NAFFCO POWER

HYBRID POWER FOR DC APPLICATIONS

(TELECOM, OIL & GAS, POLICE, RAILWAYS ETC.)

"COMMITTED TO KEEP YOUR POWER ON"

- Reduce GHG Emissions
- Fuel Saving Up to 60%
- Curtail Running Cost On Diesel
- Best Suited For Rural/Off Grid Applications
- Up to Zero CO_2 Emissions (with Renewable Power)

www.naffcopower.com

AN INTRODUCTION TO NAFFCO

NAFFCO was founded in Dubai, UAE to become the world's leading producer and supplier of life safety solutions. By recognizing the importance and convenience of having easy access to multiple safety services, we became specialized by offering complete solutions under one roof for all types of ***high quality*** firefighting equipment, fire protection systems, fire alarms, addressable emergency systems, security systems, custom-made vehicles such as fire trucks, ambulances, mobile hospitals and airport rescue firefighting vehicles (ARFF) , ***Hybrid power solution*** and Special Purpose Vehicles for Electrical Transmission, Generation, Distribution & Maintenance.

With the most talented and dedicated employees from around the world, NAFFCO has over 15,000 team members including 2,000 passionate engineers and over 8.5 million square feet of manufacturing facilities. We are currently exporting to over 100 countries worldwide.

NAFFCO manufactures UL,FM,BSI & Global Mark approved products in our facility in consistent with International Standards UL-DQS ,BSI certificates for the Quality Management System against ISO 9001. Our Environmental (ISO 14001) and Occupational Health & Safety (ISO 45001) Management Systems have been certified by UL-DQS. Our Trucks & Vehicles division has been assessed & certified for Quality Management System requirement for Aviation, Space & Defense organization(AS 9100) by UL-DQS.

Our success is driven by our ***"passion to protect"***; our vision is to become the world's number one provider of innovative solutions in protecting life, environment and property.

HYBRID POWER SOLUTIONS

LEADING THE HYBRID TECHNOLOGY BEST CLASS PERFORMANCE

The **HY-BOLT 1000** is a high efficiency hybrid generator, capable of achieving greater performance.

The **HY-BOLT 1000** with variable speed engine and long-life deep cycle batteries guarantees fuel consumption savings up to 60% compared to a traditional genset. It is ready to be connected with renewable energy resources to further reduce fuel consumption and CO_2 emissions.

The **HY-BOLT 1000** is particularly useful for remote/rural off grid applications or in areas where the grid is available with frequent outages.

HYBRID POWER UNIT

Main Features :

- DC Generators - PMG Technology
- Variable speed Diesel Engine
- High proven savings
- Deep cycle batteries
- Plug & Play with renewable energy sources
- Armored and Anti-theft devices

99.9% UPTIME GUARANTEED

UP TO 60% FUEL SAVINGS Compared to a Traditional GENSET

UP TO ZERO CO_2 EMISSIONS Combined with Renewable Energy Sources

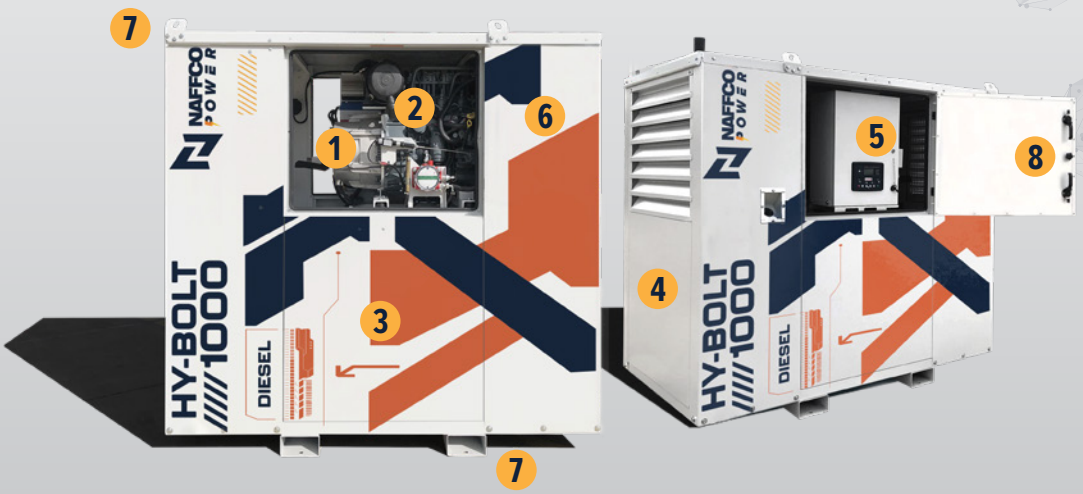
Characteristics :

