
Network 18
&
Honeywell
Present
SMART
BUILDING
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Introduction:

This document is intended to serve as a glossary to the Honeywell Smart Building Score™ (HSBS) survey. You may access definitions of line items mentioned in the survey here.

Outcome: The HSBS Survey measures responses across 3 outcomes:

- Green: Environmentally sustainable components of a building
- Safe: Safeguard the building, its occupants, users and owners
- Productive: Enhanced comfort and productivity for users and owners

A smart building is smart across these 3 outcomes: Green, Safe & Productive

Enabler: Each outcome is evaluated on the basis of 5 enablers. This makes 15 enablers in total. An enabler is a building feature that helps the building score higher in that particular outcome.

Asset: HSBS™ is scored on the availability of assets across each of the 15 enablers. Every piece of equipment/every system used in the building could be defined as an asset (example: centralized air conditioning, car parking etc).

In a nutshell:

Asset → Enabler → Outcome → Smart Building

Building Assets' Definitions:

Generic Definitions

Building Management System (BMS): This is a computer-based control system installed in buildings. This system controls and monitors the building's mechanical and electrical equipment such as lighting, HVAC, ventilation, fire, security and power.

Command & Control System (CCS): A single command and control room where building administration can monitor all the BMS data and take appropriate decisions.

Enabler 1: Energy Sources

Renewable electricity generation: Generation of the building's energy requirements via resources that are naturally replenished on a human time-scale (solar power, wind power, biomass).

Solar Panels: Panel designed to absorb the sun's rays and use this solar energy for generating electricity.

Solar Water Heaters: Equipment for using solar energy (energy from the sun's rays) for heating water.

Wind Power: Using wind/air flow through wind turbines for powering generators and converting this wind energy into electricity.

Biomass: Organic matter from living or recently living organisms that can be used to provide energy (either by directly burning to produce heat or by converting biomass into biofuel).

Electricity Recycling: Utilizing energy that would normally be wasted by converting it into electrical or thermal energy that can be used to power other functions. This will help reduce both energy costs and greenhouse gas emissions.

Regenerative Brake Elevators: Elevators that use regenerative braking technology to lower their power requirements. This technology extracts energy from the braking (stopping) process (that is normally dissipated as heat) to be stored and reused.

Commercial CHP (Combined Heat & Power) system: Simultaneous cogeneration of both electricity and thermal power. The electricity generated is a stable source of electrical power and can be isolated from the electrical grid if required. The thermal energy generated can be used to heat water/as steam/fed into an absorption chiller providing a source of cold water. A CHP system helps in lowering the amount of fuel consumed.

Solid waste management for power generation: Recovering the energy content of waste material as well as eliminating the need for waste disposal by combusting solid waste generated in the facility to generate power.

Enabler 2: Utility Sources

Manual Water Fixtures: Water fixtures that are operated (i.e. turned on or off) by hand.

Self Closing Water Fixtures with Sensors: Water fixtures with sensor based control i.e. moving the hand over a sensor located near the faucet or basin to turn the water supply on or off.

Water Conservation System: Equipment and processes to reduce water consumption by limiting water usage/ using alternative sources of water or recycling used water.

Rain Water Harvesting: Collection and use of rain-water on site, rather than allowing it to run off.

Water Wells: A structure created by drilling into the ground to access groundwater from just below the earth's surface. This is also known as borehole.

Liquid waste recycling: Reusing waste-water by cleansing and conversion process. The resulting clean water can be used to meet the building's water requirements.

LPG Gas Connection: Liquefied Petroleum Gas that is used as fuel in cooking equipment. (Cylinder format).

PNG Gas Connection: Piped Natural Gas that is delivered via pipes to be used a fuel for cooking equipment.

Induction Cooking: Heating a cooking vessel via magnetic induction rather than heating over a flame (like the above 2 examples). Runs directly on electricity as opposed to gas and is thus easier and safer to use. Since induction cooking directly heats the vessel, rapid temperature increase can be achieved.

Enabler 3: Temperature Control

Cooling and Heating System: A system that helps in regulating the internal temperature of the building by cooling the building in summers and heating it in winters. Also termed as HVAC system. (Heating, Ventilation and Air Conditioning)

Water cooler: (Also known as evaporative cooler/ desert cooler/swamp cooler). Cools air through the evaporation of water. Simplest method of air cooling that uses least energy.

Window AC: Most commonly used air conditioner where all the AC components are enclosed in a single box that is fitted on the window sill/slot made in the wall of the room. This is useful for cooling a single room.

Cooling only unitary Split system/Cooling only mini Split AC units: A split system is a combination of an indoor air handling unit and an outdoor condensing unit. (These are separated and not placed together, hence the name 'split'.)

Basic Centralized AC system: A central unit cools and dehumidifies the air before circulating it throughout the entire building.

Cooling only packaged system with air cooled condenser / Cooling only packaged system with water cooled condenser: A packaged system is a single unit that contains all the components of a split system. The unit is placed outside the building and indoor air is "ducted" from the building to the packaged system and back through an air distribution system.

Centralized AC with VRV / VAV: Centralized AC system with Variable Refrigerant Volume/Variable Air Volume: VAV systems provide variable airflow at constant temperatures, thus allowing for more precise temperature control. In VRV systems, refrigerants are used as cooling mediums.

Hybrid heat split system: These are advanced HVAC system with improved efficiency. Different from normal systems as the air conditioner is replaced with a heat pump. Heat pumps provide efficient heating in moderate temperatures.

Chilled Water System: This is used in areas that need large cooling capacity. Water is used as the secondary refrigerant. Chiller is used to remove heat from the water; the chilled water is then circulated through other components to absorb heat from the space (that is to be cooled).

Packaged terminal heat pump system: Heat pumps are similar to cooling only systems with one exception. The refrigeration cycle can be operated in reverse. A cooling only system cools the indoor air and rejects heat to the outdoors. A heat pump can also cool the indoor air, but when the valve is reversed, the indoor air is heated.

HFC Refrigerants: A refrigerant is a substance that is used in a heat pump and refrigeration cycle in both HVAC systems and refrigerators. HFC refrigerants are non ozone-depleting (0 Ozone Depletion Potential or ODP) but can contribute to global warming via their GWP (Global Warming Potential).

HFO Refrigerants: These refrigerants are recognized as the next generation of refrigerants due to their environmental friendliness and energy efficiencies. These have 0 ODP and very low GWP.

Enabler 4: Electricity Control

Manual monitoring using basic meters: The simplest way of monitoring electricity (utility) consumption using a mechanical display to display the reading.

Electromechanical meters: A type of meter with a non-magnetic metallic disk that rotates faster or slower depending on the amount of power passing through it. This meter is nowadays being phased out (in India).

Basic electronic meters: LED/LCD display with digital reading of the electricity (utility) consumption.

Electronic meters with remote transmission and / or tariff calculator: Smart meter connected to the internet which will help in remote reading of meter data. The bill can also be calculated remotely based on the data received and transmitted back to the meter site.

Electronic meters integrated with SCADA: Smart meters integrated with SCADA (Supervisory Control and Data Acquisition) help provide real-time reading and monitoring capabilities. The data received can also be analyzed to detect and fix problems much faster.

Fluorescent Lights: Simple tube lighting.

Compact Fluorescent Lamp (CFL) lights: Fluorescent light that is a replacement for incandescent (yellow) lights as it is more energy efficient.

Light Emitting Diode (LED) lights: This is an energy efficient lighting system. An LED light is a semi-conductor device that emits visible light when an electric current passes through it.

CFLs / LED bulb fixtures with sensor based control: These lighting fixtures can be turned on or off via sensors that detect hand motions, rather than via manually operated switches.

Electrical Appliances: Appliances that run on electricity which are used in the building for daily living purposes, such as washing machines, dish washers, microwave ovens, etc.

Energy Star rating and certification: Energy Star is as US Based certification for the energy efficiency of electrical appliances. Energy Star certified products have lower emissions of greenhouse gases and other pollutants as well as lower fuel costs.

Enabler 5: Utility Control

Meters: Same as above in Enabler 4: Electricity Control.

Water leakage detection & alarm system: Consists of a cable with sensors attached to it that runs around the area where water leakage is to be detected. The sensors are evenly spaced along the cable. If a thin water film connects adjacent sensors, an audio-visual alarm alerts the building of a water leakage in that area.

Automatic water shut-off system: Automatic shut off of the water supply to the area of water leakage after the alarm is sounded.

Enabler 6: Security – People, Vehicle, Material

People screening system: System to monitor people entering the building and ensure that they pose no security threats to the building.

Manual Frisking: Manual check of people entering the building via a guard.

Handheld metal detectors: Portable detector used by security guard to check people entering the building and whether they are carrying any metal.

