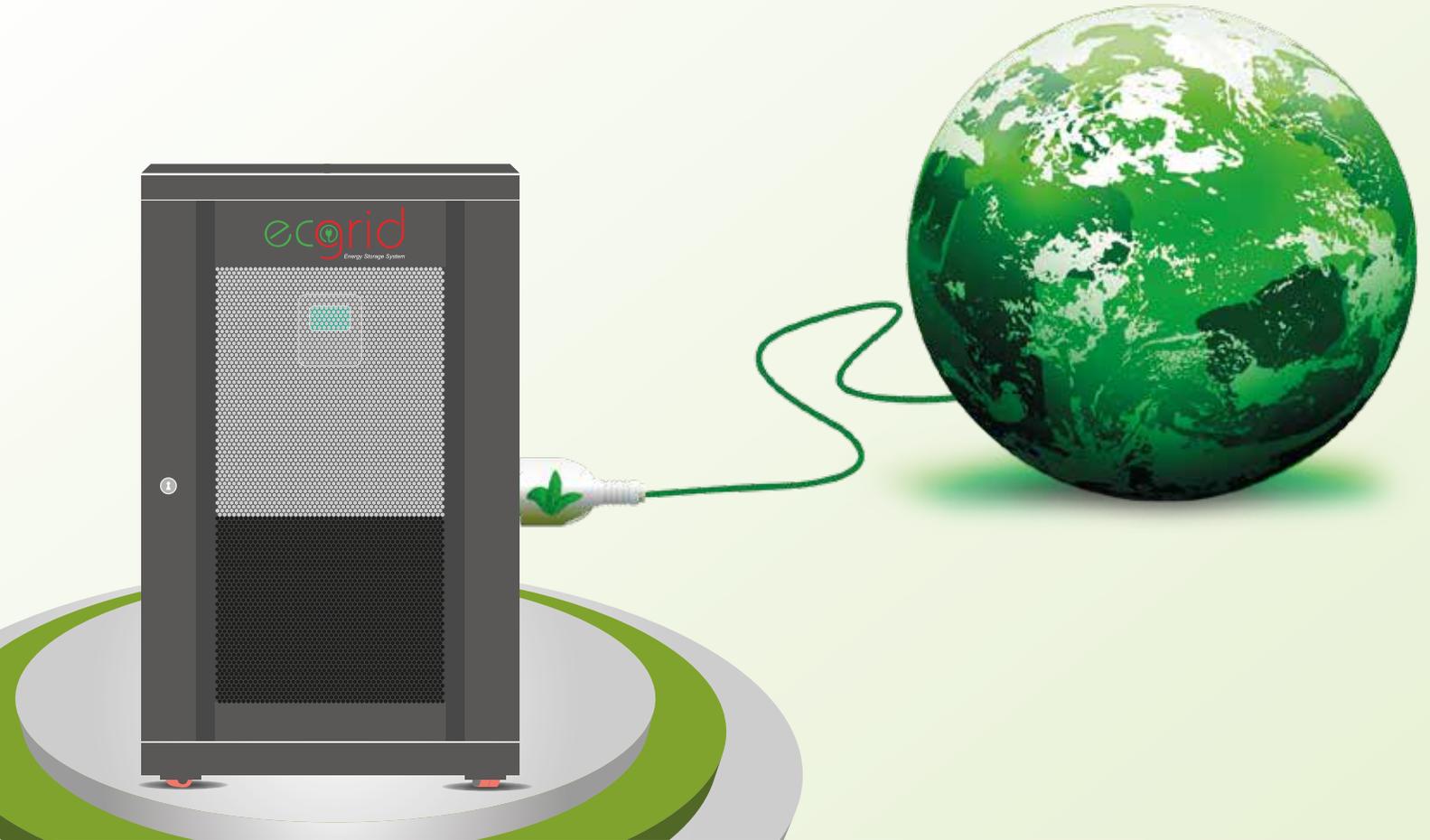




greenergy

Charging the Future

Energy Storage for a sustainable world



Grid Scale



Health care



High Altitude Areas



Telecom



Hospitality & Retail



Industries



Offices



Buildings & Residence

SUCCESS STORY

HIGH ALTITUDE AREAS



THE GAME CHANGER HAS ARRIVED

EcoGrid Energy Storage System is already serving Defence Force as a vital component to provide them energy independence for their stationary applications. Here is a case study on how it is making a positive and major difference to them on a daily basis by solving their living and operating challenges.