- Dc Variable Speed -48VDC Genset with PMG Technology
- Diesel Engine
- Deep Cycle Batteries (Pzs Or Lithium Technology)
- Hybrid Controller for Complete System Management
- Plug & Play with Renewable Energy Sources
- Integrated Fuel Tank with Anti-siphoning System
- Sand Filters, Sound & Weatherproof Canopy Up to 70 dBA @ 1m
- Anti-theft Devices : Armoured Doors to Prevent Access with Crowbar, Safety Cage for Charging Batteries, Steel Belt for Starter Battery
- Cage for Charging Batteries, Steel Belt for Starter Battery
- Remote Monitoring System Software Package is Integrated for Remote Access & Control
- Integrated Cooling System, Safety Locks, Emergency Stop Push Button

HIGH EFFICIENCY DESIGN AND COMPONENTS

ENGINE VARIABLE SPEED, PMG TECHNOLOGY AND DEEP CYCLE BATTERIES ENGINEERED TO ACHIEVE THE BEST PERFORMANCE

The "All-in-One" Composition



All-in-one power solution housed in a sound & water proof canopy made by galvanized and e-coated sheet metal structure, the HY-BOLT 1000 is composed of the following basic elements:

1. DC GenSet with PMG Technology
2. Variable Speed Engine (Diesel | LPG | NG)
3. Integrated Fuel Tank with anti-siphoning system
4. Deep Cycle Batteries (PzS or Lithium Technology)
5. Hybrid Controller for complete system management
6. Sound & Water proof canopy up to 70 dBA @ 1m
7. Lifting points for easy transportation
8. Armoured lockable doors

Anti-Theft Devices

SAFETY CAGE FOR CHARGING BATTERIES

ARMOURED DOORS TO PREVENT ACCESS WITH CROW BAR

INTEGRATED FUEL TANK WITH ANTI-SIPHONING SYSTEM

DC GENSET WITH VARIABLE SPEED ENGINE

CONTROLLER WITH INTEGRATED HYBRID LOGIC

SOUND & WEATHERPROOF CANOPY UP TO 70 dBA @ 1m

HYBRID WORKING PRINCIPLE

THE TECHNOLOGY THAT ALLOWS HUGE SAVINGS IN TERMS OF FUEL CONSUMPTION, EMISSIONS AND OPEX

The HYBRID TECHNOLOGY

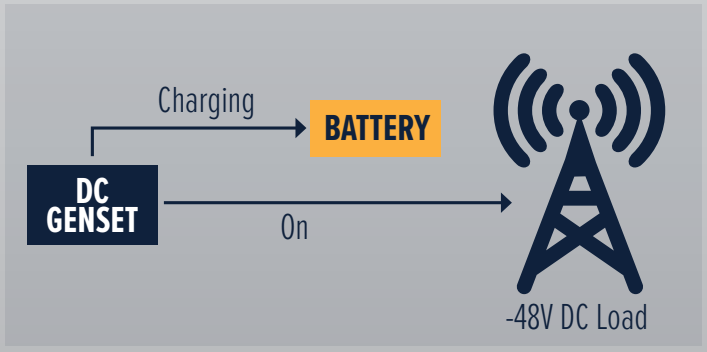
In Hybrid Technology, when DC Genset is running & supplying the load (ACTIVE MODE) it parallely keeps charging the Batteries. Once the DC Genset is off (SLEEPING MODE), the load is fed directly from batteries consequently achieving huge savings in terms of fuel consumptions, emissions & operative costs.