Baggage Scanners: Conveyor belts to place bags/purses/brief cases etc that are X-rayed before they can be carried into the building

Door Frame metal detectors and full body scanners: Door frame metal detectors are walk-through metal detectors. They are mostly used in airports. Full body scanners are devices that detect objects on a person's body, without making physical contact. These scanners use X-rays or electromagnetic radiation to generate an image/representation of the person's body with an indicator for suspicious items.

Vehicle Screening System: System used to monitor vehicles entering the building and check their contents.

Manual Screening: Done by security guards at the entrance by opening the trunk of the car and checking for suspicious items.

Handheld metal detectors: Same as above (for vehicles).

Automated tag readers (RFID): Radio frequency identification (RFID) can track tags attached to vehicles. These tags can automatically identify vehicles that move in and out of the building.

X-ray scanning: Enables security personnel to see what is brought in and taken out of the site without hand-searching vehicles. The scan can be controlled and viewed from a remote workstation as well.

Under car scanners: Provides high resolution images of the underside of vehicles (which is the only area of the vehicle that cannot be locked or secured). This can help in quick detection of foreign items in the underside of vehicles.

Automatic Number Plate Recognition (ANPR): Uses image technology to read vehicle registration plates. Can either be done real-time or in a remote location after the image has been transferred.

Boom Barriers: (Also known as boom gate). A boom barrier helps in efficient security at the entrance and exit points of building. A bar or pole can be pivoted to block vehicular access through a controlled point till the inspection is over.

Access Control System: System to monitor building entrants and regulate their access to the building.

Manned Gates: Manual access control in which a guard manually checks or verifies building entrants.

Entry through access card: Building entrants (i.e. regular users) are given access cards which they can swipe at designated points to access the building.

Biometric readers: Biometrics refers to metrics such as fingerprints, DNA, palm lines, retina scan etc: which are unique human characteristics used to label and describe individuals. Thus biometric readers (most commonly fingerprint readers) are a reliable way to identify individuals entering the building.

Access card retrieval system: Recover the access card's private encryption keys and certificates in the case the card is lost/revoked/expired.

Time & attendance monitoring: Monitor the attendance and movement of employees. Employees can clock in and out using these systems.

Gate management system such as turnstile: Turnstile is a form of gate that allows only one person to pass through at a time. This can restrict passage only to people who insert a coin/ have a ticket or pass etc.

Visitor management system: System to track and regulate visitors entering the building.

Manual record maintenance: Visitors are required to manually enter their details such as name, person s/he is meeting, contact details etc.

Electronic record maintenance: The visitors details are electronically entered and stored on a computer/online.

Prior appointment /permission through call / internet: Visitors can call/reserve an appointment to enter the building and conduct business.

Middleware: Connects the organization/building's software applications. Colloquially can be described as 'software glue' and enables various components of a distributed system to manage data.

Surveillance & intrusion detection system: System for surveillance of the building and detection of any unauthorized persons.

Manual perimeter surveillance: Guards that man the building check points and survey the building compound.

Perimeter surveillance systems: System to monitor the entire building perimeter – can be manual and/or electronic (using cameras).

Intelligent cameras with motion based alerts, smart storage: Cameras that can detect motion and send alerts. This can also help in cloud storage with images stored in a remote server.

Connected cameras with remote monitoring: Monitoring can occur remotely with the 'feed' from all the cameras. The cameras are interconnected to ensure the entire area is covered without any blind spots.

Electric fencing: Barrier using electric shocks to deter people/animals from crossing a boundary.

Intrusion detection sensors (Motion/ glass break/ seismic): Sensors that can detect anomalies and thus the presence of intruders.

- Motion sensors: These use infrared/ultra sound/vibration/contact technology to detect movement.
- Glass Sensors: Glass break acoustic detectors are mounted closely to glass panes and listen for sound frequencies associated with breaking glass.
- Seismic sensors: These convert ground motion into a measurable electronic signal to detect seismic vibrations.

Electronic fence, sensor enabled for intrusion detection: Sensor cables can be attached to the fence to detect intruders and provide early warning.

Integrated cameras with video analytics and proactive prediction: Video analytics uses software to automatically identify specific objects, behaviors or attitudes in video footage (without human intervention). Video Analytics has the capability to analyze a video frame or a group of video frames to detect and recognize a predetermined event and filter non-relevant movement. Thus, this software can

help turn the camera into a predictive tool that can solve brewing problems and proactively prevent incidents.

