COUNTRY:
INDIA

SOLAR POWERED IRRIGATION SYSTEMS – COUNTRY CASE STUDY RAJAWAS

Geographical Location:

- Rajasthan, Jaipur
- Latitude: 24°4’17” N
- Longitude: 75°44’10” E
- Altitude: 430 m

Specific Site Conditions:

- Climatic condition: semi-arid
- Remote location, but connected to public grid
- Frequent regular load-shedding and irregular voltage fluctuation
- Only 6 hours of electricity per day/night
- Free-of-charge water is pumped from a drilled well directly into the irrigation system
- Good water quality but constantly decreasing and seasonally varying water level in the region

Salient Features of Solar-powered Irrigation System:

- 3,1 kW_p PV generator installed on Tata Solar manual tracking system
- PV pumping system size is pre-fixed by government
- Not well matched PS4000 Lorentz pump/controller – system capacity is not fully exploited
- Solar pump mainly serves to bridge periods of lacking grid-electricity
- Daily mean water output: 76 m^3/day
- Pumping Head: 50 m
- Conventional impact sprinkler and drip irrigation system in place, but no systematic irrigation outlay, frequent moving of sprinklers/drip lines

System Costs / Financing:

- PV pumping system: 5,426 EUR
- Irrigation equipment: approx. 900 EUR
- Government investment subsidy 70% , own equity of farmer 30%
- Farmer pays a flat-rate for grid-electricity of 12 EUR/month

Farming System / Cropping Patterns:

- Smallholder farm with1.2 ha
- Main cash crops: wheat, mustard, water melon, green pea
- Cereal and oilseed cultivation irrigated with impact sprinklers (2 bar nominal pressure, discharge 2.72 gph, 11.5 m radius), vegetable production on 0,25 ha irrigated by 1/2" drip tube with built-in emitters (turbulent flow, discharge 0.2 gph)

Experiences / Lessons Learnt:

- Comparably small PV generator limits potential of the motor/pump => acceptance problems
- Standard-type sprinklers, frequently used in India, are not well-suited in combination with capped PV pumps => acceptance problems
- Subsidies provided by central / regional government hamper market development
- Need for technical training and improvement of locally manufactured components
- No structured monitoring of success or failure of programmes

Promoting and Planning Bodies:

- 30% investment subsidy by central government + 40% by Rajasthan Horticulture Development Society
- Investment subsidy will only be granted if farmer is the land owner and is willing to install water-saving irrigation technology (sprinkler and/or drip)
- System integrator: Tata Power Solar