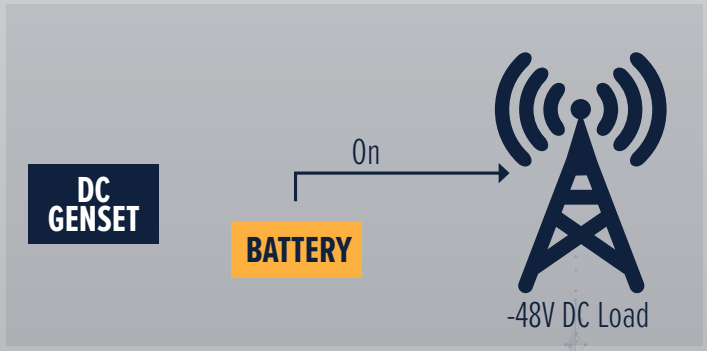
ACTIVE MODE - ENGINE ON

" When in ACTIVE mode, the GENSET is "ON" to power the loads and stores the excess power into the batteries"

SLEEPING MODE - ENGINE OFF

" When the Batteries are fully charged the GENSET automatically switches to STANDBY /SLEEPING mode & the site is powered by Batteries .Here when the batteries are discharged 50%, the GENSET switches to ACTIVE mode ."





TECHNICAL DATA

DIESEL / -48 Vdc | 7 - 24 kW | 2000 - 3000 Ah

ACCESSORIES & OPTIONAL

- Web Based Remote & Control Management System (4G / 5G)
- Rectifier 6-24 kW -48 Vdc / 230 Vac, 50/60 Hz to connect with GRID
- Inverter 0.8 -10 kVA -48Vdc/230 Vac, 50/60 Hz
- Solar Charge controller + PV package (panels + metal structure)
- DC Distribution Panel
- Automatic Lube Oil Top Up system to avoid daily check of lube oil level

HY-BOLT 1000
HYBRID POWER UNIT

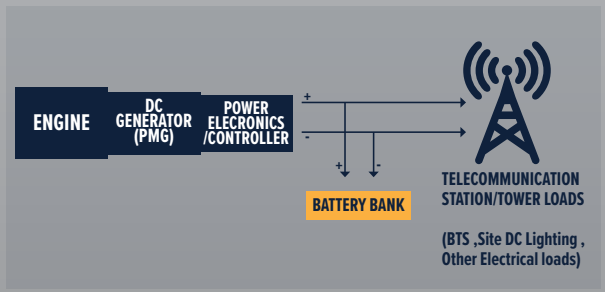
HYBRID GENERATORS | SERIES HY-BOLT 1000 DIESEL | PzS or Lithium Batteries

MODEL	ENGINE BRAND	DC GENSET MAX.POWER @ - 48VDC	*OPERATING LOAD RANGE	DC GENSET TECHNOLOGY	BATTERIES STORAGE CAPACITY [Ah]
		[kw]	[kw]		
HY-BOLT 1010	Perkins	7	2 - 0	PMG	300
HY-BOLT 1020	Kubota	10	3 - 0	PMG	300
HY-BOLT 1030	Perkins	10	3 - 0	PMG	600
HY-BOLT 1040	Kubota	10	3 - 0	PMG	600
HY-BOLT 1050	Deutz	12	5 - 0	PMG	900
HY-BOLT 1060	Deutz	18	6 - 0	PMG	1200
HY-BOLT 1070	Deutz	24	7 - 0	PMG	1500
HY-BOLT 1080	Deutz	24	8 - 0	PMG	2000

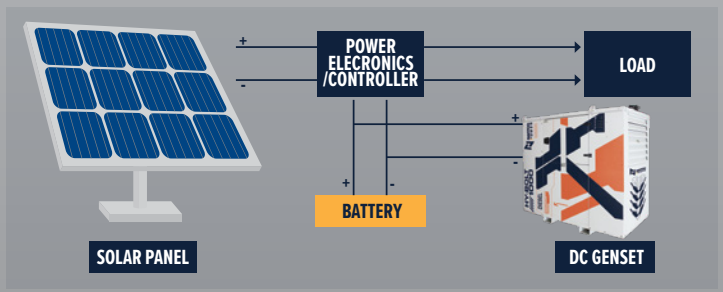
** Operating load range above is the best range for fuel savings.*

