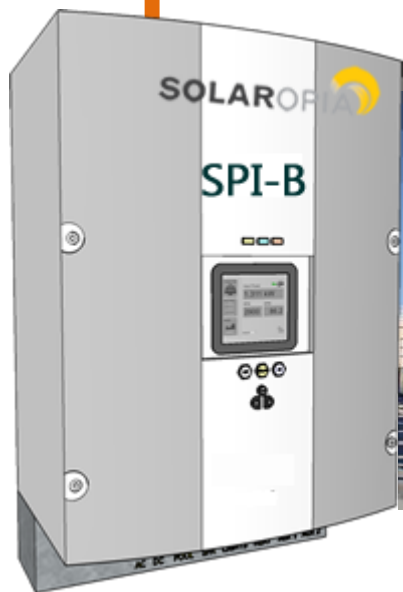


SOLAROPIA

INNOVATIONS IN SOLAR PUMPING TECHNOLOGY

BOOSTING SOLAR PUMPS FOR LARGE PLANTS



SPI-B OPERATES WORLD'S FIRST 500 HP PUMPS WITH SOLAR POWER

The Pumping Technology of the 21 Century Operates with Solar

ABOUT SPI-S SOLAR PUMPS

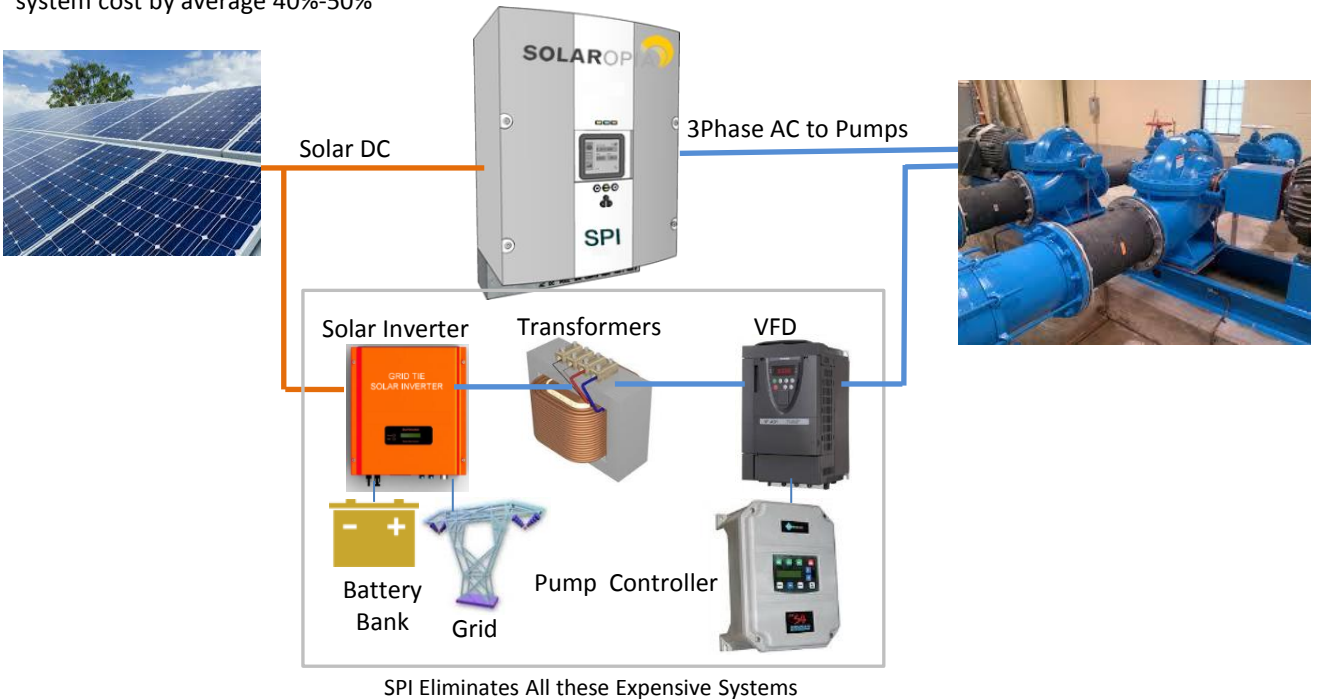
SOLAROPIA SPI-B represents a new generation of solar pumping systems that employs solar VFD technology to directly operate pumps up to 500 HP from Solar PV arrays. These pumps can handle city scale water distribution plant to supply potable water, irrigate thousands Acre s of land, or boost pumps in RO water recycle or sewage plants

- Operate pumps Off-Grid (in Rural Areas)
- Operate 24 hours pumping in hybrid Solar-AC mode (in Urban Areas)
- Pump type independent (no need to change existing pumps to operate with SPI solar)
- Extremely efficient (about 40% higher efficiency than conventional solar systems)



HIGH EFFICIENCY-LOWER PUMPING COST

Conventional solar inverters (Off and On Grid) are not suited to operate pumps – they would need four systems (Solar Inverter, Transformer, VFD, and Pump Controller) which translates into 20% of solar power losses. SPI eliminates all these systems (see the diagram below) and reduces solar system cost by average 40%-50%



THE SOLAR PUMPING ECONOMY

Pumps consumes lot of power and represents 95% of plants operating cost. SPI-W tremendously reduces this cost by 50%-to-70%. The cost and saving data for 50 HP pump, for example, is provided below to compare SPI cost (average ₺8 per KWh), with diesel power plant (average ₺22 KWh), and Utility power (average ₺18KWh). SPI saves about 75% of diesel plant operating cost, and 55% of grid power cost to operate the same pump.