Enabler 7: Fire Safety

Fire detection & notification system: System to detect fires in the building, raise occupant alarm, help in evacuation and notify emergency response personnel.

Notification appliances (MCP & Hooter / strobes): Uses audible/visible/other stimuli to alert building occupants of a fire. MCP (Manual Call Point) allows building occupants to signal a fire by means of a simple button press. This is connected to a central fire alarm panel and then an alarm system in the building. A Hooter is an audible fire alarm and a Strobe is a visible, flashing alarm light.

Conventional detectors: Simple on/off devices that do nothing is there's no smoke or heat. At a certain pre-set level of smoke or heat, these detectors switch into the 'Alarm' state. If a conventional detector goes into alarm, the control panel will be able to identify which zone has gone into alarm, but will not have the exact location of the fire or which device went into alarm.

Multivariate detectors or addressable detectors: Individually identified with an address (number) on a loop of wiring. The control panel communicates with each device that reports back with how much smoke or heat is present. The control panel, not the detector, then makes the decision to sound the alarm system. With an intelligent system, if a fire is detected, its position can be pin-pointed because each device has its own unique address which means its exact location can be found quickly.

Basic or Manual Public address systems: Electronic sound amplification and distribution system with microphones, amplifiers, loudspeakers that can be used to address the building at large.

Voice Evacuation System: Sound an alarm tone and a voice message warning that an emergency has been reported and to evacuate the building. Voice evacuation systems can also be used by personnel to give specific live information and/or instructions over the alarm system using a built-in microphone.

Emergency lighting system: Lighting system that works on battery/alternative power source and comes on in case the main power is shut off.

Enabler 8: Gas Safety

Gas detection & notification system: System to detect gas leakage, take appropriate reaction and notify building occupants in case of a risk to their health and safety.

Vehicle Parking (CO): Carbon Monoxide detection in parking areas.

Swimming Pool (Chlorine): Chlorine gas detection in swimming pool areas.

Chiller (Ammonia): Chiller refers to cold cabinets/cold room storage to store food/other material a few degrees above freezing. Gas detectors need to check for ammonia gas in this area as this gas is used for the cooling process.

Mechanical Room/Battery Room (Hydrogen): Battery Rooms are used to house batteries for backup or uninterrupted power supply systems. Hydrogen gas (which is flammable) can leak from these battery packs. The Mechanical Room is a room in the building dedicated to mechanical and electrical equipment (instead of human occupancy).

Kitchen (LPG/ Methane/Natural Gas): Flammable LPG/Methane/Natural Gas could leak from cooking gases used in the kitchen.

Boiler Room (Combustible gases like methane/propane/LPG): The Boiler Room contains heating equipment and/or boiler.

Lab (gas (es) relevant to processes carried out): Labs can be present in research areas of the building. Depending on the research process being carried out in the lab, there could be dangers of toxic/flammable/other harmful gases escaping and being released into the general atmosphere. The lab should have detectors for these specific gases.

Manufacturing Areas (gas (es) relevant to processes carried out): In an industrial area, there could be manufacturing processes that may produce (or use) certain gases which could be dangerous. The area should have detectors for these specific gases.

Enabler 9: Worker Safety

Worker safety equipment: Equipment worn or carried by maintenance staff and workers to monitor and protect their health and safety.

Protective clothing/ technical work wear: Clothing to keep workers secure and provide protection, durability and comfort in hazardous environments.

Protective head gear (helmets/ caps/ hoods/ hats): Equipment to protect the head area, especially in the case of a fall.

Harnesses and anchor systems (for working at heights): A harness is a looped restraint or support that is attached to/tied around a worker. A harness secures the worker to an anchor point (which is the point from which support is given) This would ensure that in the case of slipping, the worker does not fall and instead merely dangles in the harness, oscillating to and fro the anchor point.

Safety spectacles: Spectacles with higher impact resistance worn to help workers protect their eyes (prevent hazardous liquid splashing into eyes, helping in unencumbered sight at night/while raining etc).

Safety boots: Boots to ensure feet of the workers are fully covered.

Safety gloves: Gloves to ensure hands of the workers are fully covered.

Welding Shields/ Glasses: Welding Shield/Helmet is a type of headgear to protect the eyes, face and neck from flash burn, ultraviolet light, sparks, infrared light, heat etc while welding. Welding glasses specially protect the eyes.