ACCESSORIES & OPTIONAL	
REMOTE MONITORING SYSTEM	
Web Base Remote Control Management System	o (3G modem) o 3G / 4G modem
Remote hosting	
N.8 free contacts for remote alarms	
ACCESSORIES TO CONNECT WITH AC SOURCE	
Rectifier to connect HY-BOLT 1000 to external AC power: grid/AC genset	o 3G / 4G modem (-48 Vdc / 230 Vac , 50/60 Hz)
ACCESSORIES TO CONVERT HPU DC POWER TO AC OUTPUT	
Inverter for small load (i.e. PC, phone, etc.)	o 800VA
Inverter charger to power AC load (i.e. Air Conditioning)	o 3 kVA / 5 kVA / 8 kVA / 10 kVA (- 48Vdc/230 Vac, 50/60 Hz)
ACCESSORIES TO CONNECT WITH SOLAR PV SYSTEM	
Solar Charge controller & PV Panels to enhance HY-BOLT 1000 performances	o 70 A o 3,24 kWp with N.12 x 270 kWp PV panel o 85 A o 4,32 kWp with N.16 x 270 kWp PV panel
DC DISTRIBUTION PANELS	
DC Distribution Panel without LVD logic for separate Tenants	o 4x80 Amp CB
DC Distribution Panel with LVLD logic for priority and non priority load	o up to 12 allocable CBs
EXTENDED RANGE PACKAGE FOR OIL REFILLING (suggested to avoid manual oil top up)	
Automatic Lube oil top up system	o to extend the manual lube oil refill up to 1000 hours
ANTI-THEFT DEVICES	
Steel Belt for starter battery	
Safety Cage for charging Batteries	
Armoured doors to prevent access with crowbar	
Integrated fuel tank	

HYBRID DC MODEL FOR TELECOM SECTOR



HYBRID DC MODEL WITH SOLAR PANELS



HY-BOLT *Flex* SERIES

LEADING THE HYBRID TECHNOLOGY BEST CLASS PERFORMANCE

The **HY-BOLT *Flex* Series** is a combination of DC Generator which is housed in an enclosure and an external Modular Battery storage cubicle called Energy Storage Cubicle (ESC).

The DC Generator enclosure houses the Generator, Hybrid controller & optional Solar Charge Controllers (SCC).

The DC Generator capacities are either 10/20/30/40 kW whereas ESC provides upto 1500Ah capacity storage.

Upto 2 x ESC solutions availble i.e. 3000Ah max.

The Core technology enables the DC generator to run only a few hours per day to power the DC load and simultaneously store energy in the Energy Storage Cubicle (ESC). When the batteries are completely charged, the DC generator stops and the batteries continue to supply the load. When the battery bank reaches the set DoD (Depth of Discharge) the DC generator starts and cycles the battery again. When SCC are installed, engine running hours are furthermore reduced even down to zero.

HY-BOLT *Flex* PACKAGE

- **Generator 10 / 20 / 30 / 40 kW**
- **Intelligent Hybrid Module (IHM)**
- **Up to 2 x Energy Storage Cubicle (ESC)**
- **Up to 1500Ah Lithium Batteries each ESC**

DC GENSET

ESC (Energy Storage Cubicle)

99.9% UPTIME GUARANTEED

UP TO 100% FUEL SAVINGS with PV Panels

MINIMUM OPEX

HY-BOLT *Flex* SERIES
FOR TOWERCOS & ESCO

THE GREEN SCALABLE AND MODULAR POWER SOLUTION

The system is designed to efficiently power Telecommunication Tower Sites with lower Opex when compared to 24/7 generator operation.
The package is designed to be hassle free. And as an option can include 5/10 years consumable spare parts, based on the usage, as well as extended warranty subject to the respect of NAFFCO terms and operations conditions.
The fully integrated IIoT System guarantees real time monitoring of the expected performances

The HY-BOLT Flex (HBF) is a green scalable power solution specifically designed for TowerCos and ESCO.

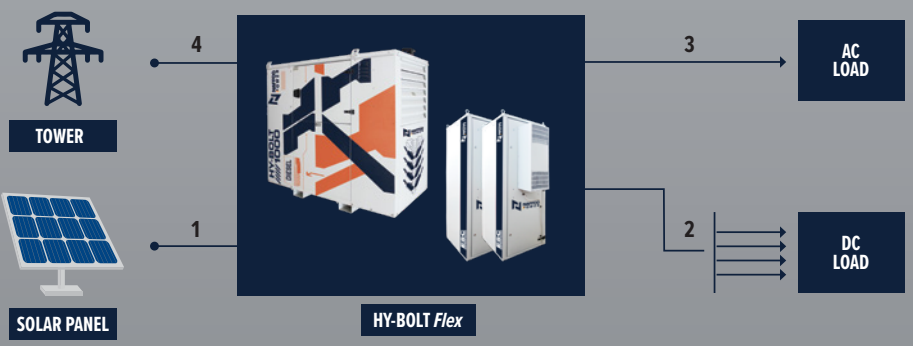
It is a flexible solution to accomodate the different needs of tower companies taking in consideration the scalabilty of the tenants that could be added without changing the main structure.

A multi-tenants distribution power output can be embedded in the HBF or the output can be connected to an existing distribution panel to easily connect up to 4 tenants of 3kW,-48Vdc power each or a mix of that up to 12kW dc load.

HY-BOLT *Flex* Series	RECOMMENDED PRODUCT HBF10	RECOMMENDED PRODUCT HBF20	RECOMMENDED PRODUCT HBF30	RECOMMENDED PRODUCT HBF40
	DIESEL + LPG + NG	DIESEL + LPG + NG	DIESEL + LPG + NG	DIESEL
TENANT CLASS A (2-3G) 2 kW -48Vdc LOAD	1 x 2kW TENANT	3 x 2kW TENANTS	4 x 2kW TENANTS	6 x 2kW TENANTS
TENANT CLASS B (3-4G) 3 kW -48Vdc LOAD	1 x 3kW TENANT	2 x 3kW TENANTS	3 x 3kW TENANTS	4 x 3kW TENANTS
TENANT CLASS A (2-5G) 4 kW -48Vdc LOAD	-	1 x 4kW TENANTS	2 x 4kW TENANTS	3 x 4kW TENANTS
MAX DC LOAD ALLOWED	from 0 to 3 kW*	up to 6kW*	up to 9kW	up to 12kW

** up to 3 Tenants (9kW) with full solar plant*

HBF 10-20-30-40 kW + 2 x ESC



SYSTEM COMPONENTS

1. PV array connection with SCC option
2. DC Distribution Panel
3. DC/AC converter for AC loads
4. AC/DC converter for tower connection

GENERATOR FEATURES

PLUG & PLAY WITH RENEWABLE ENERGIES
Ready to plug with Photovoltaic System

ECO FRIENDLY
- Reduction of CO2 emissions
- Noise Reduction

FUEL CONSUMPTION REDUCTION
Reduction up to 100% fuel consumption

IIoT PLATFORM
Web-based Remote management system

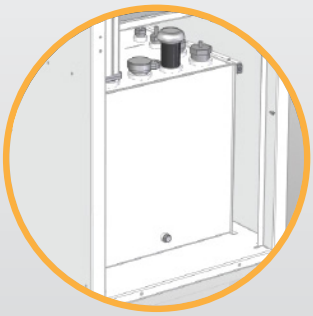
SCALABILITY
Minimum Opex

CUBICLE COMPOSITION

Scalable system housed in a galvanised and coated sheet metal structure, the Generator cubicle includes the following basic accessories:

- 2000L Integrated fuel tank
- Integrated control panel with IHM Module
- Automatic lube oil top up system
- Sound and weather proof canopy

COMPONENTS

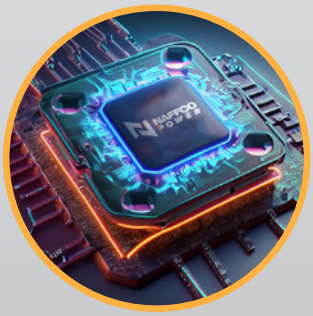


2000L INTEGRATED FUEL TANK

Integrated Fuel Tank forty days autonomy with 5kW load (no PVS).

