

Solar Powered Water Pumping System for Ghana

Water Pumping with Industrial 3-phase Motors/Pumps

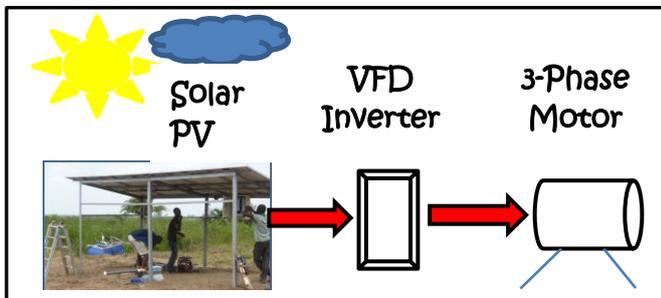
Technology has improved over the past years and it is now a feasible option to invest in solar powered water pumping systems. The driving factors are the following: **(1)** Decreases in PV module prices **(2)** Increases in fuel and electricity prices **(3)** Advances in Inverter Technology

How does it work?

Solar PV modules convert sunlight into electricity (DC current).

DC current is only useful for DC applications, such as charging batteries and running special DC motors and pumps.

It is possible to convert the DC current from Solar PV directly into 3-phase 230/380V AC. Industrial motors can be utilised. See sketch below:



VFD = Variable Frequency Drive

It is also possible to run existing, older 3-phase AC motors by Solar PV.

Where applicable, dual power, ECG and Solar PV can be utilised by means of a simple change-over switch. In such scenario the motor can run by Solar PV throughout the day and via ECG during night time and times of insufficient radiation.

Investing in Solar PV



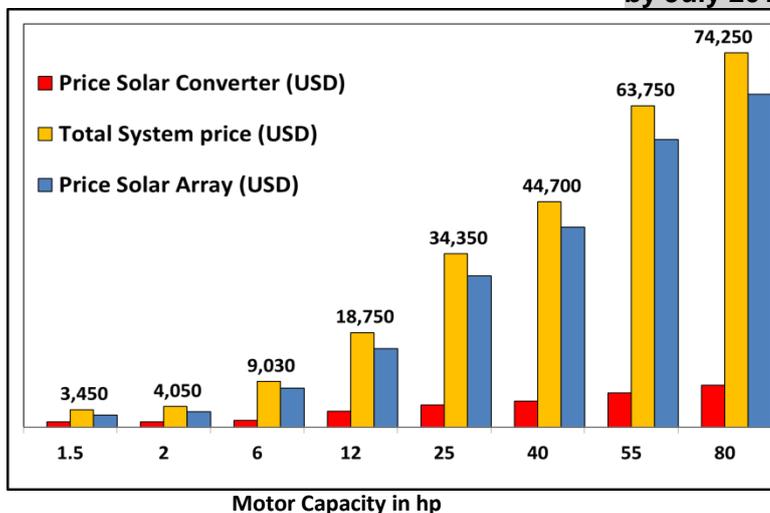
2.5 kW field irrigation system using PV Solar and a surface water pump (Aveyime, Volta)

At first glance, any investment into Solar PV might look expensive, and it is expensive.

You need to compare the benefits of the Solar PV investment in the long run, over many years.

After you invest, your PV system is generating energy free of charge. Power is supplied by nature, no tax or hidden charges will disturb your business.

The graph below compares motor capacity versus system costs; prices are indicative but most accurate by July 2016



Graph to the left: The main cost implication is the Solar PV array **blue bar**. Inverters, controllers **red bar**, motors, cables and pipes are comparably much cheaper. Total costs => **yellow bar**.

Now you see it is expensive. But do not forget Solar PV modules will work for 20 years and longer, delivering a lifetime of free energy!

Do not forget to take this lifetime of free energy into your consideration, before you make a final judgement on the feasibility of your project.

The above chart applies to Ghana, where import taxes are comparably low and the business climate is in favour of green investments. The chart includes VAT = 15% of net investment but no profit margins

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