Pump Power Source (50 HP Pump)	Operating Cost (15 years)*	Saving of Operating Cost (15 years)
Diesel Power Plant	\$440,000	\$0
Utility Power	\$315,000	\$125,000
SPI Solar Plant	\$140,000	\$300,000

*SPI solar systems operate 15 years as minimum -25 years average.

INDUSTRIAL- HEAVY DUTY SOLAR PUMPING SYSTEM

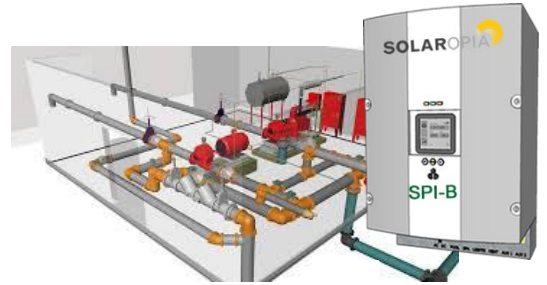
BUILT-IN PUMP PROTECTION CONTROLLER

PUMP OPERATION PROTECTION

- Soft-start and Soft-shutdown.
- Dry-Run Protection
- High Pressure Protection
- Pipe Breaks-leakage Protection
- Flow Compensation .
- Pipe fill Protection

PUMP ELECTRICAL PROTECTION

- High Voltage Protection
- Power Surge protection
- Phase loss Protection
- GFC protection
- Emergency stop
- Main turbulence protection



BUILT-IN SMART PUMPS CONTROLLER

- Auto start in Solar mode (No need to turn pump ON / OFF)
- Auto-switching between power modes
- Boost –decrease Flow Rate (Manual-Time Set- Remote)
- Built in meters for distant transmission (Flow Rate , Daily Pumped Volume , Solar Power (KW)

BUILT-IN PUMP COM-CONTROLLER

- Communicate remotely using standard Protocols (Modbus, Profibus) with other pumps , data servers, PLCs, control rooms



SPI-S APPLICATIONS

SPI-W enables to power and operate large water plants, oil fields , RO plants , farms and utility projects

City Scale Water Plants



SPI-B -500 model can pump 5 million GPD (20,000 m3/day) of fresh water using one solar pump at 500 KW PV

Brackish-Recycle RO Water Plants



SPI-B 500 model can operate RO pump to deliver 1 million GPD (4,000 m3/day) from 3000 TDS brackish water using one solar pump at 300 KW-PV

Large Farms



SPI-B offers models to operate pumps to irrigate large farms up to 500 Acres with Central Pivots

Industrial



SPI-B 100 can supply 1million gallon of water per a day with 100 KW PV to operate :

- 200 MW power plant
- 20,000 barrel oil production

SPI-B MODELS FOR SOLAR BOOSTING PUMPS

SPI models are referenced following pumps horse power (HP) and requires equal power PV array in KW. SPI models are listed below for given pumping head (H), flow rate(Q), and referenced with the required PV (KW).

Q FLOW RATE		H: Total RO Pump Pressure (bar-psi)				
GPM	m3/h	3bar-50 psi	5bar-75 psi	7 bar -100 psi	15bar-200 psi	20bar-300 psi
100	25	SPI-6	SPI-9	SPI-9	SPI-18	SPI-24
200	50	SPI-9	SPI-15	SPI-18	SPI-36	SPI-42
300	75	SPI-15	SPI-24	SPI-27	SP-48	SPI-72
400	100	SPI-18	SPI-36	SPI-36	SPI-72	SPI-90
500	125	SPI-24	SPI-42	SPI-48	SPI-90	SPI-120
600	150	SPI-36	SPI-60	SPI-60	SPI-120	SPI-150
800	200	SPI-60	SPI-90	SPI-120	SPI-150	SPI-210
1200	300	SPI-90	SPI-120	SPI-150	SPI-210	SPI-300
2000	500	SPI-120	SPI-150	SPI-210	SPI-300	SPI-420
4000	1000	SPI-150	SPI-210	SPI-300	SPI-420	SPI-750

SOLAROPIA is the world's single company that provides and warrants its solar pumping performance data

Complete Solar Pumping Systems

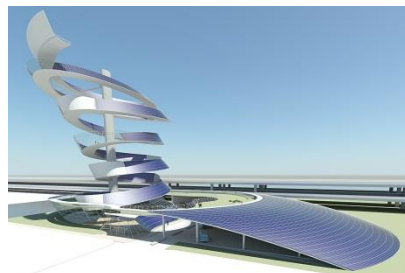
SOLAROPIA offers three packages of ready-to-install solar pumping systems

PAC1: Package with SPI only (Installers supply PV and mounts).

PAC1: Package to operate existing Pumps with solar power (SPI with PVs , Mounts , and AC-DC cables included).

PAC2: Package for New Pumping projects (PAC2 with new pump from SOLAROPIA Partners Pump manufacturers)

PAC1	PAC2	PAC3
SPI system only (Solar PV and Mounts are not included)	Complete solar System for Existing Pumps (SPI, Solar PV , mounts, Combiner Boxes with DC and AC Cables –are included)	PAC2 with new pump supplied by SOLAROPIA pump manufacturers partners in USA , or in the country of installation.



SPI SYSTEM ORDERING REFERENCE

SPI-B	HP	V	P
	Pump HP	Pump Voltage	PAC:1,2,3

