



## Criteria for Selection of Quality Solar Pumping Products & Services

### Product Quality

Quality is a key criterion in equipment selection and can be defined as the ability of a product or service to consistently fulfil defined requirements over a defined period. Quality is an integral part of a product or service and should be a key consideration in equipment selection.

Selection of products of dubious quality (especially related to solar modules) may result in declining performance of the pumping system that may erroneously cast doubt over the overall suitability and sustainability of the project. On the other hand, carefully selected quality products will ensure you get value for money while contributing to the sustainability of the project.

Some dimensions of product quality that should be used to establish the desired characteristics of a solar water pumping system are described below.

<b>Performance</b>	The selected product must meet the specified water demand and head, during the design month, which can be the month with the least irradiation, the driest month etc. The provided design should show the monthly pumped outputs in line with the requirements.
<b>Efficiency</b>	Efficiency impacts the cost of ownership. The payback period for the solar system with the expected cost savings over the life cycle of the system will be a differentiating factor of systems with similar performances.
<b>Reliability</b>	The desired product should not fail within a specific period. Evidence that the product has worked in the past without failure from field examples will be a good indicator of reliability.
<b>Conformity</b>	The product should meet the specified standards of quality and safety such IEC/EN certifications, UL/MET listing, or other internationally recognised standards.
<b>Durability</b>	The design life of a solar pumping system must be at least 25 years and components with a short life should be eliminated (e.g. batteries' which have a typical life of 3-5 years).
<b>Robustness</b>	The system should be designed for use in remote locations without failure. Key design elements that make the solution suitable for the environment it will be installed in should be considered.
<b>Serviceability</b>	All components should be subject to minimal servicing and without expensive parts. Parts should be replaceable at a low level of modularity to reduce replacement costs. The expected time and skill level required for replacement of parts should be such that downtime is reduced.
<b>Aesthetics</b>	Even though it has no bearing on performance, the installed system should be pleasing to the eye.

### Key Features of Key Components

Some key characteristics of desirable equipment are summarised below.

	Equipment Characteristics		
	Solar Module	Pump & Motor	Controller
<b>Performance</b>	Use mono & poly crystalline modules	<ul style="list-style-type: none"> <li>– Use helical rotor or centrifugal pumps</li> <li>– Use variable speed induction motor</li> </ul>	Maximum power point tracking (MPPT) and current boosting function
<b>Efficiency</b>	Min 14%	Motor: > 80%	Min 95%

<b>Reliability</b>	Prior successful off-grid use e.g. Yingli, solarworld, Jinko	Used for the last 10 years without failure e.g. Lorentz, Grundfos	
<b>Conformity</b>	IEC/EN 61215 & 61730	EN 809 & EN 60034-1	EN 61800-1, EN 61800-3, EN 60204-1
<b>Durability</b>	25 years	7 years for motor 10 years for pump	7 years
<b>Robustness</b>	<ul style="list-style-type: none"> <li>- Quality encapsulation</li> <li>- Not break easily</li> <li>- Sturdy frame</li> </ul>	<ul style="list-style-type: none"> <li>- Constructed of non-corrodible material such as stainless steel (AISI 304 or higher)</li> <li>- Permanently lubricated</li> <li>- Closely matched to ground water temperature, water quality</li> </ul>	<ul style="list-style-type: none"> <li>- Environmental protection of IP54 or higher</li> <li>- Withstand ambient temperature range of minimum -10 to +45°C</li> </ul>
<b>Serviceability</b>		<ul style="list-style-type: none"> <li>- Modular design i.e. detachable pump &amp; motor</li> <li>- Maintenance free (e.g. brushless motors)</li> </ul>	<ul style="list-style-type: none"> <li>- Keep electronics above ground</li> <li>- Low replacement cost for spare parts</li> <li>- Low frequency of repair</li> </ul>

### Supplier Selection

Besides product, selecting a good supplier is one of the critical efforts of having a sustainable solar water pumping system. The right supplier will not only provide the right product, but also provide a sound installation and workmanship which will contribute towards system longevity. Some criteria that may be applied in selecting a good supplier include;

<b>Product quality</b>	Operate a quality management system that is ISO 9001 or equivalent and have recognised third party verification. Have UL / MET listed products for supply
<b>Delivery</b>	Reliable supplier who can deliver within the required timelines
<b>Experience</b>	Has relevant experience of designing, installing and maintaining solar pumping solutions of a similar size, scope and application
<b>Reputation</b>	Good international standing in the industry. Provide references from previous customers and peers
<b>Capacity</b>	Have staff, tools and equipment to satisfactorily execute the project
<b>Technical capability</b>	Certified trained staff that can successfully implement the project
<b>Warranty and After sales service</b>	Has policies that support post installation replacements and repairs. Must have access to spare parts supply with backing from the equipment manufacturer
<b>Training</b>	Has certified trained staff that can provide training to the buyer and users