The Indian Armed Forces are the prime guardians of our national integrity and sovereignty. Braving inclement weather conditions is a part of their life to protect & serve the entire length and breadth of the country including places which face extreme weather conditions. These places face following further challenges making living further tougher:

- No grid availability at most of the frontiers / forward locations.
- Un-reliable power because of frequent breakdown of distribution lines.
- Poor Quality of power due to distances – Substation and point of use.
- No preventive Maintenance - Frequent Damages of electrical / electronic equipment due to electrical fault.
- Sub-zero temperature making it difficult to survive (frozen water and Fuel)

Thus, they were left at the mercy of DG Sets. However, running DG Sets in High Altitude Areas (HAA) also comes with its own set of logistical

limitations & technological challenges:

- DG Sets run with poor efficiencies and deration due to high altitude.
- Lack of trained manpower for DG Maintenance.
- Severe issues of Cold Starting.
- Improper Selection of DG Sets Sizing – Result in further inefficiencies.

**“Indomitable,
they are.
FEARLESS,
they are.”**

To combat the limitations of DG Sets, Indian Army and Paramilitary Forces installed Solar PV and Wind Energy Systems with Conventional Lead Acid Battery based Energy Storage System. However, it was not successful as renewable energy source in HAA cannot function to full potential due to limitations with Lead Acid Battery banks.

No one deserves the title of a 'Hero' more than a soldier. The brave men guard one of the most notorious international borders which behave like a battle-field all around the year. But, thanks to EcoGrid which is successfully providing them power independence round the clock.

DG limitations in HAA

- **High Altitude:** Due to the low air density, the engine remains hot causing frequent overheating.
- **Temperature:** Due to inadequate oxygen levels available for combustion ignition and frequent overheating; it collapses regularly.
- **Humidity:** Low oxygen levels impair ignition.
- **Derating:** Every 1000 ft above sea-level, a gasoline will get derated by 2–3% of its standard output.
- **Fuel Problems:** Getting diesel in HAA is a very cumbersome & expensive affair. Also gelling of diesel fuel may set in a new challenge.
- **Logistics:** Heavy weight of generators pose another major problem.
- **Maintenance:** Frequent maintenance required – High fuel gas temp. Maintenance expenses are also a cause of concern.
- **Low Efficiency:** Low efficiency yields high energy cost.
- **Polluting:** DG Sets are highly polluting & also cause global warming.
- **Large footprint:** Placing them at High altitudes is very cumbersome and risky.
- **Security Threat:** DG engine makes a noise which gets traced by enemies.



Lead Acid Battery Limitations in HAA

- Not working due to low temperature
- Low Efficiency
- Heavy Weight
- High Operating Cost
- Less Cycle Life – Frequent replacement
- Long Charging Time (Minimum 8 Hrs.)
- Polluting – Lead is a poisonous substance
- Large footprint
- Day to day challenges in smooth functioning

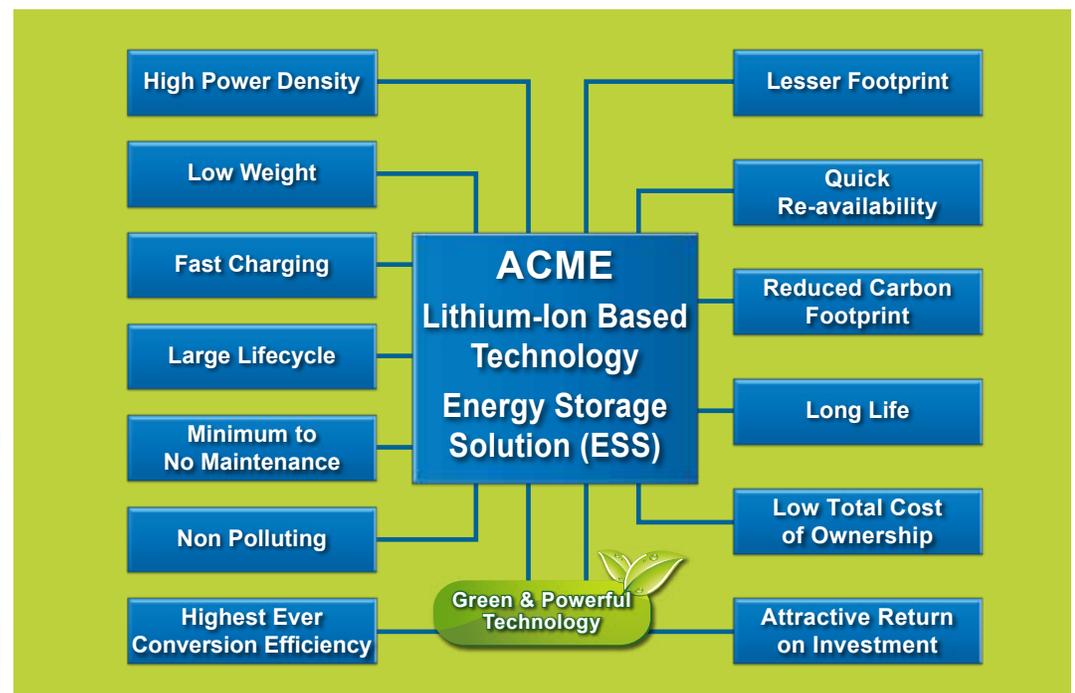
The Long Sustainable Technological Solution

ACME experience in energy sector goes way back. Founded in 2003, our business focus is around 3E's – Energy Conservation, Energy Management and Energy Generation. Now with expanded vision, ACME has introduced game-changing Lithium-ion based EcoGrid Energy Storage System (ESS) which work successfully under any critical conditions and fit every application from residential, commercial to industrial.

