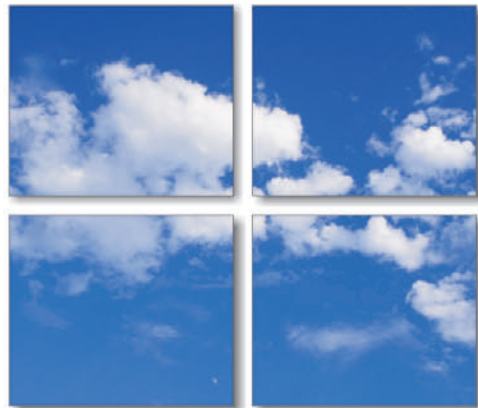


Greener Pastures....

C O M P A N Y P R O F I L E



Clean
POWER 

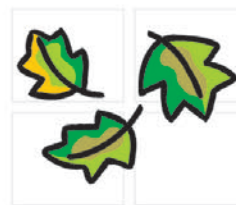
Clean Power

Clean Power, an independent and credible forum, acknowledged by the Alternate Energy Development Board (AEDB) Government of Pakistan, is an independent company that specializes in high-level technical consultancy on engineering projects, particularly in projects related to renewable energy.

Clean Power

Mission Statement

To operate in the alternate / renewable energy sector through local & international collaboration, and contribute to sustainable social development by creating awareness and providing cost effective, practicable and environmentally friendly solutions. Also, to provide end-to-end project management consultancy on engineering projects, and to work on Human Resource Development in renewable energies and other specialized engineering disciplines.



Why Clean Power?

Most of us take electricity for granted; we also tend to overlook the fact that over 2 billion people in the world do not have access to electricity. The world population is increasing at an alarming pace; it will cross the 12 billion mark by the year 2100. With the upsurge in population, the world's energy requirements are also increasing. It is estimated that in times to come, the demand for energy will be more than 5 times greater than it is right now.

Modern technology and industrialization, with all its advantages for society, has also created some serious hazards.

The present sources of energy are proving to be grossly insufficient to meet the ever-increasing energy requirements of planet Earth. Therefore, a need has been created to diversify the supply sources for energy... this includes increasing the use of renewable energy and not to rely primarily on one type of fossil fuel or another, be that gas, coal or nuclear. Meeting energy requirements through

renewable sources will not only help preserve the depleting sources of energy, but also be friendlier to the environment.

The main burden for CO₂ reductions inevitably falls on the developing world, since it has yet to build its electricity infrastructure and supply.

- Rapid rise in population presses for more electricity.
- More than half of the population below poverty line.
- Huge expense and major logistical problems in electrifying remote areas.

Economic development of the country is heavily reliant on alleviating poverty and promoting industrial activity in remote areas. Using renewable sources to provide energy to remote areas is the need of the hour.

The social and environmental issues involved are:

- The mining of finite fossil resources. The current rate of using coal, oil and gas will increase the global temperature by 2 degrees Celsius by 2010.
- The transportation of fossil fuels via tankers, railways, and pipelines.
- The harmful CO₂ emissions, and related air quality and global warming concerns
- Acid rain
- The disposal of waste materials (some of which remain hazardous for 50,000 years, such as high level radioactive waste).
- The enormous quantities of fresh water utilized to cool thermal power plants.



HUMAN RESOURCE

Clean Power has qualified and dynamic personnel, which it considers as its best and most valuable resource. Clean Power's competitive edge is based on the skill and experience of its human resource in end-to-end management of complex technical and engineering projects. Our people are competent in a variety of areas, including;

- ❖ Business Development
- ❖ Systems Engineering
- ❖ Product Design, Development and Qualification.
- ❖ Commissioning and Product Support
- ❖ Configuration Management (CM)
- ❖ Integrated Logistics Support (ILS)
- ❖ Total Quality Management (TQM)
- ❖ Information Technology (IT)

Moreover, we can safely claim that we have some of

Human

the most qualified personnel in Pakistan in the field of renewable energies. The strength of Clean Power is not only the theoretical knowledge of its personnel, but also their hands-on experience in renewable energy applications. Their academic and practical knowledge is further complemented by their patriotism and their commitment to develop and spread the use of renewable energies for the betterment of society.

Resource

Clean Power strongly believes in human resource development it encourages continuous learning and growth through exposure to state-of-the-art technology, best management practices, and result-oriented project management.



