Thinking solar and irrigation?

Irrigators considering purchasing solar and incorporating this technology into their pumps are advised to do the following groundwork to ask the right questions prior to deciding on a solar PV system. The expected useable life is 25 years, so it pays to do it once and do it right.

Step 1
Before seeking solar quotes, check your current irrigation system for other potential high-return/fast payback investments:

- Water use efficiencies: are you losing water in dams or channels as evaporation and seepage? You may be using energy to pump water that is not reaching the crop root zone (which is a waste of your money). Investigating potential solutions for remediating losses, this may payback faster than a new solar PV system. Automated irrigation can also help irrigation application efficiency – saving water and energy.

- Pump efficiencies: if water comes out of the pump when you turn it on, that’s a good start. Complacency can be costly. Do you know exactly, or have you ever tested flow to ensure its operating on the correct duty point, or the motor is sized correctly? Pump energy costs can be monitored as an indicator of pump wear and failure. Pump curves contain valuable information which is vital for energy savings. Simple calculations and a change in motor speed or pump model can achieve impressive Return On Investment (ROI) numbers from minimal expensive.

Step 1
Understand your energy usage and seek advice on your current system;
- Review your electricity bill
  - Tariffs change and your usage might be altered from the last time you checked. Is this tariff the best fit for your usage?
  - Do the sums add up – is your meter old and antiquated? It could be faulty and costing you money. Remote or smart meters may help if you have mobile service
  - Consider using a Variable Speed Drive (VSD). These can save you money when the pump speed
can be adjusted on sites where Total Dynamic Head (TDH) changes or a system requires capacity to provide for a variation in flow or pressure

- **Measure energy use and keep records**
  - Set benchmarks across your farm at each pump site: litres diesel/ML and $/ML electricity. Outlying data can help trigger an investigation.
  - Power Factor Correction (PFC): For larger pump sites, it is critical to calculate your PFC to determine electricity wastage. Installing capacitors can improve PFC to acceptable levels cost effectively, often leading to 1-2 year payback and stellar ROIs.

- **Can your load be shifted to daytime?**
  - Many irrigators work towards night and weekend pumping to avoid peak rates. With solar, daytime pumping can immediately offset grid consumption and replace retail energy with on-site generation: no line rental fees, no other variable costs as long as the sun is out. Drives that mix energy sources can prioritise solar energy, then topped up with grid power to meet the pump energy demand.

  The annualized (lifetime) cost of solar energy is around 4-6 c/kWh depending on mounting configuration. Moving pumping into daylight hours can offset peak rates of retail electricity, often 10 times the price of solar. The amount of solar kWh that can be substituted for grid kWh will determine the speed of investment payback and internal rates of return.

**Step 3**

**Find your supplier.**

Things to ask the supplier about your system;

- **Water**
  - Request a report detailing the amount of water delivered by month from solar
  - The report also needs to contain water pumped from grid and solar energy sources. This should be based on your data you have given. Make sure you understand it.

- **Costs and modelling**
  - Request a quote that breaks down each item: pump, motor, VSD, tracker, solar panels, energy certificates (STCs), array size, inverter, an option for remote monitoring and telemetry, wiring/cabling and commissioning
  - The economic modelling by the supplier:
    - Is this above ground costs only or pump included?
    - What indexation is applied to future grid prices?
    - Does this calculation include insurance and inverter replacement?
    - What is the STC price rebate compared with the market STC price?
    - What is the system payback period or IRR?
    - Do you want to build, own/operate, lease or just buy the power?
    - Have you factored in insurance costs on your farmpak?
  - Have you procured another quote to compare?
  - What are the differences in warranty period?
A PV system should last a generation if researched and installed properly and your children will appreciate the time and effort in good decisions made now. Renewable energy can also offset traditional fossil fuel use such as coal or gas used to generate electricity and improve industry sustainability along the way.

**Step 4**

**Operational Warranties and Quality Assurance**

Check the following with your quoted job:

- **Warranty**: is the warranty held by the installer or the foreign panel/inverter supplier?
- Has the business been around for some time, or only a recent ABN?
- Does the supplier specialize in solar pumping systems and have a presence in Australia?
- What is the expected lifespan and warranty on the whole system? Check inverters have a minimum 10-year warranty
- What is the manufacturer guaranteeing vs installer? Who has the responsibility for what?
- What is the responsibility of the customer? E.g. cleaning, shade etc.

**Before physical work starts:**

- Make sure the agreed work will not be subcontracted to a non-accredited installer
- For larger systems above 100 KW a Level 3 Accredited service provider is recommended:
- Do you have technical drawings of the layout for the arrays?
- Does the installer have indemnity insurance?