



SQFlex – “a game changer for hand pump retrofits”



Summary

Hand pumps are ubiquitous in Africa and other parts of the developing world as a relatively simple, human-powered means of obtaining water from shallow aquifers. They are still appropriate for some applications, but advances in solar-powered submersible pumps means these are now an exciting alternative.

Solar pumping systems are being widely adopted and can represent a reliable, long-term solution. According to World Vision Zambia, Grundfos' SQFlex pumps are a great fit for many of the communities the NGO is helping.

Introduction

Hand pumps have been around for centuries in various forms and have long been the established way of drawing water, especially in remote and rural areas. In Africa, millions of them are in use across the continent.

Until solar-powered solutions became available in Africa, there was no feasible alternative to manual pumps. Even where diesel- or petrol-powered pumps could be installed, they remained beyond the financial reach of most would-be users because of the expense of fuel and maintenance.

But hand pumps, despite being relatively cheap and representing an obvious improvement on the rope-and-bucket systems they replaced, can have some drawbacks.

GRUNDFOS 

Possibility in every drop



The disadvantages of hand pumps

Hand pumps, commonly found in rural areas where there is no piped-water infrastructure, can only be used where the underground water is close to the surface and produce a limited rate of flow. Only one person can fill a container at a time, and the water flows only when someone is operating the handle which entails some physical effort. This can result in queues and wasted time as women and children wait for their turn.

Some types of hand pumps use components made of galvanized iron, which is prone to corrosion when the groundwater has a low pH level. Because hand pumps are not suited to supplying a network of dispersed communal taps, such taps can be located far from where the water-users live.

Solar solutions – an excellent replacement for hand pumps

According to OurWorldinData.org, the price of photovoltaic (PV) panels plunged from just over \$100 per watt in 1976 to US38c per watt in 2019. This has contributed to the proliferation of solar-powered pumping solutions over the past decade, and they are becoming increasingly popular across Africa.

Among motorised pumping systems, PV versions are leading the way in developing countries. They are characterised by easy installation, low maintenance and zero operating costs — they exploit free, renewable energy from the sun.



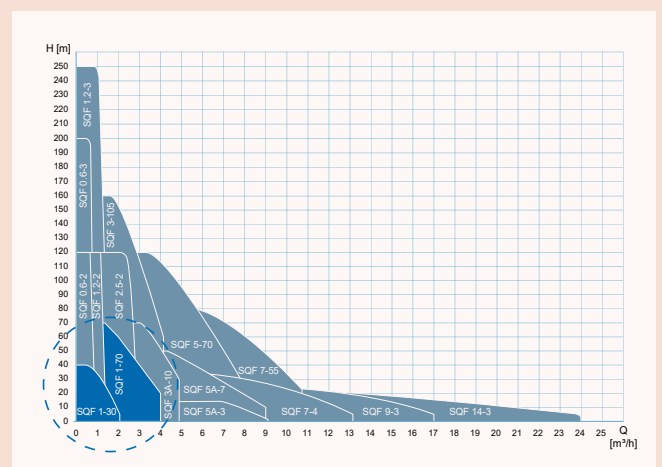
SQFlex – Grundfos’ entry in the market for hand pump alternatives

In the initial stages of finding alternatives for hand pumps, one of the challenges was that few submersible solar-powered pumps had appropriate specifications for the shallow wells or boreholes in which

manual pumps are installed. In response Grundfos developed the SQFlex, a plug-and-pump solar solution well suited to this application. Over the years, the SQFlex range has been expanded to offer a wider range of performance options that allow the implementation of the most cost-efficient system.

The SQFlex is a smart pump with a high-efficiency motor that can operate on both AC and DC power. There are helical models for higher-head, low-flow applications, and centrifugal models for lower-head, higher-flow applications.

The solution is available in a range of performance specifications, depending on the need. The SQFlex models most commonly used as hand pump alternatives are the SQF 1-30 and SQF 1-70, which are well suited to extracting water from shallow depths. For deeper wells, other models can be considered.



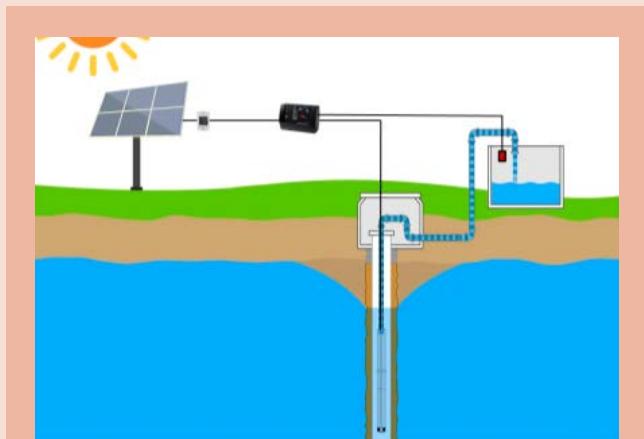
Typical hand pump application area

All SQFlex pumps offer the full range of solar-power benefits: they are easy to install, incur virtually no maintenance costs and provide a reliable supply of clean water. In addition, they operate across a wide DC voltage range, from 30 VDC to 300 VDC, and do not require a specific voltage to run. The pumps have an integrated dry-run protection system, which is activated by an electrode. When the water level falls below the level of the electrode, the pump will automatically shut off to protect itself. It will resume operation once the water level rises above the electrode.

“SQFlex is an all-in-one solar pumping solution that’s very simple to install and use. It has built-in dry-run and overheating protection, and when it’s installed correctly it doesn’t need much maintenance — apart from cleaning the solar panels to make sure they are operating at their best. Simplicity and durability have been key to this pump’s success ever since it was developed, and it is still unique in the market.”

Jakob Normann Olesen

Global product specialist on solar pumping, Water Utility, Grundfos.



1-example of a solar installation using SQFlex

SQFlex specifications:

- Motor size: 0.3kW - 2,5kW
- Flow rates of up to 18m³/hour with heads of up to 250m (820 feet)
- Liquid temperature: 0°C to +40°C
- Enclosure class: IP68

SQFlex in action

World Vision Zambia has already installed 80 solar-powered SQFlex pumps, which are now serving more than 20,000 people in rural areas across Zambia. The beneficiaries spend less time and effort fetching water.

“These pumps are a game changer for our beneficiaries in the field when talking about hand pump retrofits. Most communities never dreamt of a time when they would see solar energy being used to pump water. Also, it used to be unimaginable that water would be readily available for people to use.”

Maybin Ngambi

Technical Programme Manager, World Vision Zambia