

Fabrication of Reciprocating Water Pump using Photovoltaic and Wind Energy

<https://www.youtube.com/watch?v=xCg3Mvejgsw>

The proposed Solar and Wind Powered Reciprocating Mechanism Based Water Pumping System is designed to pump water using solar and wind energy as the primary renewable power sources. The system consists of a solar panel, wind turbine, charging circuit, rechargeable battery, DC motor, reciprocating mechanism, piston pump, and water storage arrangement. The solar panel converts sunlight into electrical energy, while the wind turbine generates electrical energy from wind. The generated energy from both sources is used to charge the rechargeable battery through a suitable charging circuit.

The stored electrical energy is supplied to the DC motor, which produces rotary motion. This rotary motion is converted into reciprocating motion using a mechanical linkage mechanism, which drives the piston of the water pump. The reciprocating movement of the piston creates suction and delivery pressure to draw water from a water source and pump it to the required location.

The proposed system provides an eco-friendly, low-cost, and energy-efficient solution for water pumping, especially in areas where grid electricity is unavailable or unreliable. The combination of solar and wind energy improves the availability of renewable power under different environmental conditions. The battery provides backup energy when sunlight or wind is insufficient. The system can be effectively used for small-scale irrigation, gardening, agricultural water supply, livestock water supply, and domestic water pumping applications, while reducing dependence on conventional electricity and fuel-powered pumps.

Features:

- Uses solar and wind energy as renewable power sources.
- Solar panel converts sunlight into electrical energy.
- Wind turbine generates electrical energy from wind.

- Uses a charging circuit to charge the rechargeable battery.
- Battery provides power when solar or wind energy is insufficient.
- Uses a DC motor to drive the pumping mechanism.
- Converts rotary motion into reciprocating motion using a mechanical linkage.
- Uses a piston pump for water pumping.
- Suitable for areas with no or unreliable grid electricity.
- Reduces dependence on diesel and conventional electrical pumps.
- Eco-friendly and produces no direct pollution during operation.
- Low operating and maintenance cost.
- Suitable for irrigation, gardening, agriculture, livestock, and domestic water supply.
- Provides reliable pumping by combining two renewable energy sources.

Major Components:

- ☐ Solar Panel.
- ☐ Rechargeable Battery
- ☐ DC Motor
- ☐ Reciprocating Mechanism
- ☐ Piston Pump
- ☐ Connecting Rod
- ☐ Water Tank
- ☐ Water Pipes
- ☐ Check Valve
- ☐ Solar Charge Controller
- ☐ ON/OFF Switch
- ☐ Supporting Frame.

□ Wind.

Block Diagram:

