Solar Water Pumping

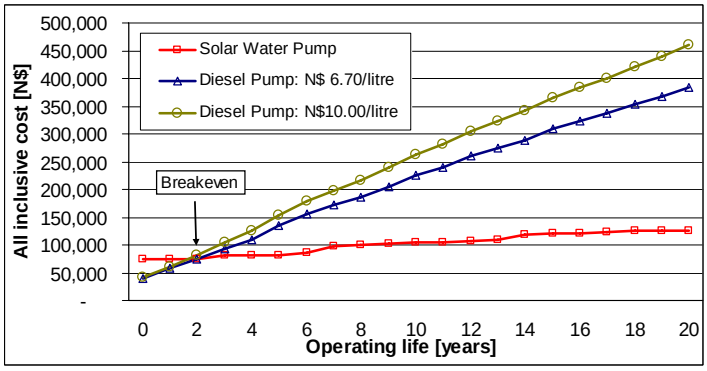
FACT SHEET

Solar Water Pumping technologies are ideal for reducing the costs of agricultural production by displacing increasing diesel fuel expenditure, while promoting sustainable rangeland utilisation and management.

The Ministry of Mines and Energy, through the Namibia Renewable Energy Programme (NAMREP), released a study in August 2006 entitled ***"Feasibility Assessment to replace Diesel Pumps with Solar Pumps"***.

The study highlights a number of features about solar water pumps:

- Availability of submersible pumps which can pump up to 200m heads,
- Pumps are able to pump larger amounts of water,
- Low maintenance requirements (3 to 5 years),
- Good performance which means fewer solar panels to pump the same amount of water,
- Some of the pump models can be backed-up by a genset to pump additional water with the same pump during the night or during overcast days,
- Simple to install and extract,
- Require minimal attention as they are self-starting,
- Tracking arrays can increase daily water pumping rates.



Solar pumps have become very cost-effective:

- The all-inclusive costs (upfront, operating, maintenance and replacement) when using diesel pumps are generally 2 to 4 times higher than solar over a 20 year period (see top graph).
- The breakeven as shown in the table occurs between zero and 7 years and is indicated by the yellow fields. The grey fields indicate that the use of diesel pumps is more appropriate as no solar pumps are currently available for these operating points.
- Solar pumps on low yield boreholes (3m³ to 5m³ per day) are cheaper than diesel pumps right from the start of operation.
- The higher upfront cost of solar pumps can be financed through Bank Windhoek (061 - 299 0380) or Konga Investments (061 – 259 961).

Head [m]	Daily water [m³/day]							
	3	5	8	10	13	17	25	50
20	0.0	0.0	0.0	0.2	0.2	0.6	1.3	2.8
40	0.0	0.0	0.4	0.9	1.0	1.1	2.6	4.1
60	0.0	0.0	0.9	1.2	1.7	2.6	3.5	5.1
80	0.0	0.0	1.3	1.6	2.3	3.7	4.6	7.1
100	0.0	0.1	2.3	3.1	3.7	4.6	6.1	Diesel
120	0.0	1.1	2.4	3.9	4.4	5.7	6.5	Diesel
160	0.0	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
200	0.0	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

Solar Water Pumping: Effects on Rangeland

Solar pumps allow the utilization of low to medium delivery boreholes. This means that additional boreholes can be economically utilized in a given area, creating more flexibility for range management. If animals are moved between these waters in such a way that grazed plants have an adequate recovery period, then significant increases in grass and animal production can be expected at the new as well as the original boreholes.

Advantages:

- The reduced time at single water points reduces over-trampling,
- Planned grazing of large livestock herds is encouraged through utilising larger water storage tanks,
- Better livestock condition due to proximity of water and grazing and better grazing conditions,
- Synchronization between extraction rate and borehole yield reduces borehole erosion and minimises risk of borehole collapse,
- Low yield boreholes can efficiently be utilised due to long solar pumping hours (6 – 8 hours daily) at lower hourly pumping volumes.

Mr Colin Nott, IRDNC

Components of a typical Solar Water Pump (excluding photovoltaic panels)

1	HDPE water pipe	**7**	Water sensor cable
2	Submersible pump in a stilling tube	**8**	Baseplate with elbow pipe fitting
3	Controller	**9**	Polypropylene safety rope
4	User manual	**10**	Water proof cable connection
5	Submersible cable	**11**	Non-return valve
6	Water sensor	**12**	HDPE pipe fitting

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