at the ground/1st basement floor in accordance with the latest National Building Code.

17.3 Electrical Substation Location in Residential Buildings:

- 17.3.1** Residential building will be supplied from nearby centralized substation of GIFT PCL. Typical power distribution scheme for residential building is attached in annexure-C. Power for units of residential building will be provided at LT 0.415 kV level whereas common area power will be supplied either of following way:
 - a. Common area load below 400 kVA will be supplied at LT level (subjected to approval of Gujarat electricity regulator commission, applied by GIFT PCL)

- b. Common area load above 400 kVA will be supplied at HT level (33 kV Voltage)
- c. developer have to pay service connection charges for all LT & HT power connections.

17.3.2 All the LT switching panels shall be preferable placed at ground/1st basement level and shall have direct access from the outside of the building for operation and maintenance of the equipment. The Metering panels shall be at the periphery of the building premise with direct access from the road/outside.

17.3.3 In case of residential projects having HT supply and related HT equipment, substation location shall be the same as stated for the Commercial, Social and Mixed Usage buildings as mentioned above. (as per the clause 17.1)

17.4 Transformer.

No oil type transformer shall be allowed inside the building. Where electric substation has to be located within the main multi-storeyed building itself for unavoidable reasons, it shall be a dry-type installation, with very little combustible materials, such as dry type transformer with preferably GIS breakers as HT switch gears and ACB or MCCB as medium voltage (MV) switchgear. Such substation shall be located on the ground level or on the first basement with following necessary conditions:

- a. The transformer room shall have fire walls of RCC on all sides, isolated from building walls.
- b. Minimum 3 Meters clearance shall be maintained on all sides of the transformers.

The transformer installation drawings as per layout are at Annexure-A.

- c. HT cables inside the building shall be laid at a distance of one meter from columns and beams of the building.
- d. Only dry type transformers shall be installed inside the building.

The recommended transformer room layout drawing with minimum clearances is placed at Annexure-A.

17.5 Minimum Clearances for electrical equipment

17.5.1 Equipment

Table 3: Minimum clearances required for electrical infrastructure

Sr. No.	Description	Minimum Clearances
1	Vertical from Electrical Equipment to ceiling/beam bottom/HVAC duct	1500 mm
2	Front of operating side of High Voltage Switchgear	2500 mm
3	Front / Open able/ Accessible/ operating sides of low voltage distribution board / Panel should have minimum clearance from door opening space. This clear space should not be below the minimum requirement mentioned.	2000 mm
4	In case of two rows of switchgear, one HT and other LT- front to front clearance	2500 mm
5	If there are any attachments or bare connections on back/rare side of panel, clearances should be not less than	1000mm

- 17.5.1.1 Addition to above due consideration should be given for opening of panel doors, removal of switch gear accessories etc. In such cases necessary additional space shall be considered.

17.5.2 Entry/Exit/Access Doors

- 17.5.2.1 All switchgear room doors shall be of opening outside type. All doors of switchgear room shall be fire proof 2hr rated.
- 17.5.2.2 Sliding and Rolling Shutters shall be only for equipment movement and for personnel movement in switch gear room, doors shall be provided.
- 17.5.2.3 Sliding and Rolling Shutters should have height clearance of 3500mm or maximum height of equipment + 1000mm which will be greater.
- 17.5.2.4 All exit spaces shall have 1800mm height clear spaces; there should not be any obstructions or projection of any external component within the clear space.

17.5.3 Cut-outs

- 17.5.3.1 Cut-out for Electrical equipments, ducts should be designed considering appropriate clearances for installing and accessing components from maintenance. Cut out sizes anywhere should not be less than 300mm.
- 17.5.3.2 All cut out and opening should be sealed with fire rated material.

17.5.4 Metering arrangement

- 17.5.4.1 Developer shall keep adequate space provision for installing metering arrangement in accordance with no of consumer and type of consumer in building.

17.5.4.2 Developer shall keep space for metering arrangement for each consumer as per below table:

Table 4 : Space requirement for Metering

Type of consumer	Space required for metering
HT consumer (Independent) CTPT Metering	Metering in Utility tunnel so no space required
HT consumer (LT metering) CTPT Metering	Separate summation metering panel of adequate size shall be provided by the developer in the electrical room.
LT consumer (LT metering) CTPT Metering	Space in LT panel for installing CT and potential contact from same bus. The minimum dimension of the metering cubicle in the LT panel shall be 400mm (H)x450mm(W)x450mm(D). For metering to be done outside LT panel, minimum space provision for installing metering equipments shall be 600mm(H)x400mm(W) for 3 phase meter and 450mm(H)x250(W) for 1 phase meter. Minimum space between two-meter boxes shall be 50 mm.

	Space provision for incoming and outgoing cables and cut-out installed by the consumer shall be provided
--	--

18 Sequence for Design/ Document Submission/ Approval process:

18.1 Load Calculation

18.2 SLD preparation considering higher motor load

18.3 Equipment sizing

18.4 Simulation report as per clause 15, table:2

18.5 Electrical equipment layout in Architectural Layout & elevation

18.6 SLD finalization as per actual motor load

18.7 CEIG drawing approval

18.8 Equipment GA, GTP and QAP approval

18.9 Installation of equipment

18.10 Testing of equipment as per field quality plan

18.11 As built drawings

18.12 Operation manuals

19 Electrical plan approval from CEIG. Initial inspection by CEIG inspector and approval for charging the plant. Regular annual inspection of plant by CEIG

19.1 Developer has to do liaison for approval Drawings of substation and distribution network inside building. Developer have to take drawing approval for distribution network from CEIG, Installation work shall commence only after approval of drawing from CEIG office.

19.2 After work completion approval for charging of network is required from CEIG office.

19.3 Developer shall be responsible for inside the building network and GIFTCL shall be responsible for outside the building distribution network approval from CEIG.

19.4 In case of building height more than 15 meters, permission of electrical installation in high rise building is required from CEIG office.