Having worked for more than 5 years in HAA and after implementing multiple projects with Indian Army and paramilitary forces for making the comfortable living conditions; ACME

introduced EcoGrid ESS customized for HAA after listening to their problems and challenges. These systems were successfully tested during winter trials in High Altitude Areas. EcoGrid ESS provides very high efficiency, 10 years lifetime and deep-cycle capability —thus providing a better ROI and cost efficiency to them as well as no hassles. Additionally, it requires less than one-third the space as compared to other solutions.

We are happy to serve our Defence Forces and take pride for successfully accomplishing this project & solving their challenges. With the installation of EcoGrid ESS, they are able to harness renewable energy and reduce their dependence on Fossil Fuels & Diesel.



A matrix below lists down various operational, physical and emotional challenges faced by Indian armed forces and paramilitary forces in High Altitude Areas and how these challenges have been eliminated by incorporating the ECOGRID:

Key Challenges @ HAA	How EcoGrid Eliminates / Minimizes challenges	Remark
Health and Safety (Space Heating and Ventilation System)		
<p>The forces deployed in HAA use various traditional heating methods due to non-availability of reliable power source. But the burning of bukharies and direct fired space heater with poor ventilation system cause CO2 Poisoning to the occupants including other respiratory diseases. These become one of the major reasons of life loss in HAA.</p>	<p>By having reliable continuous electrical power of good quality through EcoGrid following is implemented to improve internal air quality:</p> <ul style="list-style-type: none"> • Use of efficient electrical heating system • Critical Instrumentation and power for forced and effective ventilation system • Use of sophisticated temperature control systems • Better possibility to use renewable energy source i.e. Wind and Solar for space heating. 	<p>The prime power source presently in use in HAA is DG Set. The running of DG Set for space heating is very inefficient technique. The Indirect fired heaters specially designed for HAA with EcoGrid have reduced the running of DG Sets and helping in maintaining good internal air quality. Also the quality of power from DG Set impacts the functionality of sophisticated instrumentation system for temperature and ventilation system.</p>
Availability of Hot Water & Disposal of Human Waste		
<p>The rivers and springs are the main source of potable water for drinking and sanitary purpose in forward locations. The forces are storing water in both insulated and un-insulated tanks. Due to extreme weather, the water freezes and heating of water through conventional methods becomes inevitable. Also the pipe lines are getting damaged due to freezing of retained water in the pipe. The less or no availability of hot water in HAA causes:</p> <ul style="list-style-type: none"> • Compromise on Personal hygiene • Unhygienic Toilets and urinals • Contaminated Drinking water - having traces of kerosene / diesel <p>Maintaining suitable thermal environment for survival of the microorganisms responsible for degradation of Human Waste is difficult at HAA. Both Anaerobic and aerobic methods of sewage treatment are ineffective due to low temperature prevailing in the area. Chemicals are very expensive for the amount of fecal matter to be degraded leading to various kinds of pollution.</p>	<p>Due to continuous electrical power availability through EcoGrid</p> <ul style="list-style-type: none"> • It becomes possible to provide electrical heat tracing in the insulated tanks and piping system • Suitable fresh water circulation system designed and implemented to have running tap water in toilets in HAA • The fresh water circulation system helping in waste heat recovery from the DG Set exhaust <p>By designing integrated system with EcoGrid, thermal environment of the sewage treatment and interconnecting piping becomes possible.</p>	<p>Conventionally these concepts of having hot running water in toilets was not possible as the formations in the frontiers were generating electricity through DG Sets and quality 24 X 7 Power was not possible due to limited stocks of diesel - one of the most critical resource in HAA with very high logistics cost.</p> <p>As EcoGrid can store harnessed renewable energy in most efficient and dependable ways, the better designed automatic water systems have been deployed.</p> <p>With conventional system it was not possible to maintain thermal environment due non-availability of electricity 24 X 7.</p>
Operational Requirements (Communication Systems)		
<p>Keeping vigilance on the activities in the border areas, require our forces to be in uninterrupted communication with the respective base units. Due to unavailability of reliable power source the formations in HAA are running DG Sets throughout to keep the communication system operational. Also as the conventional energy storage systems are ineffective due to low ambient temperatures the renewable source cannot be used efficiently causing:</p> <ul style="list-style-type: none"> • Inefficient and high power cost • Air pollution • Thermal Signature easily detectable on thermal imager 	<p>EcoGrid integrated with alternate energy source can ensure minimum running of DG Sets and systems can be designed for 10 to 15 days autonomy.</p>	
Operational Requirements (Surveillance Systems)		
<p>The surveillance systems deployed in frontier formations i.e. Thermal Imager, Night Vision Cameras, Radars, etc. need uninterrupted electrical power source, to keep the system working effectively. Earlier it was being done through DG Sets due to unavailability of quality power.</p>	<p>By integrating EcoGrid with surveillance systems a uninterrupted power is ensured and our forward formations can use the deployed systems to the fullest and better border management can be ensured.</p>	