THE EXPERTISE:

Clean Power's areas of expertise include renewable energy applications, project management, consultancy & training, and engineering certifications.

1. Renewable Energy Applications

Clean Power's main focus is on development and promotion of renewable energy applications in Pakistan. Our objectives in this sector are as follows:-

- ❖ Reducing dependence of Pakistan on imported oil.
- ❖ Diminishing the adverse impact of carbon contents in the air, thereby ensuring a cleaner environment and addressing global warming concerns.
- ❖ Grass-root level poverty alleviation in Pakistan.
- ❖ Providing alternate fuel to power farming, transportation, and industrial activities.
- ❖ Providing sustainable and cost-effective

electricity to remote areas.

- ❖ Promoting industrial activity and use of modern farming machinery in remote areas.

Clean Power's scope of work in the area of renewable energies includes the following:-

- ❖ Research and feasibility studies (technical and commercial) with solutions for widespread acceptance of renewable energy applications
- ❖ Policy recommendations for government agencies and law-makers
- ❖ Pilot projects demonstrating viability of solutions, including pilot production and qualification
- ❖ Large-scale projects for mass deployment / production (including supply chain mechanism)
- ❖ Design, planning and development of infrastructure
- ❖ TOT and operations management
- ❖ Public awareness of renewable energy applications through seminars, conferences, user training, etc.

*Renewable
Energy*



2. Project Management

- ❖ Project planning & feasibilities
- ❖ Project execution
 - ♦ Prototyping, testing and qualification
 - ♦ Commissioning and installation
 - ♦ Groundwork for mass deployment
 - Vendor development and qualification
 - Production through qualified vendors
 - Supply mechanism
 - Distribution mechanism
 - ♦ Infrastructure planning and development
- ❖ Operations management
- ❖ Technical documentation and CM
- ❖ Quality Management Systems (QMS)
- ❖ User-level training
- ❖ Product support and ILS

*Project
Management*



3. Consultancy and Training

❖ Configuration Management (CM)

"The process of managing products, facilities and processes by managing the information about them, including changes, and ensuring they are what they are supposed to be in every case."

- ❖ Documentation and record maintained from design till completion.
- ❖ Record of modifications and upgrades.
- ❖ Traceability to project execution.
- ❖ Repeatability of processes.
- ❖ Compilation of TDP.
- ❖ Complete processing via software.
- ❖ Reduces the product's development cycle.
- ❖ Reduces the product's cost.
- ❖ Improves the product's quality.

❖ Integrated Logistics Support (ILS)

"The planning, estimation and implementation of the infrastructure and facilities required to ensure successful management of a project, and/or smooth

induction of a product in the customer's environment"

The elements of ILS include the following:-

- ❖ Supply Chain Management
- ❖ Maintenance management
- ❖ Systems integration for optimum performance
- ❖ Systems modifications during operations
- ❖ RAM engineering
 - ◆ Reliability
 - ◆ Availability
 - ◆ Maintainability
- ❖ Engineering support in the field
- ❖ Technical publications for the end user

4. Engineering Certifications

- ❖ Vendor Development and Certification.
- ❖ TOT of consultancy services to make vendors independent.

*Consultancy
&
Certifications*



PRODUCTS

- ❖ Bio-fuels
- ❖ Solar Photovoltaic Systems
 - ◆ Street Lights
 - ◆ Bill Board Lighting systems
 - ◆ Portable Mobile Phone Chargers
- ❖ Mobile Generator Systems
 - ◆ Pedal Generator
 - ◆ Hand-operated Generator
 - ◆ Hand-operated Mobile Phone Chargers
- ❖ Small Portable Windmills Design

THE PROJECTS:

Clean power conducts research and development activities in several areas of renewable energy; including

- ❖ Bio-fuels
- ❖ Solar Energy
- ❖ Mobile Generator Systems
- ❖ Wind Energy
- ❖ Fuel Cell technology

Products & Projects

LOCAL AND INTERNATIONAL COLLABORATIONS

Clean Power is working with the following groups within Pakistan and abroad:-

- ❖ The federal and provincial governments.
- ❖ Alternate energy governing bodies and regulatory agencies.
- ❖ Alternate energy associations and societies.
- ❖ Social and economic development agencies in public and private sectors.
- ❖ Investors from private sector.
- ❖ OEMs.
- ❖ Manufacturers of indigenous and reverse engineered products.