Walkie Talkie: Hand-held, portable, two-way radio transceiver that can be used for communication by the remote worker.

First aid kit: A kit containing basic first aid equipment such as bandages, pain medication, disinfectant etc.

Respiratory masks: A mask to protect the worker from inhaling harmful dust, fumes, vapors or gases. These can either just purify air by filtering out the harmful elements or deliver a secondary source of air.

Self-contained Breathing Apparatus (SCBAs): Also called Industrial Breathing Sets/ Compressed Air Breathing Apparatus or simply Breathing Apparatus. Provides breathable air in an "Immediately Dangerous to Life or Health" (IDLH) Atmosphere.

Ear muffs/ ear plugs: Ear plugs block the ear canal. Ear muffs consist of sound attenuating material and soft ear cushions. Workers can use either to reduce the amount of sound entering their ears.

Emergency escape kits/ devices: Personal escape kits that help workers escape hazardous situations. Can contain hooks, anchors, ladder belts, carabiners etc.

Electrical safety equipment (clothing, gloves, insulated mats) for electricians/ electrical workers: Insulating equipment for workers that work with live power and other potential electrical hazards.

Lockout/ tagout devices for hazardous/ under-maintenance equipment: Protocol to restrict access to equipment that is damaged/dangerous or under maintenance.

Portable gas detectors for the workers: Gas detectors that can be carried by workers to indicate harmful gases in their immediate area of work.

Certified Worker Safety Equipment: The worker safety equipment used should be certified by the appropriate governing bodies to ensure they meet specified standards.

Sensor enabled Worker Safety Equipment: Wearable sensors are attached to the worker safety equipment to monitor information such as toxic gas exposure, breathing (sensors attached to SCBA), heart rate etc to provide a holistic picture of what the worker is experiencing and also alert relevant authorities in case of any anomalies or emergencies.

Smart phone app for worker safety management: Safety apps help control workplace incidents and accidents by enabling information flow to and from workers.

Worker safety management software: Specialized software solution to monitor worker health and safety, keep track of accidents/incidents, identify hazards and risks etc.

Enabler 10: Disaster Response

Disaster Response System: System for disaster response and control such as warning/evacuation, search and rescue, providing immediate assistance, assessing damage, continuing assistance and the immediate restoration of infrastructure.

Manual/Automated Suppression Device: Suppression systems use dry chemicals/gas/water to suppress fires. These can be manual or automatic. If a fire is detected through heat sensors, wiring or manual detection, the suppressor comes into play. Water based suppression systems could include fire sprinklers that discharge water when detecting the heat of a fire. Gas based suppression systems use inert gases/chemical agents to extinguish a fire.

Clearly marked emergency exits/Maps: A defined exit route with prominently marked exits that can be used to safely leave the building in case of emergencies. Also – building maps to indicate where the exits are located.

Designated assembly areas and escape routes and escape ladders: A designated assembly area is a safe zone where the building occupants can gather in case of an emergency. Escape routes and escape ladders will help to safely exit the building.

Emergency Lighting system: Already explained in Enabler 7: Fire Safety.

Earthquake early warning system: Earthquake alarms/sensors that will warn the building occupants in case of an impending earthquake.

Enabler 11: Indoor Air and Water Quality

Air purification system: System to remove contaminants from the air in a room or building. These contaminants could include Particulate matter (airborne particles such as pollen, dust etc), Germs/Bacteria as well as Odors and Vapors.

Portable air purifier: Can be used to purify a room/smaller area. This can be carried to the required area of purification.

Centralized air purification system: Integrated with/installed directly into the HVAC system to ensure that clean and purified air is delivered throughout the building.

Drinking Water purification: System to deliver potable (i.e. drinking quality water) to building occupants.

Standalone water purification system (UV or RO): UV or Ultraviolet water purifiers help remove bacteria, viruses and micro-organisms from drinking water. RO or Reverse Osmosis water purifiers use reverse osmosis to remove ions, molecules and larger particles from drinking water via a semi-permeable membrane.

Packaged water dispensers: These cool/heat and supply drinking water. These are huge water cans normally sourced from vendors outside the building and simply inverted onto a dispenser.

Centralized drinking water treatment plant: Large amounts of water and centrally filtered, purified and dispensed throughout the building.

Enabler 12: Circulation – People, Vehicle, Material

Elevator: Vertical transportation that can transport people/materials to an upper or lower level.

Passenger Elevator: Used to transport passengers (people).