20 Equipment installation, testing and commissioning guidelines.

20.1 Installation

20.1.1 Field quality plans, method statement, installation checklist and installation manual if any shall be submitted to GIFTCL for approval

20.1.2 During Installation there shall be supervision from the supplier/manufacturer of equipment

20.1.3 Installation checklist for equipment shall be signed and documented in presence of supplier/manufacturer

20.1.4 Material installation report shall be generated along with remarks/observations if any and shall be treated as a part of O& M manual document.

20.2 Testing

20.2.1 Post installation tests as per approved QAP & Field quality plan shall be carried out by developer in presence of supplier/manufacturer of equipment.

20.2.2 Proper combined report of test carried out and test certificates shall be prepared and submitted along with as built drawing.

20.3 Commissioning

20.3.1 Commissioning test report shall be submitted to GIFTCL for review.

20.3.2 Partial commissioning of any system will be treated as pre-commissioning and again whole commissioning process shall be followed for complete system commissioning.

20.4 Operation & maintenance

20.4.1 List of mandatory spares

20.4.1.1 List of mandatory spares such as HT fuse, MCB, termination kits, etc shall be added in the tender specification and requirements.

20.4.1.2 The relevant standards and best industry practises shall be followed for provision of mandatory spares.

20.4.1.3 In case of consumable products such as lubrication oil, filters etc quantity shall be kept in spare for minimum one top up/replacement.

20.4.2 Tools & tackles

20.4.2.1 Developer shall provide minimum one set of each necessary tool at every electrical room for hassle free O&M of installation.

20.4.2.2 Required tools such as insulation tester, tong tester, multi-meter, thermal imager, etc. Shall be provided.

20.4.2.3 Storage Space shall be provided within the electrical room for spares and accessories.

20.4.3 Manuals

20.4.3.1 One set of combined documents containing shall be handed over to O &M Staff

- i. As built Drawing of all equipments
- ii. As built SLD
- iii. As built Layout drawing
- iv. Set of installation manual

- v. Set of operation manual
- vi. Set of troubleshooting manuals
- vii. Summary of Past historical data recorded during snag & de-snag

20.4.4 O& M Formats

- 20.4.4.1 Recommend maintenance checks shall be provided with clear demarcation of frequency of preventive maintenance classified as hourly, daily, weekly, monthly, quarterly, annually & SOS (as and when required).
- 20.4.4.2 Maintenance report shall be prepared in through details so as to avoid any breakdown of infrastructure.

21 ACCESS TO CONSUMER'S PREMISES

21.1 The GIFT PCL (Distribution Licensee) or any person duly authorised by GIFT PCL (Distribution Licensee) may, at any reasonable time, and on informing the occupier of his intention, enter any premises to which electricity is, or has been, supplied by him, or any premises or land, under, over, along, across, in or upon which the electric supply-lines or other works have been lawfully placed by him for the purpose of –

21.1.1 Inspecting, testing, repairing or altering the electric supply lines, meters, fittings, works and apparatus for the supply of electricity belonging to the GIFT PCL (Distribution Licensee); or

21.1.2 Ascertaining the amount of electricity supplied or the electrical quantity contained in the supply; or

21.1.3 Removing where a supply of electricity is no longer required, or where the GIFT PCL (Distribution Licensee) is authorised to take away and cut off such supply, any electric supply-lines, meters, fittings, works or apparatus belonging to the licensee.

21.2 A GIFT PCL (Distribution Licensee) or any person authorised as aforesaid may also, in pursuance of a special order in this behalf made by an Executive Magistrate and after giving not less than twenty-four hours notice in writing to the occupier,

21.2.1 Enter any premises or land referred to in sub-section (1) for any of the purposes mentioned therein;

21.2.2 Enter any premises to which electricity is to be supplied by him, for the purpose of examining and testing the electric wires, fittings, works and apparatus for the use of electricity belonging to the consumer.

21.3 Where a Consumer refuses to allow the GIFT PCL (Distribution Licensee) or any person authorised as aforesaid to enter his Premises or land in pursuance of the provisions of Clause 1 or 2, when such GIFT PCL (Distribution Licensee) or any person has so entered, refuses to allow him to perform any act which he is authorised by those clauses to perform, or fails to give reasonable facilities for such entry or performance, the GIFT PCL (Distribution Licensee) may, after the expiry of twenty-four hours from the service of a notice in writing on the Consumer, cut off the Supply to the Consumer for so long as such refusal or failure continues, but for no longer.

- 21.4** Developers shall permit GIFT PCL to lay cable network or bus duct and metering arrangement on mutually agreed path and place as per prudent practices of power distribution for distributing power in the same building or any other building in nearby area.

22 PROCEDURE FOR POWER APPLICATION

22.1 SUBMISSION OF APPLICATION

The GIFT PCL shall be contacted for following application:

- To obtain a new connection for Low voltage or High voltage power supply.
- To have additional load / shifting of service line / extension of service.
- An alteration of power supply
- Change of registered name for Low Tension or High Tension power Consumer.

- 22.2** Along with an application complete set of document shall be provided as per IE rule 11 and 13. As per requirement of GIFT PCL complete set of document in hard copy

22.2.1 DOCUMENT TO BE SUBMITTED WITH APPLICATION

- Premises ownership documents from GIFT UDA.
- For a partnership firm copy of partnership deed
- Duly notarised registered Power of attorney for authorising to dealing with GIFT PCL for electricity connection.
- For firm's registered under Company's Act memorandum of article along with details of directors on Rs 100/- stamp with residential address.
- Copy of Resolution for authorisation to deal with GIFT PCL for electric connection
- NOC of GPCB

- Photo identity proof
- Age proof

22.3 Along with application developer shall furnish

22.3.1 Demand Load with estimation

22.3.2 Critical load in case of main Grid failure

22.3.3 Metering philosophy

22.3.4 Concept & key single line diagram showing metering point

23 O&M Plan

23.1 Operation, maintenance and condition monitoring of equipments and all electrical infrastructure is completely developer's responsibility.

