

## **DeLight™ by Tawanai Energy™ Solar Photovoltaic power systems.**

**"Your independence from  
electrical utility companies."SM**

DeLight™ offers complete solar electric power systems.

Along with services for the easy installation and maintenance at your home or office in Karachi.

Our leading systems provide a safe and reliable source of alternative energy.

Our systems are designed to supply years of maintenance-free operation. Each system comes complete with solar panels, power electronics, mounting frames, UPS, and batteries.



DeLight™ solar electric systems are designed to be

installed on to the flat roofs commonly found in Karachi buildings.

The systems can be installed in buildings which are new or old.

## **Complete services are available for our solar systems including :**

- We provide phase wise installations. So our customers can start with a smaller system and then grow it later.
- Installation services
- Complete system installation, monitoring and maintenance of the system by us for the customer.
- Technical and management supervision for installation, monitoring and maintenance of the system. Work done by third parties.
- Procurement of parts only for the customer. The customer gets the installation and maintenance done by other contractors.
- Net metering option.
- Periodic checking services to make sure everything is working perfectly.
- Preventive maintenance
- Failure maintenance
- Disaster recovery
- Sales
- Demonstrations
- Moving services. Uninstall, transport, and reinstall.
- Custom designing for specific client applications.
- Upgrading services. Change inverter or solar modules according to changing environments.



### **How it works.**

The sun shines daily for approximately 10 hours. It delivers 1000 to 1350 watts per square meter when directly overhead. The solar cells in the solar panels convert the energy into electrical energy.

This energy is used to charge the batteries. The batteries are connected to a UPS which can be used to power common appliances like mobile phone base stations, modems, computers, lights, refrigerators, fans or whatever you like.

During the day, the power can be used and excess power shall be stored in the batteries.

The solution has extra benefits as compared to running a generator.

A solar cell is rated to work

for at least 25 years at greater than 80% to 90% of its minimum capacity.



At 6 hours per day, 365 days per year and 25 years it shall work for at least 54750 hours. It does not suddenly die out like other electrical devices like a bulb, transistor or a fuse but slowly degrades in performance. So you do not have to worry about your investment. 1 watt for 1825 hours per year is 1.825 KWh.

It costs about Rs 200 per watt for the installation for the parts that include the solar modules, inverters, installation but without the storage part. The storage is usually based on batteries.

Since the cost of utility electricity is Rs 60 per KWh, the payback is in 3.33 years. This is an ROI of about 30 percent per year.

Since the system is designed for at least 10 years, you can expect a return of Rs 1095 over the first 10 years. Also the solar modules can be expect to work for at least 25 years with minimum 80% capacity.

So the return can be over 10 times over 10 years based on the current prices and expected situation.

Over 10 years the generation shall be 18.25 KWh and the expected cost is Rs 250 including maintenance.

Rs 1095 minimum cost of electricity for Rs 250 is a benefit of 4.38 times.

Batteries cost is about Rs 328 per Ah for 12V.  $\text{Rs } 328 / 12\text{V} = 27.3$  per watt hour. We shall assume a run time of 10 hours. So we shall use Rs 40 per watt hour. 1500 cycles for tubular.  $\text{Rs } 40 / 1500 \text{ cycles} = 2.6$  paisa per watt hour cycle. That us Rs 26 per KWh cycle.

So the cost of storage can be expected to be Rs 26 per KWh for the night.

We shall assume a house with 360 KWh ( units ) per month.

We shall assume 24 hours of use at 500 watts. Usually it is more at night, but we shall be calculating at a constant rate to keep the example simple.

From our experience of installing these systems example covers the explanation for a lot of houses in Karachi.

Storage shall be required for 16 hours. So 16 hours means 8 KWh of storage. Each watt hour costs Rs 27.3 so 8 KWh shall cost Rs 218,400

The solar power generation required for 24 hours is for 12 KWh minimum.

The solar generation cost for 12 KWh / 5 hours per day = 2400 Watts.

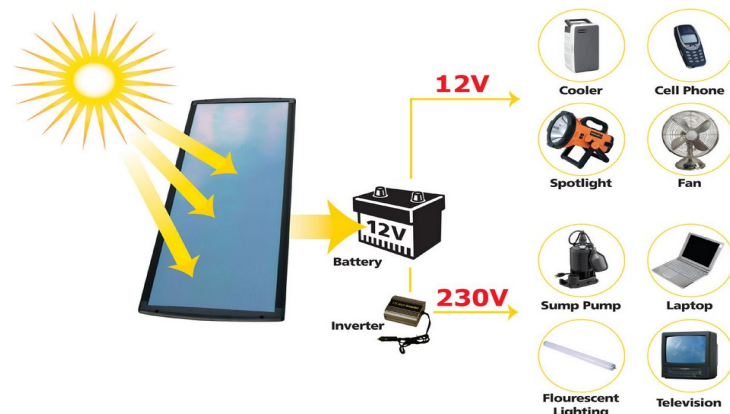
2400 Watts x Rs 200 per watt = Rs 480,000 for the solar generator side.

So the system costs about Rs 220,000 for the storage and Rs 480,000 for the generator side. This totals to about Rs 700,000.



### How Solar Works

When this system is installed properly and maintained properly, it offers electricity at a cost much lower than the Utility power.



## **Other advantages of our solar power system include :**

- Noiseless operation. The loudest item is an inverter.
- No smoke.
- No diesel or petrol to store.
- Totally automatic operation.
- No switching required.
- Reduced or no electricity bill.
- No worries of power failure when you have friends or customers to deal with.
- No accidental and deliberate feeling the need to swear at the utility company.
- No electricity bill and no disconnections worries and non a completely independent system.
- Earlier return on investment if the cost goes up. Very likely based on trends.

For any queries or questions you have regarding this product. Please feel free to call, whatsapp, telegram, SMS or email anytime.



**Service charges :**

First visit for feasibility : Rs 5,000 ( For locations in Karachi )

Visit done by system design engineer and electrician.

Scope of work : Analyze last 1 year's utility bills to ascertain the feasibility of the system.

Measure the premises to develop the rough design of possible implementations.

Analyze utility reliability and quality patterns. Get requirements from customer of quality and reliability requirements.

Provide rough possibilities and recommendations to the customer.

Check the wiring conditions by our electrician.

Report findings to customer.

For other than Karachi locations, please contact for estimated visit charges.



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**Tawanai Energy**