

OVERVIEW OF SOLAR INTERVENTION FOR PETROL PUMP IN INDIA

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ABSTRACT

As the population and development activities increase, requirement and demand of the petrol pumps are also increase. If this trend of continuous utilising of conventional method of petroleum, then very soon these sources will be exhausted in near future.

With the help of solar power solution for petrol pump, we can utilize the power of innovative renewable technology such as solar in providing uninterrupted power to customers and businesses in various applications.

In this paper we will study, what are the challenges and solution of solar petrol pump in our country in present scenario.

Key words: BPCL, IOCL, ONGC, KW, DG, KVA, PCU

Aim and objective of this paper

- Challenges and solution of solar petrol pump for the sustainable development
- Overview of solar petrol pump
- To guide people towards solar petrol pump for their utilization.
- To motivate petrol pump holder for solar related products.
- Opportunity for identification of appropriate technology related to solar.

To promote solar petrol pumps in our country

I. INTRODUCTION

- Over country has more than 50,000 petrol pump stations catering to the fuel demand of the country. In which near about 20,000 of these belong to Indian Oil (IOCL) and 6,000 each to Bharat Petroleum (BPCL) & Hindustan Petroleum (HPCL). Some other agencies related to petroleum and natural are also planning to installed or open solar petrol pump in future. IOCL has more number of petrol stations in India than that present in the whole of Canada or UK.
- On an average, a normal petrol pump requires more than 5KW of electricity every day for its day to day fuel dispensing operations and yearly this amount approach total capacity of over 1,500 KW.
- Mostly petrol pumps of our country derive power from Diesel Generator (DG). The operation cost for running the pumps is very high. Every day around Rs 1000-1500 per day loss as operation cost for running the pump on DG Sets.

- Punjab has approx. 700 numbers of DG petrol stations if we calculate total lost per year then we analysis that Punjab is losing 25 crore per year. Similarly Haryana has over 500 petrol stations alone. If we calculates the loss incurred by the petrol pumps as a result of high operation costs by using diesel generator sets, the amount would run into 18 crore approximately.
- Recently, oil agencies have started rural petrol stations which are established in the interior areas of villages and are meant to help the agriculturists and constructed with minimum investments. These stations sell pesticides, seeds, lanterns etc. which are the specific requirements of the farmers besides Petrol and Diesel.

II. COMPARISON BETWEEN DG SETS AND SOLAR PV PLANTS

Problems with DG sets	Advantages of solar PV plants
Higher switch over time	Reduction of electricity bill
Power fluctuations also end up damaging dispensing units at petrol pump	Tax benefit from Government
Sudden power failure leads to loss of fuel, time	Can work in synchronization with grid and DG set
More expensive(Running cost is high)	Long life
Operating generator is a tedious and labor orientated task during intermittent vehicular movement	Uninterrupted power supply
Maintenance cost is also high	No voltage fluctuation
	Overall reliable operation
	Almost zero maintenance
	No Extra space require for the systems
	Best solution for places with DG usage of more than 8 hrs

III. SOME PETROL PUMP SOLAR INSTALLATIONS IN INDIA

Following are details of some solar petrol pump in many states in the country including Delhi-NCR Maharashtra, Andhra Pradesh, Punjab, Haryana etc. The solar power system is becoming very useful to the owners whose petrol pumps are situated on remote locations on highways and rural areas.

No.	Petrol Pump name & location	Capacity installed
1	IOCL Petrol Pump in Kota, Rajasthan	2 units of 7.5 KVA solar PCU
2	IOCL Petrol Pump in Baran, Rajasthan	2 units of 10 KVA solar PCU
3	IOCL Petrol Pump in Sonapat, Haryana	10KVA Online UPS - 1; Bazooka battery – 16;