23.2 Its developer's prime responsibility to appoint the operation & maintenance team during handover stage/completion stage of project to avoid any possible hindrances to the tenants of the building.

23.3 Developer to submit the operational philosophy of building electrical infrastructure covering the normal operational sequence, scheme to cater transformer/HT cable/LT bus-duct failures, changeover scheme for emergency power supply, preventive maintenance, breakdown maintenance, outages planning, condition monitoring, Standard operating procedures of (SOP) O & M etc.

23.4 As built drawings of HT & LT panels, Transformers, APFC panels, LT DB's etc.

24 Housekeeping of network, plant and assets of GIFT PCL

24.1 GIFT PCL shall be responsible for housekeeping of Substation, switching station, switching panel rooms and any other electrical assets outside building area.

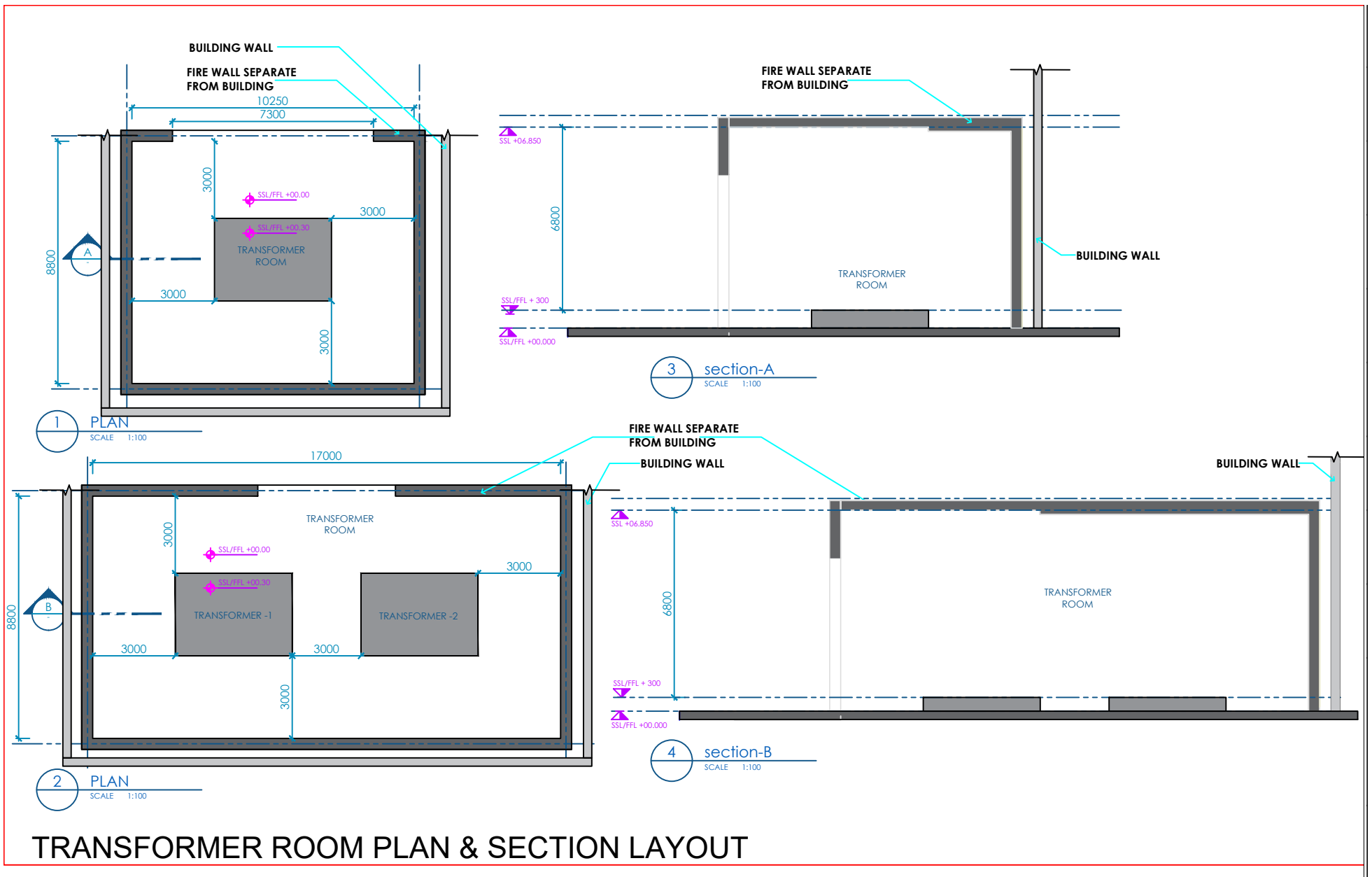
24.2 Developers shall be responsible for housekeeping of electrical rooms in side building including floor level distribution room and cable duct or sand-witch bus duct area under authorised supervision.

25 Charges for Power Connection:

Power connection charges are subject to change from time to time by the Distribution Licensee as per tariff order after approval of Gujarat Electricity Regulatory Commission.