AUTOMATIC LUBE OIL TOP UP SYSTEM

Automatically refills the oil in the sump and guarantees oil level between maintenance steps (up to 1000 running hours).



CONTROLLER WITH IHM CORE

The Hybrid Controller is the core of the system.
It's designed to manage all components including external renewable energy sources.

SOUND AND WEATHER PROOF CANOPY

The residual noise guaranteed by our canopies is tested at 80dB @ 1m.

TECHNICAL DATA

GENSET FEATURES	
ENGINE	
Engine	Perkins / Deutz
Operating Speed	Variable Speed
Fuel	Diesel (LPG and Natural Gas Option Available)
Service Interval	up to 1000 hours
ALTERNATOR	
Alternator manufacturer	ASCOT
Power (kW) @ ISO 3046 conditions	up to 40 kW
Exciter type	PMG

ESC MAIN FEATURES
ENERGY STORAGE CUBICLE

CLEAN ENERGY STORAGE CUBICLE

ESC

The ESC is a clean energy storage cubicle designed to reduce drastically the running hours of an existing diesel generator in an off grid or bad grid scenario. In case of good grid the ESC can perfectly replace your genset while configured in a standby application.

- SMALLEST FOOTPRINT AND SIZE
- 24/7 CONTINUITY OF SERVICE
- BACK UP/PRIMARY SOURCE
- COMPACT AND LIGHTWEIGHT

ENERGY STORAGE

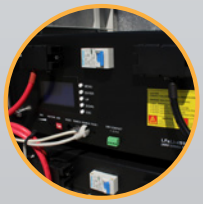
BATTERIES CAPACITY
1500 Ah

TECHNICAL DATA

ENERGY STORAGE CUBICLE FEATURES

Type of batteries	Lithium LFP
Nominal voltage battery bank	-48 Vdc
19” Rack slots 4U each	N°9
Battery module 19” Rack shape	100 Ah or 150 Ah
Battery bank nominal capacity	up to 1500 Ah (10 x 150 Ah)
Lifetime forecast	5000 cycles @80% DoD 30°C