Standalone passenger elevator: Elevator that operates on its own, with all motors and machinery contained in its own lift shaft.

Passenger elevators: Interconnected - Grouped with Logic Controls: Large buildings with many elevators have programmable logic controls (PLC) that integrate button-press requests from all elevators and all floors. They then respond based on the relative positions of all elevators with the objective of reducing response time.

Passenger Elevators: Interconnected with authorized access systems: Elevators which will only move up/down after travel has been authorized via an access control system.

Vehicle parking system: An area in the building designated for parking vehicles, as well as a clear path to get to this area.

Manual Vehicle Parking System: The user enters the car parking area and parks his vehicle in a free spot, based on availability and eligibility of a particular spot (example – spots reserved for handicapped people are not eligible for a non-handicapped person.)

Semi-automated Vehicle Parking System: Vehicle parking system that uses a mechanical system of some type to move the car to its parking space. However, putting the car into the system and operating the system is done manually by an attendant.

Automated Vehicle parking system: Operates like robotic valet parking where the driver drives the car into a designated area, uses an automated terminal for payment and exits the car. The car is then lifted by a mechanical system and transported to a per-determined space in the parking area.

Material handling system: Specialized system to handle material and cargo entering and exiting the building.

Goods elevators: Elevators specially designated for transport of cargo.

Conveyors: Mechanical handling system that moves heavy and bulky material from one place to another via a moving conveyor belt/platform.

Pneumatic system: System that uses gas or compressed/pressurized air to transport material.

Automated container delivery system: A comprehensive system that organizes and delivers material throughout the building.

Enabler 13: Personalization

Concierge for Visitor management and Building navigation: A front desk/reception that can guide visitors entering the building. Visitors can register and get directions on how to approach relevant areas.

Smartphone app for building occupants: Specialized mobile application that has been developed to simplify the lives of building occupants by helping them in their daily personal or professional lives. These apps can help building occupants book meeting rooms, reserve seats, access building floor plans/maps, submit work requests to admin departments as well as personalize air and lighting in the occupants' seating areas.

Enabler 14: Connectivity

Voice and data communication system: Telephone/internet system that helps building occupants access pertinent information and communicate with others.

DSL / VoIP based telephone system: DSL stands for Digital Subscriber Line. VoIP stands for Voice over Internet Protocol. DLS is a technology that transmits digital data (high bandwidth information) over telephone lines. It uses the same wire as a regular telephone line. The advantage is that the telephone line remains active even with an open internet connection. VoIP is a technology for making voice calls using broadband internet connection instead of a regular (analog) phone line.

Fibre-enabled broadband: High speed broadband internet that uses fibre-optic cables to deliver the data. These cables are immune to interference and do not suffer signal attenuation as experienced by copper lines.

Wireless Local Area Networks (WLAN): Wireless computer network linking devices over a certain area using a wireless distribution method. A mobile user can connect to the network using a wireless (radio) connection.

Password protected wifi: Access to the network is dependent on entering the right password – to ensure that the network is not overburdened with non-authorized users.

Wireless data access / mobile signal with no dead zones: A dead zone is an area where the signal between the hand held device and the mobile antennas is blocked or severely reduced or an area where

the wireless network is inactive due to limitations in network density or interference or limitations in the system architecture.

Enabler 15: Energy Quality

Power back-up system: Independent source of power that can serve as a secondary source in case of power outage.

Diesel generators with manual switch over: Combination of diesel engine (engine where the fuel is combusted internally to release energy) with an electric generator (converts mechanical energy into electrical energy) to generate electrical energy.

- Manual switch over means that the generator has to be manually started once the power supply is down and manually shut down once the power supply resumes.

Combination of DG sets with automatic switchovers: Diesel Generator sets (consisting of multiple DGs) that automatically turns on once main power is down and turns off once power resumes.

UPS Battery system: UPS stands for Uninterruptible Power Supply. This is an electrical appliance that provides emergency power when the main power fails. It supplies energy stored in batteries or super capacitors that is typically short lived.

Power conditioning system: (Also known as line conditioner or power line conditioner). This device is intended to improve the quality of power delivered (i.e. deliver voltage of the proper level and characteristics in order to ensure the equipment functions properly).

Basic AC Power Conditioner: This power conditioner has basic AC (alternating current) power as its input.

Hybrid Power Conditioner: This power conditioner can integrate and amalgamate inputs from various sources such as solar, AC power, wind etc to deliver smooth output.