Bio-Fuels:

With increase in demand of petroleum products, the prices of fossil fuels are not only rising day by day but are also conferring hazardous damages to our environment. Hence it is imperative that some alternative sources of energy for running our automobiles, generators etc. are identified.

Clean Power has been conducting research on Bio-fuels as commercially viable and environmentally friendly alternates for fossil fuels.

❖ Clean Power is the pioneer of Bio-diesel in Pakistan. It is the first company in Pakistan to have developed Bio-diesel from completely renewable sources like plant seeds and waste oils. Clean Power has conducted various experiments of Bio-diesel as an alternative fuel for diesel engines. Successful road runs have proven that it is a more

efficient fuel. Applications other than automotive include powering industrial machinery and farming machinery.

❖ Clean Power has been selected by the AEDB for conducting R&D of Bio-diesel in Pakistan, and developing a working model to serve as a basis for mass-scale production and usage of Bio-diesel.

❖ R&D work is also being done on Fuel Ethanol, which can be used as an alternative to petrol. Clean Power is working on development of Fuel Ethanol from renewable bio-mass (molasses) which is abundantly available in an agriculture-based industry like Pakistan.



Solar Energy

Solar Energy:

Like majority of the under developed countries, Pakistan is blessed with naturally existing solar energy. Except for the northern areas, the entire country receives rich solar insolation throughout the year. Solar energy is clean, predictable and naturally available. It holds good promise for supplementing Pakistan's effort to overcome shortage of energy and its provisioning to masses. Clean Power has expertise in all areas and applications of solar energy. It has developed a variety of solutions including the following:-

❖ Portable solar mobile phone chargers for the public in areas where grid-electricity is not available. In line with the GoP's objective to uplift the rural population, Clean Power's product will become part of a bigger solution to;

- ♦ give the rural public cellular connectivity
- ♦ increase chances of economic development
- ♦ enhance their living standards.

❖ Solar electrification of homes and villages

- ♦ Identification of domestic electricity requirement
- ♦ Gathering of behavioral data
- ♦ Design of system
 - Solar photovoltaic cells
 - Battery bank
 - Charge controllers
 - Light Emitting Diodes (LEDs)
 - Fans
- ♦ System integration (including indigenous manufacturing and procurement of off-the-shelf items)
- ♦ Installation and commissioning
- ♦ Operational support

- ❖ Solar-lit billboards with energy-efficient LEDs
 - ♦ Off-grid lighting of billboards
 - ♦ No infrastructure for transmission lines



- ♦ Portable systems
- ♦ Zero / Low operational & maintenance cost
- ♦ Energy Conservation by using LEDs



Mobile Generator Systems:

This is another area where Clean Power has had pioneering and ground-breaking success. Pakistan has high percentage of population living in areas where there is neither grid-electricity nor are other sources of renewable energy (wind and solar) feasible. Mobile Generator Systems will give those people low-cost and practicable solutions for “home-made electricity”.

Pedal and Hand-operated Generator Systems convert human energy into electricity which is stored in a Battery Bank.

Clean Power has indigenously developed and tested prototypes of Pedal and Hand Generator Systems through local resources in Pakistan.

*Mobile
Generator
Systems*



Wind Energy:

Wind offers an inexpensive, clean and reliable form of power. Unlike fossil fuels, wind power cannot be depleted and produces no pollution. Wind energy has become one of today's lower cost renewable energy technologies. Following the OPEC Oil Embargo of 1973, interest in wind energy resurfaced in response to climbing energy prices and questionable availability of conventional fuels.

According to Alternative Energy Development Board notification, Pakistan plans to generate 10% share of total installed capacity through renewable energy in general and wind energy in particular by the year 2015.

Using wind energy, lighting can be provided to the population along the coastal belt in the Balochistan and Sindh provinces; large wind turbines can also

*Wind
Energy*

provide them grid connected energy.

Clean Power has expertise in end-to-end project management of wind-mill projects in Pakistan, with practical experience in micro wind turbines. **Clean Power** has the following strengths in wind energy projects:-

- ❖ TOT management.
- ❖ Development and manufacturing through qualified vendors.
- ❖ Consultancy on installation, commissioning and testing.
- ❖ Practical undertaking of installation, commissioning and testing.
- ❖ Operations Management of Wind Farms.
- ❖ Product support and maintenance.
- ❖ ILS, technical documentation and CM.



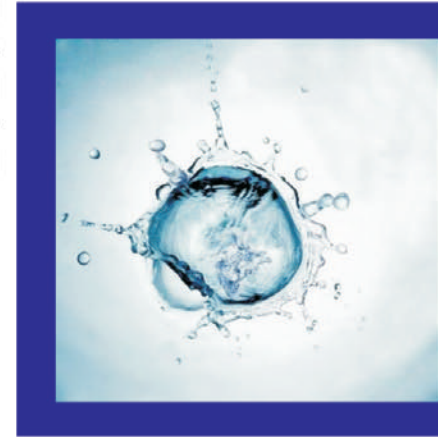
Fuel Cell Technology:

An alternate source of providing cost-effective, grid-independent, environmentally friendly, and sustainable electricity to the rural and remote areas of Pakistan is the Fuel Cell. The Fuel Cell is the technology of the future, and has great potential to supplement Pakistan's upcoming energy requirements. Applications of the fuel cell will open up the possibility of spurring rural industrialization and development, promoting broad-based sustainable agriculture, in addition to giving clean drinkable water as a by-product. The applications of fuel cell technology range from poverty alleviation to "clean cars" to military applications.

Clean Power has the knowledge and expertise to promote and implement fuel cell applications in Pakistan. Our experts are especially trained in this technology, and have practical knowledge of fuel cell applications. Our core competency is not only our research and knowledge base in this area, but also the fact that Clean Power is the first company in

Pakistan that has developed a laboratory model of the fuel cell. We have also developed models for various applications of fuel cells, after extensive research and consultation with international OEMs of the likes of Toshiba International of Japan and ECN of the Netherlands.

Clean Power's mandate also includes increasing awareness about fuel cell technology and applications in Pakistan, and encouraging research in this area in local universities. Leading professional universities in Pakistan, including the University of Engineering and Technology Taxila, and NED University Karachi, are conducting organized research in fuel cell applications.



Human Resource Development:

Clean Power's mission includes not only increasing public awareness about renewable energy applications in Pakistan from a user point of view, but also developing and training the human resource in the country in order to prepare them to cope with the technologies of the future.

These technologies include renewable energies as well as specialized engineering areas like CM, ILS and QMS.

Human Resource Development

Clean Power provides training and encourages information-sharing in these disciplines in the form of

- ❖ Workshops and short courses.
- ❖ Conferences and seminars.
- ❖ Exclusive training for organizations.
- ❖ Introduction of renewable energy curriculum in academics.



THE FUTURE VISION:

❖ Establishing **Bio-fuels** as commercially viable substitute fuels for automobile and industrial applications.

- ♦ Streamlining supply sources and establishing large-scale production / supply chain mechanisms for raw material.
- ♦ Setting up of Bio-fuel production / blending plants.
- ♦ Working toward subsidies and incentives by GoP for Bio-fuels.

❖ Development of energy-efficient **Solar Products** and thereby promote the cause of Government of Pakistan of providing electricity to remote areas through Solar Energy.

❖ Mass deployment of **Hand-operated and Solar Chargers** for mobile phones to facilitate cellular service in areas without electricity.

❖ Mass deployment of **Mobile Generator Systems** for off-grid electrification in Pakistan, mainly in remote areas where WAPDA cannot provide electricity, or where other forms of renewable energy, like solar or wind, are not feasible.

❖ Encouraging foreign / local investors to invest in Wind Energy sector by showing them the long-term economic benefits by providing consultancy in this area.

❖ Development of Fuel Cell applications in Pakistan for not only providing grid-independent electricity to rural areas, spurring rural industrialization, and promoting broad-based agriculture; but also to provide uninterrupted back-up supply to critical applications like hospitals and banks. Additionally, to promote fuel cell mobile applications in

*The
Future
Vision*



transportation sector, especially fuel cell “rikshaw”.

The Future Vision

for Renewable Energies in Pakistan; the objective is to impart not only the technical knowledge of renewable energies, but also their management and implementation in Pakistan.

❖ Configuration Management Establishment of a dedicated CM forum / certification authority in Pakistan.

❖ Establishing a Renewable Energy Institute. All over the world, and even more critically in Pakistan, there is a dire need for adequately trained professionals in the field of renewable energies. Pakistan needs the right people to plan and implement the shift from conventional to cleaner, environmentally-friendly, renewable sources of energy. Clean Power plans to establish an Institute