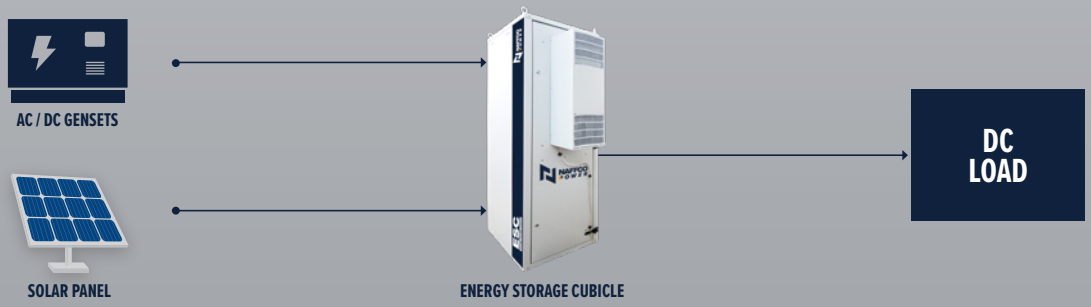
COMPONENTS



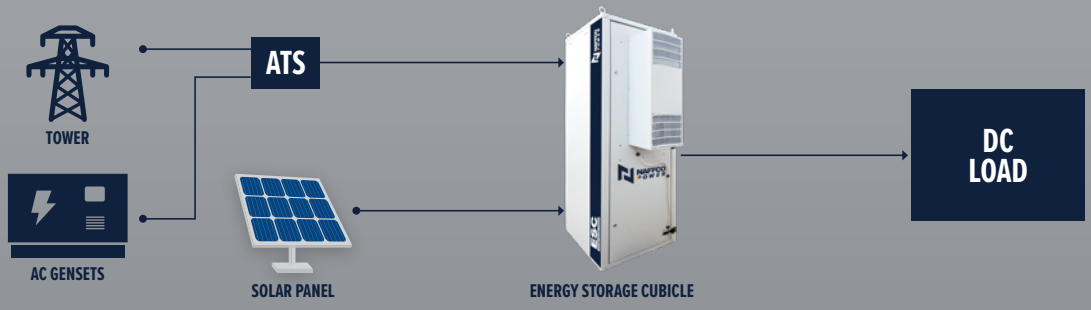
APPLICATIONS

- GOOD/BAD GRID configuration | Once connected with grid it is a perfect substitute of a standby genset.
- OFF GRID configuration | Once connected with a PV system it drastically reduces the genset running hours.

OFF GRID APPLICATION SCENARIO



ON GRID / BAD GRID APPLICATION SCENARIO



WORKING PRINCIPLE

THE HY-BOLT Flex SERIES

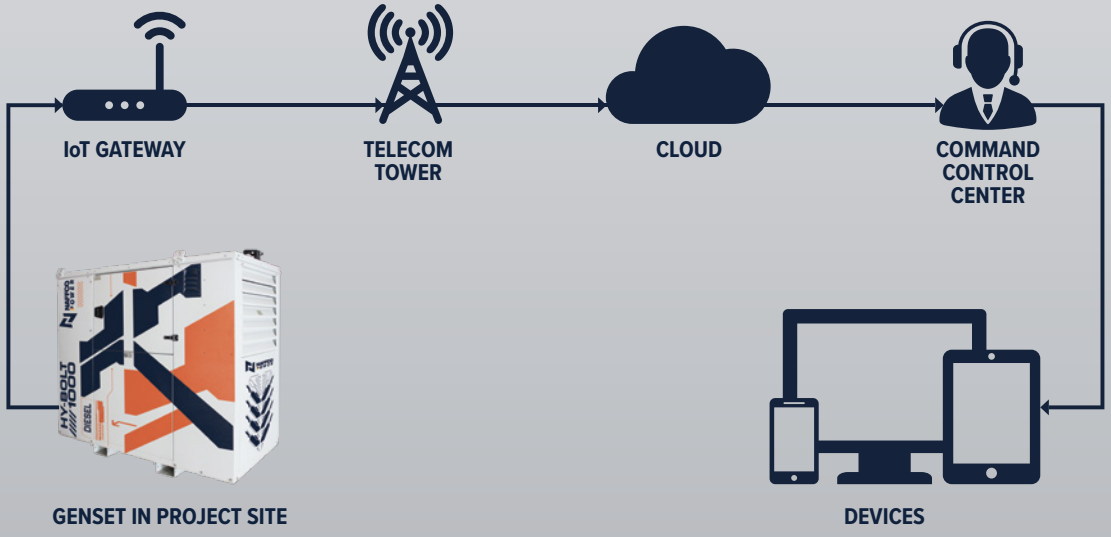
The **HBF** (**HY-BOLT *Flex* Series**) is designed to provide reliable energy as it can be used as a core product to hybridize energy production or as back-up power source. This System can provide huge savings in terms of fuel consumption and engine running hours compared with the traditional AC Genset running 24/7.
The main working principle is the CDC (Charging Discharging Cycling operation).

When the HBF engine is running, it feeds the load and stores the excess power into the ESC (Enegy Storage Cubicle). When the ESC is fully charged, the HBF engine automatically switches to stand-by mode and the site is powered by the ESC. When the batteries are discharged at the set DoD (Depth of Discharge) the HBF switches again to engine running.
If some PVs are added further savings will be granted for fuel and engine running hours.

If the PV Plant is sized to fully supply the load, then the Generator will only work as stand-by to it and it will be sized to supply the load only (no power to charge the battery will be needed).

