

# SOLAROPIA

INNOVATIONS IN SOLAR PUMPING TECHNOLOGY

## SOLAR SURFACE PUMPING FOR LARGE PLANTS



SPI OPERATES UP TO 500 HP SURFACE PUMPS WITH SOLAR

The 21 Century Pumping Technology Operates with Solar

## ABOUT SPI-S SOLAR PUMPS

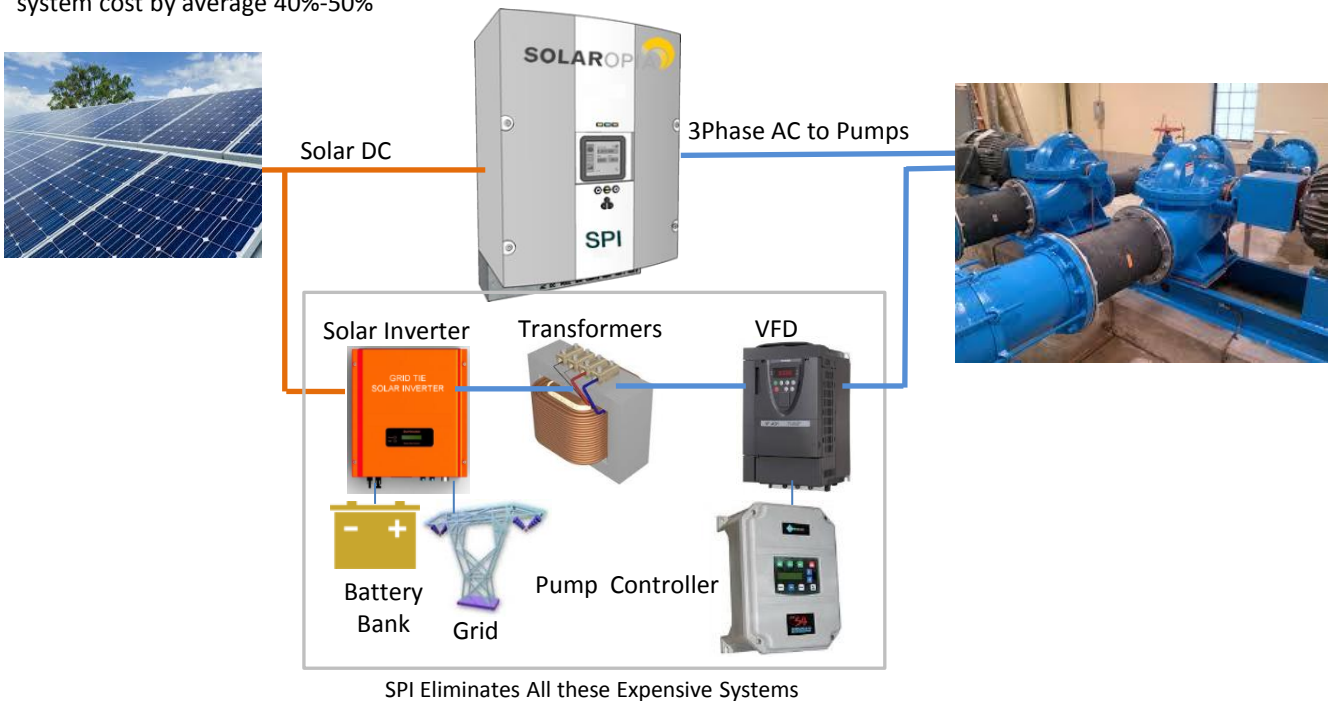
SOLAROPIA SPI-S represents a new generation of surface solar pumping systems that employs solar VFD technology to directly operate pumps up to 500 HP from Solar PV arrays. These pumps can handle city scale plant to supply potable water from rivers and reservoirs, irrigate thousands Acre s of land , or to feed large sea water RO desalination 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 use SPI solar power)
- 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-S 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

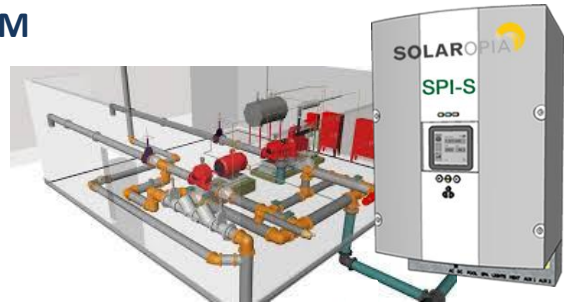
## BUILT-IN PUMP PROTECTION CONTROLLER

### 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



## APPLICATIONS

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

### Feed Pumps to City Scale Water Plants



SPI-S -500 model can pump 10 million GPD (40,000 m3/day) of fresh ground water using one solar surface pump at 500 KW PV

### Feed Pumps to Desalination Plants



SPI-S 300 model can feed RO plants with 5 million GPD (20,000 m3/day) from sea water using one solar pump at 300 KW-PV

### Irrigation Plants



SPI-S 300 model can operate 300 hp pump to move 7 million GPD (20,000 m<sup>3</sup>)

### Industrial Plants



SPI-S- 80 with 80 KW PV can supply 1million gallon water per a day to operate :

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

# SPI-S MODELS FOR SURFACE WATER SOLAR PUMPING

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: SURFACE PUMPIN HEAD ( Feet', Bars, Meters)		
GPM	m3/h	30'-1 bar-10m	75'-2.5 bar-25m	150'- 5 bar-50 m
400	100	SPI-6	SPI-12	SPI-21
800	200	SPI-12	SPI-24	SPI-45
1000	300	SPI-18	SPI-30	SPI-60
1500	400	SPI-24	SPI-48	SPI-75
2000	500	SPI-30	SPI-60	SPI-90
2250	750	SPI-60	SPI-90	SPI-150
4000	1000	SPI-90	SPI-120	SPI-210
6000	1500	SPI-150	SPI-210	SPI-270
8000	2000	SPI-210	SPI-270	SPI-350
12000	3000	SPI-270	SPI-350	SPI-420
16000	4000	SPI-330	SPI-420	SPI-500
20000	5000	SPI-400	SPI-480	SPI-560



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