No.	Petrol Pump name & location	Capacity installed
		80W solar panel - 48 with SCC
4	Chaudhary Khim Lal Malik Indian Oil Petrol Pump, V.P.O- Lakhua Bhuna Tehsil- Gohana DIstt. Sonapat.	
5	Hindustan Petroleum Petrol Pump in Chandragiri, Tirupati	2 units of 6KVA solar PCU
6	Hindustan Petroleum filling station in Parali, Maharashtra	2 units of 6KVA solar PCU
7	IOCL filling Station in Chehal, Punjab	6 KVA solar PCU; 250W solar panels - 8, 150 Ah TT battery - 16
8	IOCL (Gulmohar) filling Station in Punjab	6 KVA solar PCU; 250W solar panels - 8, 150 Ah TT battery - 16
9	IOCL (Jai Shiv Shankar) filling Station in Punjab	6 KVA solar PCU; 250W solar panels - 8, 150 Ah TT battery - 16
10	IOCL (Saket) filling station in Punjab	6KVA solar PCU; 250 W Panel - 8; 150 AH TT battery - 16
11	IOCL (Randawa) filling station in Punjab	6KVA solar PCU; 250W solar panel - 8; 150 Ah TT battery - 16
12	ESSAR petrol pump in Georai, Aurangabad, Maharashtra	5 KVA solar PCU; 3000 W solar panels; 180 Ah TT

No.	Petrol Pump name & location	Capacity installed
		battery - 16
13	IOCL petrol pump in Kodada, Andhra Pradesh	2 KVA solar PCU; 2000 W solar panels ; 180 Ah TT battery – 8
14	IOCL Petrol pump in Shad agar, Hyderabad	3 KVA solar PCU; 2000 W solar panels; 180 Ah TT battery - 8

IV. SOLAR POWER SOLUTIONS FOR PETROL PUMPS

Ground mounted solar installation for petrol pumps



Roof top solar array installation



Solar petrol pump can changes a critically important sphere of energy and is therefore constantly evaluating solar applications in order to reach a wider customer base and varied business uses. It has come up with a complete customized solar power solution for petrol pumps that shall help the owners and customers in combating the hazards of intermittent power supply in this business. The customization of the solar system varies from pump to pump depending upon the energy requirement of the petrol pump and availability of grid power in the area. Solar power solution for petrol pumps is an example of how we can utilize the power of innovative renewable technology such as solar in providing uninterrupted power to customers & businesses in various applications.

Diesel Generator sets are used as an alternative to electricity from the grid in these areas. However, this proves to be very expensive as the fuel and maintenance cost of diesel generator sets is very high.

V. A OPPORTUNITY TO SOLAR



The only solution for our today's energy consumption is electricity cost and implements renewable sources.

A petrol pump can easily derive power from solar:-

- **Huge reduction in hefty electricity bills** – Adoption of solar system for energy usage shall help the petrol pump in reducing hefty electricity bills. The petrol pump shall also save money during peak hours when the electricity is charged at a higher rate
- **Quick and higher ROI** - The solar package provides greater Returns on Investment (ROI) to the petrol pump owner. It reduces his dependency on the Diesel Generator Set, thus increasing profits by reducing operational and fuel costs
- **Govt. subsidy on solar installation** – The Indian government gives 30% subsidy on solar installation so the initial cost of the solar solution goes down marginally
- **Tax benefits** - Investment in solar helps in saving tax as one can enjoy the benefits of accelerated depreciation
- **Easy option of Grid tie solar systems that eliminate the use of batteries** – Since most petrol pumps offer only day time operations, grid tie solar systems become easy options for these pumps. The grid tie systems offer 98% efficiency in deriving solar power and eliminate the use of batteries completely thereby saving space and costs
- **Eco friendly** - Unlike conventional energy fuel, solar power package solution doesn't emit any gases or leave any residues, thereby contributing to a greener environment and reducing one's carbon footprint
- **No extra space required for the system** - A solar system's panels require open space at the pump to be installed. Only the PCU/inverter and batteries (in case of off grid systems) require storage space.

VI. CONCLUSION

Petrol pumps require to be run 24x7, which huge amount of consumption take place. Other sources have their own limitation, like switchover time and dispenser pump shuts down ,power fluctuation, sudden power failure,etc.

Petrol pumps, installed by conventional method are facing many problem because of above mention details. Now days, petrol pump is becoming a basic need in small town and village also. But in our country many villages and town are still present where no electricity, face erratic power supply or have grid supply for a minimal time period. Installing solar petrol pump can reduce monthly electricity bill, operational cost reduction on diesel generator, over a period of 25 years DG sets are 5 times as expensive as solar energy, accelerated depreciation benefits (80% first year, 20% second year) to reduce your tax liability. Also a solar energy is a clean form energy offering reduction in carbon emission for a 1kw system a solar system can reduce carbon emission up to 1.5 tons/year.

Hence due to above discussion we can say solar Petrol Pump can be a best option in present scenario.

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