

Volanta Thermal Solar

A low cost alternative for solar powered community water supply

Product Sheet

Within the aim of exploring new applications for low-cost renewable energy, PRACTICA is developing a thermal solar powered, steam driven Volanta pump, a robust deep well pump for community water supply.

The context

Volanta pumps are in use across West African as hand pumps. The thermal solar version can replace expensive and theft-prone Photovoltaic pumps of various types, and has powerful applications in cases where the water tables are very low and/or large quantities of water are needed.

The advantages of solar thermal over solar PV pumps include much lower investment costs and reduced risk of theft. Compared with fuel engine driven deep well pumps, the advantages are lower energy costs and reduced environmental impact, which is particularly important in climate change-related poverty reduction programs.

The technology

A solar collector heats water to produce steam. This steam drives a steam engine which is directly connected to the pump. For the solar collector, both vacuum tube collector and linear Fresnel concentrator types are currently being tested for steam production, longevity and cost.

The engine uses a diaphragm instead of a piston and all parts that come into contact with the steam are made of durable plastic as to minimise wear and condensation losses which reduce the overall efficiency of the pump system.

The facts	
Costs	€ 2.500-3.500 (depending on collector surface)
Capacity	At 20m depth: 3m ³ /day with 1 collector module (3.5m ²) 24m ³ /day with 8 collector modules At 60m depth: 8 m ³ /day with 8 collector modules
Availability	Moving through development and field testing. Product launch planned for 2011.

The application

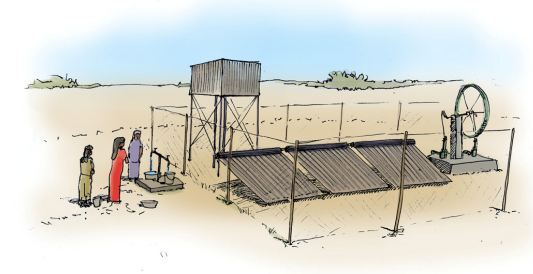
Small steam engines used for this application have traditionally had the problem of low efficiency, which has so far hampered the application of these engines with solar power. Through many years of small engine R&D, PRACTICA has been able to improve the efficiency, reducing cost and making this approach more affordable for communities and NGO programs.

Specific uses of the Volanta Thermal Solar are expected to be in:

- Rural communities where the water is too deep for manual pumping;
- Rural communities with piped distribution systems; and
- Institutions such as schools, rural health centres, etc.

The current state of development is prototype field testing, which will expand through the end of 2009 and beginning of 2010. Data obtained from the field will lead to optimization and finalization of the design of the collector and the engine.

Training and introduction of local production or implementation of the Volanta Thermal Solar can be provided by PRACTICA after field testing and product optimization are completed. Organizations interested in supporting development of this promising pump through funding or field testing are encouraged to contact PRACTICA.



Next Steps

This solar pump is moving through development. Field testing is ongoing in Burkina Faso. Next steps planned for 2009 and 2010 are:

- Continuation of field testing in Burkina Faso in cooperation with the local Volanta pump production facility;
 - Continuing the development of the solar collector for optimal sun-steam conversion;
- Once prototype testing has been completed, the design will be optimized and first steps will be taken for testing of a small pre-production series of pumps.

PRACTICA Foundation develops and disseminates low-cost appropriate technology in water and renewable energy in developing countries. We focus on technology that responds to local cultural contexts, can be locally produced and maintained, and leverages existing market systems.

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