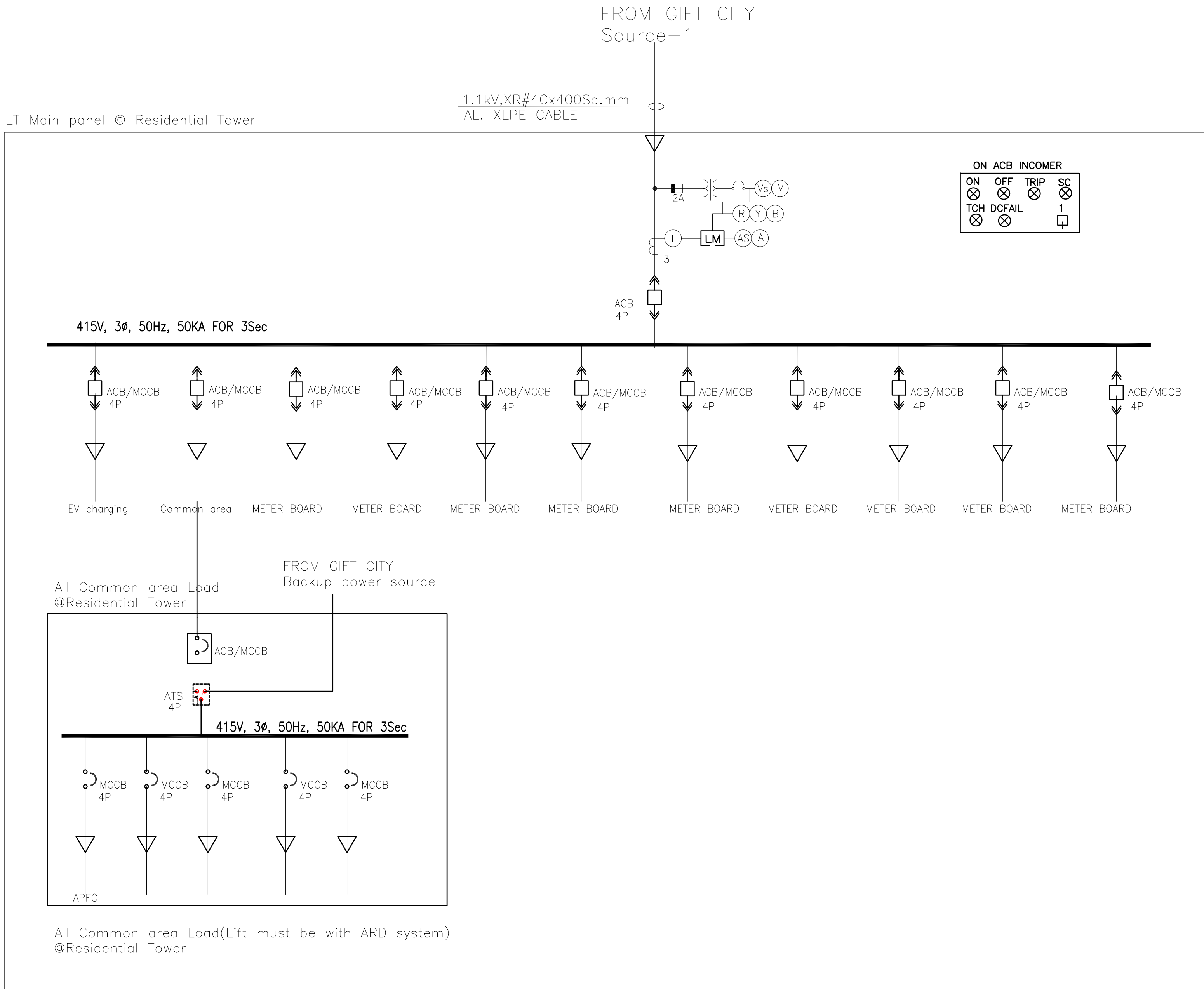
Power connection charges and tariff order can be download from GIFT website <http://power.giftgujarat.in> .

ANNEXURE-A
TRANSFORMER SPACE PLAN

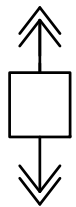


ANNEXURE-B
TYPICAL ELECTRICAL SLD FOR COMMERCIAL
BUILDINGS

ANNEXURE-C
TYPICAL ELECTRICAL SLD FOR RESIDENTIAL
BUILDINGS



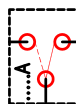
legend



Air Circuit breaker



Molded Case Circuit Breaker



Automatic transfer switch panel

Note:
1. All dimensions are in Meter.
2. Only written dimensions and UTM coordinate reference provided to be followed.
3. Any discrepancy to be brought to the notice of Infrastructure Planning Department before implementation.

Drawn By:
D.M

Date
13/10/2021

Checked By:
P.D

Date
13/10/2021

Approved By:
A.R

Date
13/10/2021



Gujarat International Finance Tec-City Company Ltd.

Zonal Facility Centre, Block - 12, Road 1-D, Zone-1, GIFT SEZ, Gandhinagar - 382355, Gujarat, India

Recommended By: MD & Group CEO

Date 13/10/2021

Issued for

TENDER

Drawing Title:-
Residential SLD
Drawing Subtitle:-
Residential SLD

Drawing Number:-

Scale:-

0 10 20m.

Date:-

13/10/2021

Revision

00

ANNEXURE-D
METERING SCOPE

Annexure D:

Schematic diagram for the metering arrangement, Scope of works for various Buildings in GIFT City.

1. Residential Buildings:

1.1. Case 1:

Power network up to incoming cable of the main LT panel of the premises.

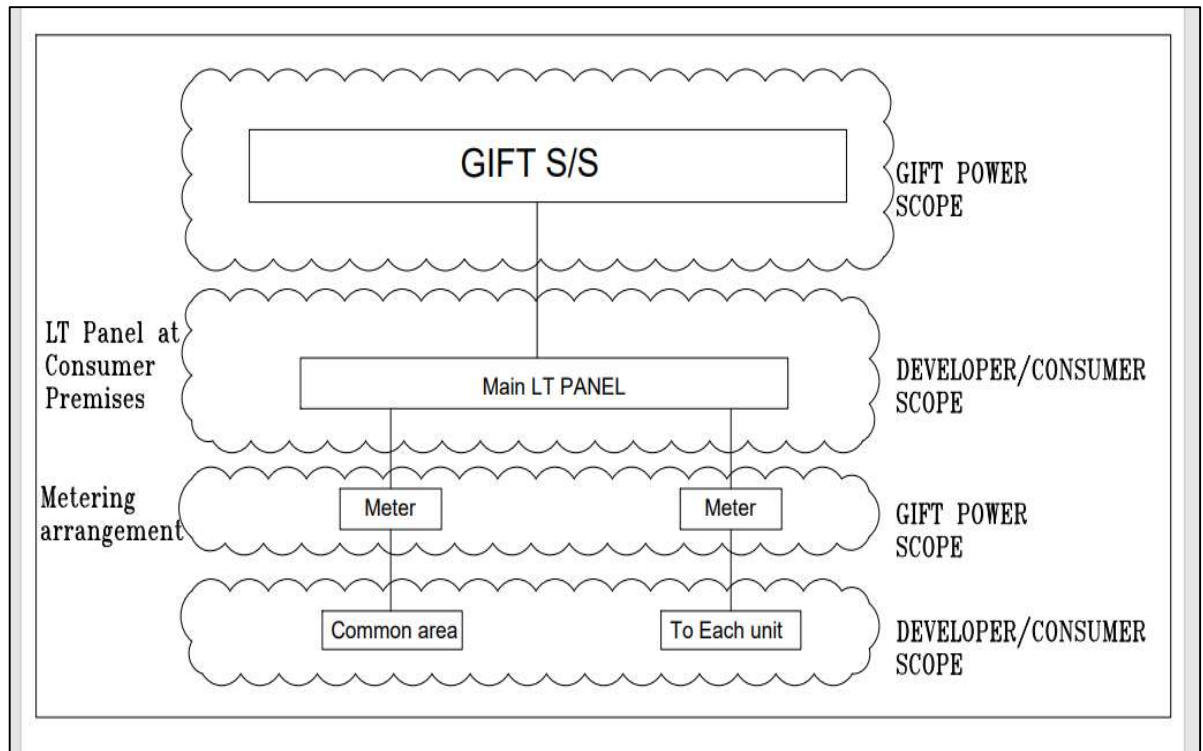


Figure: 1

Case 2:

Power network up to the LT metering point.