SUCCESS STORY

MICRO-GRID FOR REMOTE AREAS

EcoGrid ESS Brings Smiles to over 5000 families of villages in Uttar Pradesh, Telangana, Maharashtra, Karnataka

through:

- Containing Diseases
- Leading to Healthier Lives
- Enhancing business

with advance innovative technology EcoGrid ESS

Transforming lives with drinkable water while overcoming Obstacles to local sustainability and crisis situation created by water borne diseases

Located in Northern India, Uttar Pradesh is the country's most populated state with over 200 million people. It is also home to some of India's most famous destinations, including the Taj Mahal and Varanasi, yet over 20 million people are without access to safe and affordable water. Much of the groundwater here has excessive levels of fluoride and total dissolved solids, as well as high microbial contaminants. Consequently, water-related sickness is a way of life here. Villagers suffer severe joint pain and other physical disabilities that impair their ability to work. Children's health is compromised and their growth, stunted, making it impossible to attend school. Drinking untreated water has often led to significant diseases, and sometimes even death.

This was also the story of Charoli Village in UP which faced a lot of problem with drinking water. A bore well was installed and villagers would drink water through the bore



well. It was found that the water had a lot of contamination which started affecting people through catching diseases. This started impacting people. Then an NGO named Safe Water Networks set up an R.O plant which started providing filtered and clean water. It started improving the lives of people who would drink non-contaminated water. Further the clean water supply was for 4 hours only because electricity was available only for limited period of time. Hence beyond that period clean water availability became again a bit scarce. Then a micro-grid was installed with new technology. This made electricity and stable electricity supply available for extended hours upto 18 hours. The clean water was then available not only to this entire village people but to the adjoining village as well. Hence this started containing diseases and villagers started living healthier lives. This improved through this new technology product called EcoGrid, a green technology which stores electricity and provides power to run the R.O plant for extended hours even during the night time. Hence it not only improved the pain points of business of the company which would supply water to villagers but importantly diseases to the villagers got contained due to non-contaminated water.

This game-changing system is designed to

support grid-tied, grid isolated in the event of grid failure, and off-grid configurations. Each configuration delivers years of dedicated peak shifting, back-up power, energy efficiency and industry-leading performance. It's a breakthrough technology and a superior advantage surpass the current technology and provides several benefits to the customers by overcoming their core challenges of related process issues, safety, security and others.

Thanks to ACME's partnership with Safe Water Network, residents of Charoli & many other nearby arid villages also have 24X7 access to the treated water at a meager amount of Rs. 7 for a 20 litre can.

The plant has a capacity to produce 1,000 litres of potable water per hour. The initiative is aimed at mitigating the drinking water woes of all the nearby villages and solving the problem of contaminated water supply in rural areas while leveraging solar with energy storage to bring the greatest advantages to the beneficiaries of the system.

The success of this installation proved that this model can be broadly replicated at almost all the locations with same or other unique set of challenges.



ADVANTAGES of EcoGrid Energy Storage Device that make it a game-changing system:

- Fast charging
- Very High Efficiency – minimum waste
- Compact- small footprint as compared to conventional systems
- Much larger life as compared to existing technologies, hence replacement hassles are not there
- Wide temperature range
- Much lesser weight
- No maintenance
- No logistical challenges
- Automatic hence no discontinuity
- Much longer performance warranty
- Optimize Economical Energy Source Utilization
- All-in-One Unitized Solution
- Reliable Power Source
- No fumes, no health hazard
- Green technology

ACME Group is happy to work with Safe Water Networks in their other ambitious projects under same model in four different states to provide over 5000 families affordable access to reliable and affordable clean water. EcoGrid not only overcame business pain points of the Company which would supply clean water to Villages but importantly diseases to the villagers got contained. Due to its success, EcoGrid has got installed at many more places and is continuing.



●
Save Energy
Increase Efficiency
Enhance Productivity
Boost Your Profits
●