IIoT BASED SMART MANAGEMENT SYSTEM

Our IIoT Platform permits monitoring & control of Hybrid Generators in remote locations



APPLICATIONS

IIoT application solution is designed to deliver the following key features that will address key challenges & meets the business goals

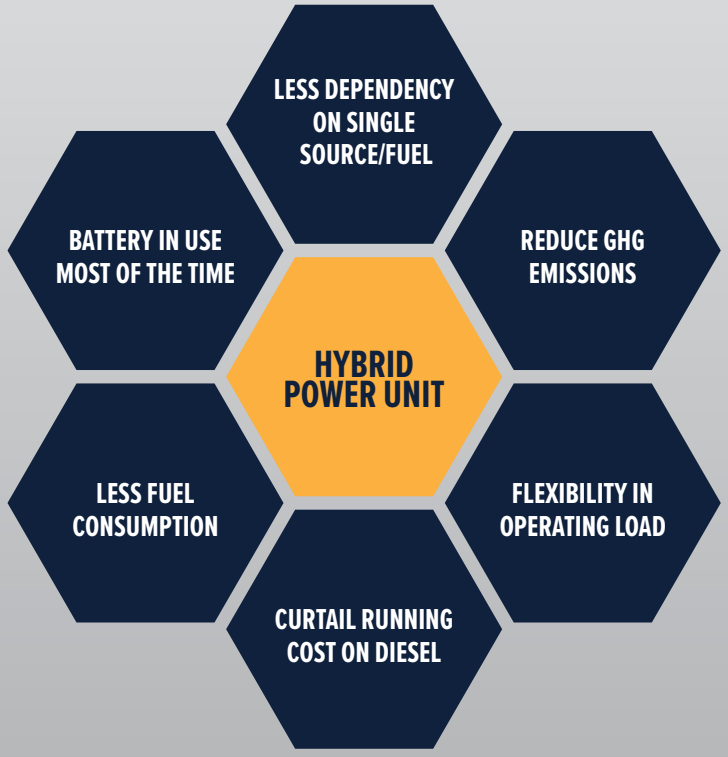
- Anywhere access
- Localization view of All Generator connected
- Remote monitoring of each Generator Condition – On/Off Status,RPM ,Engine Temperature
- Remote Start and Stop of the Generator, Battery status Management, Fuel Management,
- Capturing Generator details such Location, Testing and commissioning date, Warranty period, test certificates, manuals, etc
- Pop Up Notifications for downtime and reason capturing
- Configurable threshold limit-based condition diagnostics & alerts
- Role based interfaces and applications
- Digital continuous improvement management system
- Ticketing system to track the issue raised from the system as well as man-initiated request using mobile app
- Periodical reports & trends for zone wise & asset utilization
- Report extraction
- Automated alerts & notifications – Email, SMS & Mobile app notifications

HYBRID APPLICATION

The DC Generators at different power and voltages are designed to power remote and Off-Grid location for different industries:

- Telecom, requires – 48 Vdc Generators to power off grid BTS located in isolated areas
- Agriculture, requires 24 Vdc Generators for irrigation and drainage systems
- Railways, requires 12 Vdc Generators to power and control the remote signals spread out along the rail
- Oil & Gas, requires 24 Vdc Generators at times to power and command the uncontrolled motorized valves spread out along the oil pipeline

HYBRID POWER SOLUTIONS BENEFITS



AFTER SALES & TRAINING

- We are not only offering the product but will also provide training, service and maintenance options.
- We offer the troubleshooting solutions in case of any breakdowns or uncommon performances.
- Our after sales team can offer the service of our specialized Engineers & technicians when needed.
- We also undertake Annual Maintenance contracts which will ensure smooth functioning of Hybrid Power unit.
- Our training includes overview on Battery charging/discharging , storage , handling precautions , other aspects like voltage check & temperature regulation.

Serving Over 100 Countries Worldwide

NAFFCO

Email: info@naffcopower.com
www.naffcopower.com

In line with NAFFCO policy for continuous product development, NAFFCO has the right to change specifications without prior notice.

NF-CA-HYPTS-U0223A-P0223A-DXB

SUPPORT IS NOW AVAILABLE ON **WHATSAPP**

+971 800 623326