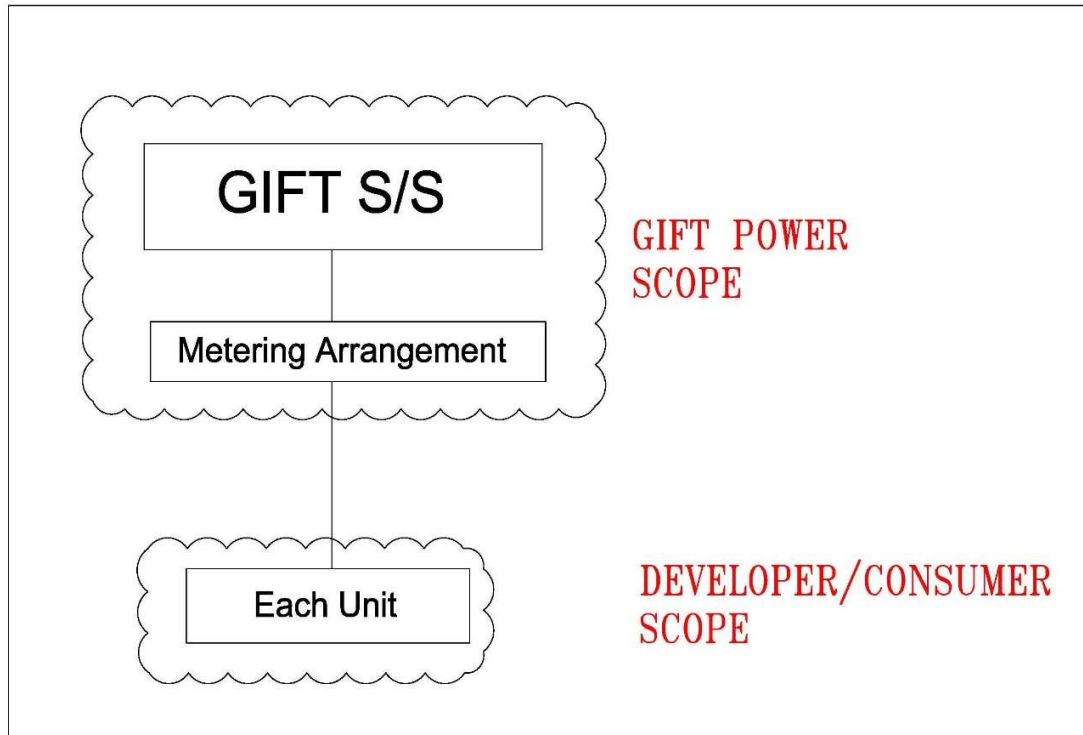


Figure: 2

1.2. Each Unit supply on LT and Common area supply on HT:

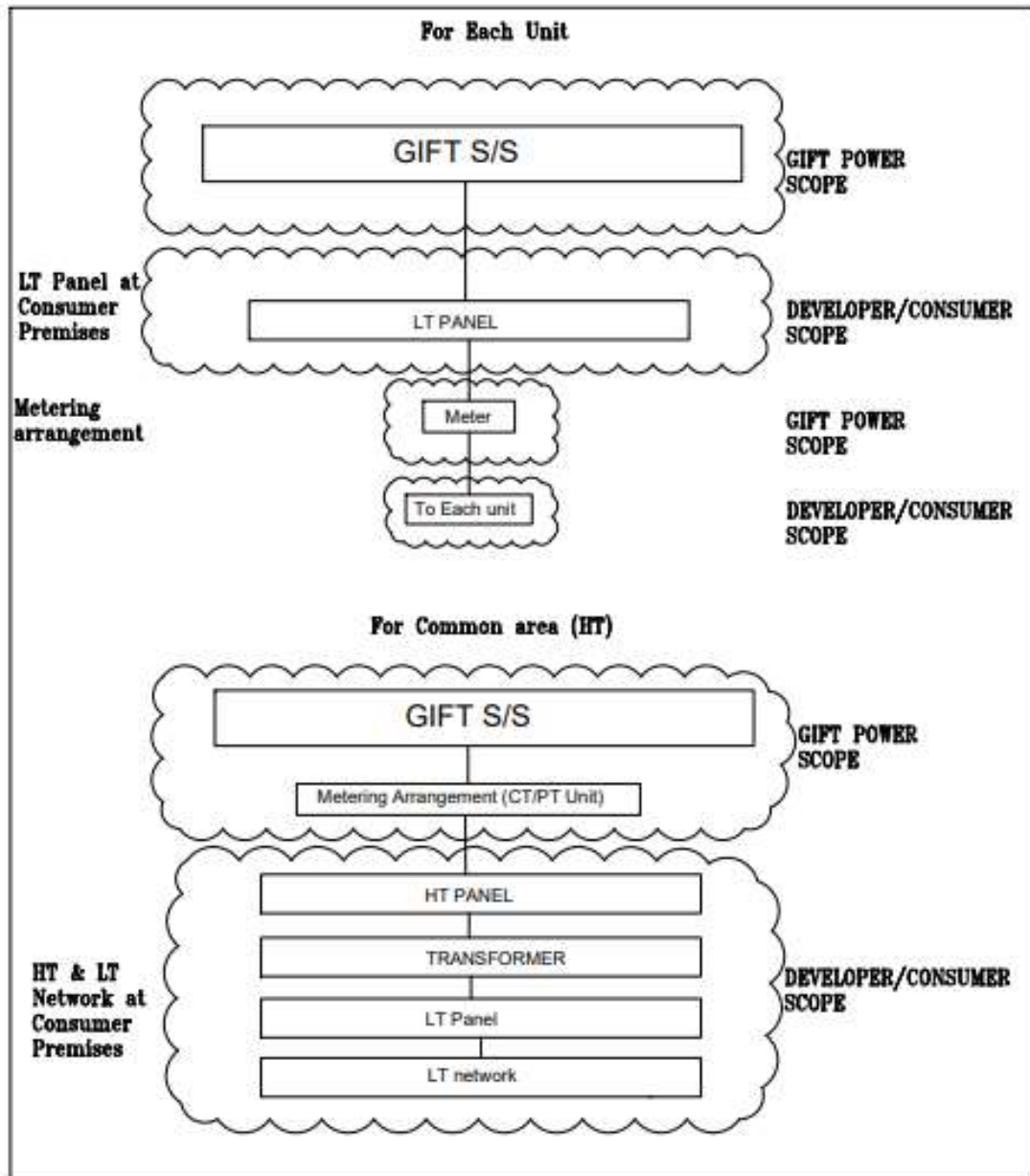


Figure: 3

1.3. Residential scheme as single consumer (HT):

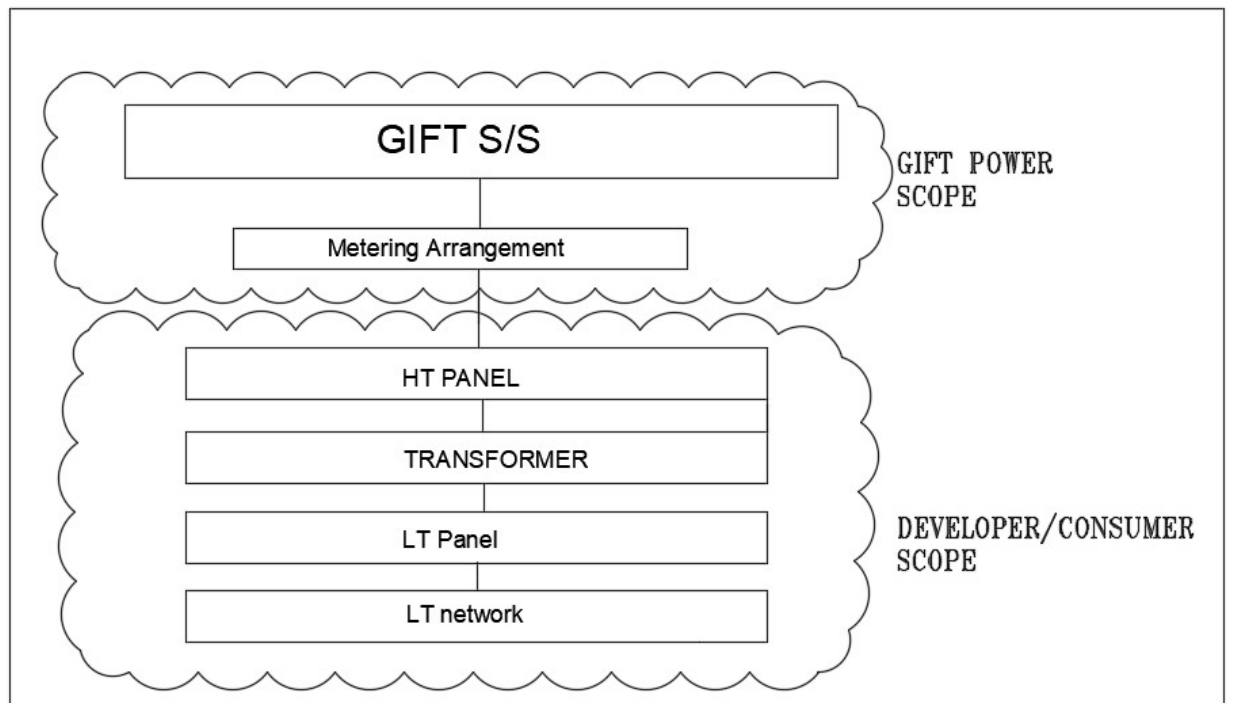


Figure: 4

2. Commercial buildings:

2.1. Commercial Tower as single consumer (HT):

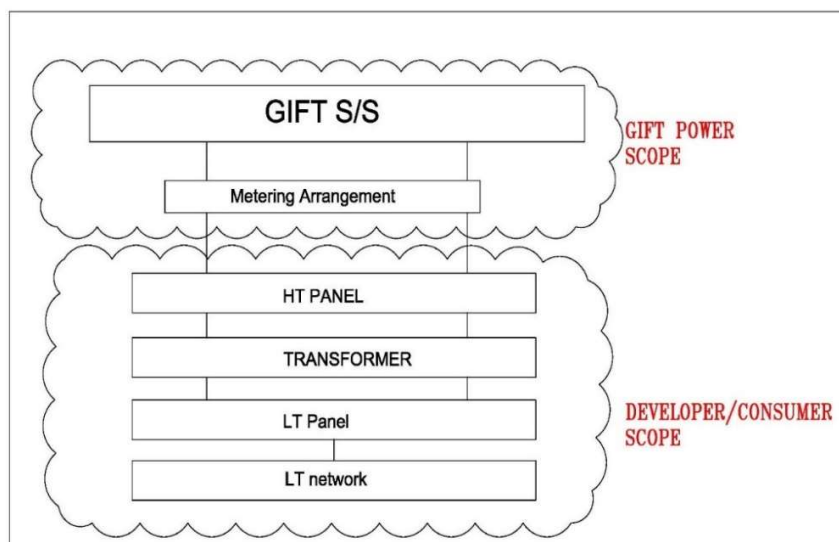


Figure: 5

2.2. Commercial Tower with both HT & LT Consumers:

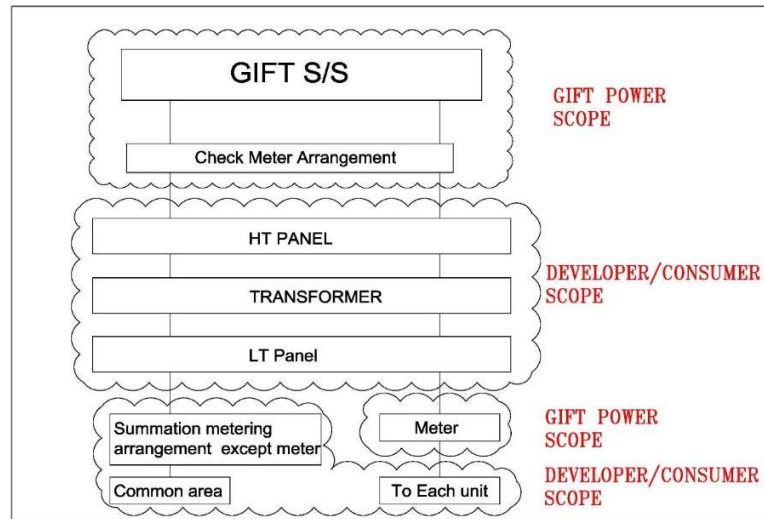


Figure: 6

3. Other buildings and amenities:

3.1. Buildings and amenities like GIFT House, Aspire-3 building, Amenity building etc. with multiple LT consumers.

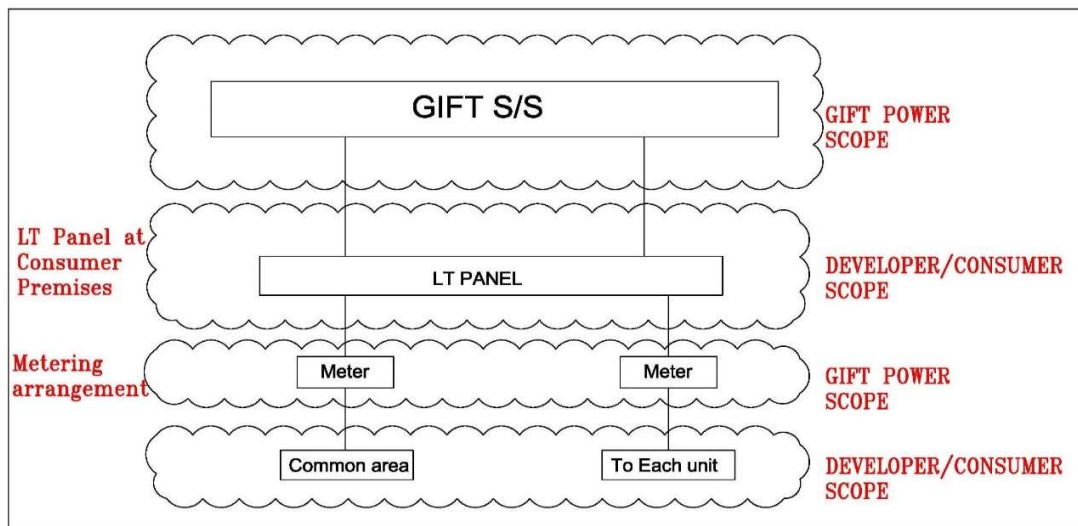


Figure: 7

3.2. Buildings and amenities like School, warehouse, nursery etc. single LT Consumer:

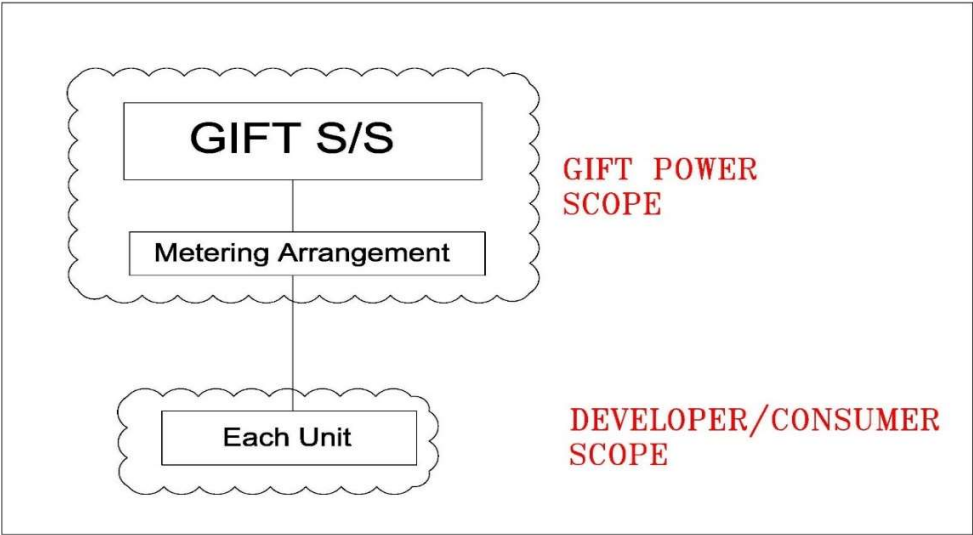


Figure: 8

4. Construction activity:

4.1. Temporary power for construction works:

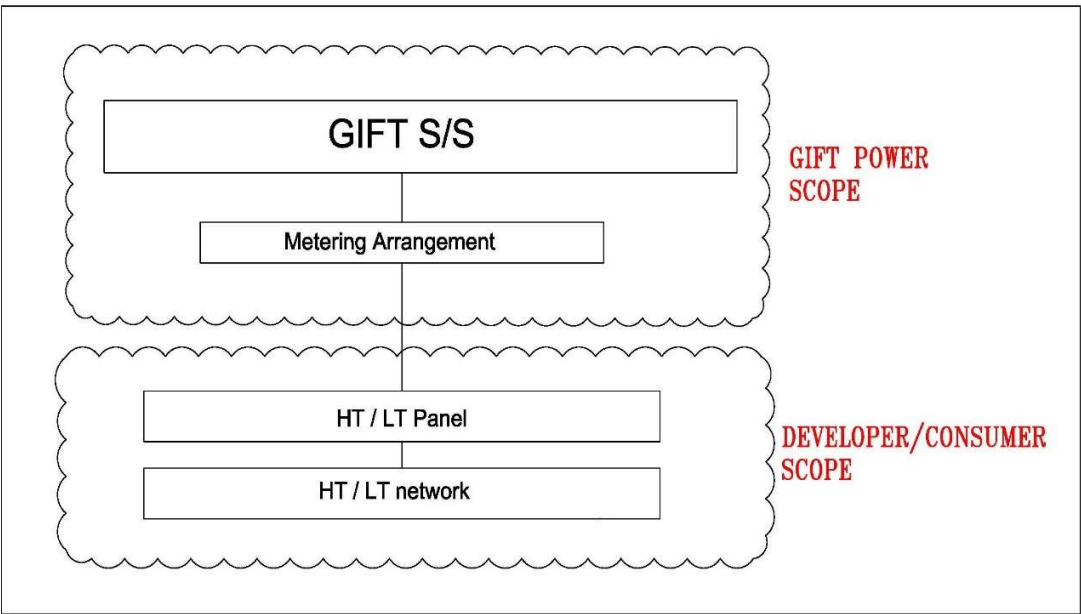


Figure: 9

4.2. Temporary power for interior work within building:

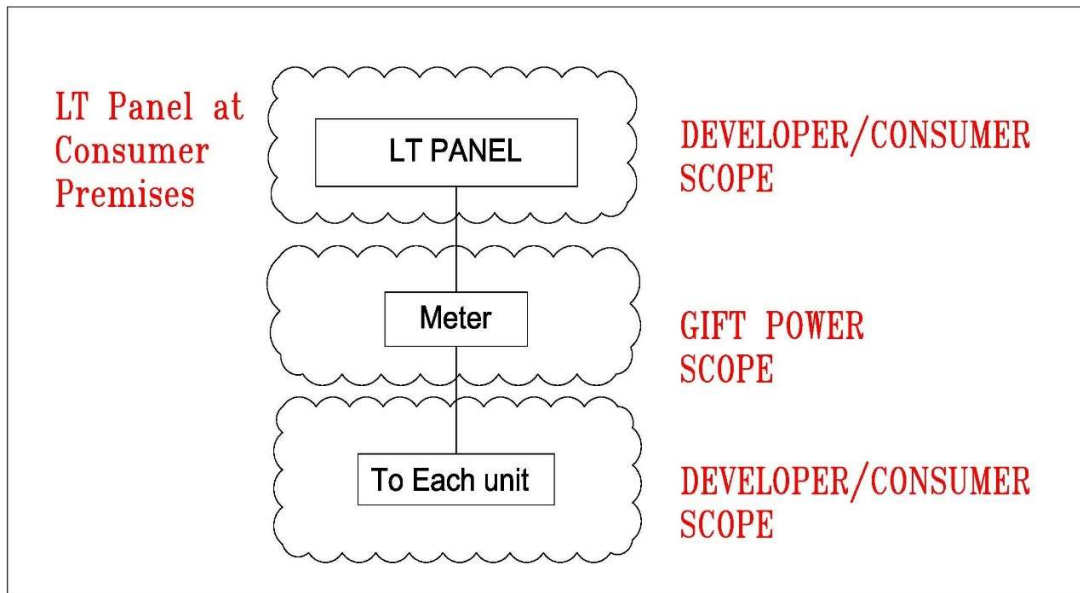


Figure: 10

Note: The developer / user shall be responsible to pay the applicable service connection charges with applicable security deposit and monthly regular electricity charges.

ANNEXURE-E

**TENTATIVE CHECKLIST FOR DOCUMENTS
REQUIRED AT VARIOUS DEVELOPMENT STAGES**

ANNEXURE-E

Submissions/compliances at various stages of Project Development		
Sr.No	STAGES	Documents required
1	Development Permission Stage (DP)	earthing location
		confirmation on HT connections if residential
		Electrical room lay outs
		electrical shaft sizing
		cable routings
		transformer room spacing
		confirmation on plinth for transformer
2	Commencement certificate (CC)	Electrical DBR
		load calculation sheet
		Transformer sizing calculations
		SLD
		APFC calculations
		Short circuit calculations
		Earthing calculations
		Cable Scheduling
		Floor wise Electrical room layouts
		Main transformer room Layouts
		Main HT Panel Room Layouts
		Electrical shaft with bus risers
		Lighting arrestor calculations and Layout
		Cable arrangements in Trays
		Detailed electrical room layouts
		Detailed Lightning arrestor layout with connection details
		Also submissions of the required vendor drawings
		Detailed earthing installation drawings
		Detailed common area lighting and power lighting layout of all floors.
3	Occupancy Certificate	All necessary test reports of electrical installations
		Earthing related test and its reports
		Permanent connection for the Building
		Installation of the metering Panels
		Developer compliances to the comments on site visits

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