

Case Study:
40 HP Pump Jack in Woods County, OK
The Solar Jack Energy Management System
Reduces Pump Jack Operating Costs

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SOLARJACK 

About Solar Jack

Solar Jack, LLC is a solar-centric, energy efficiency management company that specializes in providing state-of-the-art technologies to the artificial lift segment of the oil and gas industry.

The Solar Jack Energy Management System (EMS) captures and combines the otherwise wasted regen energy created by the pump jack combined with solar energy, lowering the energy cost for pump jack operators. The system also allows operators to easily optimize the strokes per minute of pump jacks, both saving energy and lowering maintenance costs.

Solar Jack offers two models of our Energy Management System:

- Net-Meter model – combines solar, variable speed regen drive with soft-start technology, and regenerative power whereby an operator can qualify for Net-Metering (power purchase) with their electric utility (where applicable).
- On-Site Storage model – combines solar, variable speed drive with soft-start technology, and on-site power retention that lowers energy cost by capturing and temporarily storing the energy created by the solar array along with the regenerative energy from the down stroke of the pump jack.

Overview

In late November of 2014 a Solar Jack Site Evaluation Trailer (SET) was set up on a 40 HP Pump Jack in Woods County, OK. 17 days of data samples were collected using an Accuenergy Acuvim II Series Power Meter (ANSI rated, utility grade). Both the Net-Meter model and On-Site Storage model were tested.

Results

This pump jack used an across-the-line starter with a 100% run time at 9.4 strokes per minute (SPM). The SPM was reduced to 8.4 for all Solar Jack system testing. It should be noted that further reduction in SPM is possible, this would lead an even greater reduction in in overall operating cost (maintenance savings + energy savings). Based on testing at this site testing, our On-Site Storage model was 11% more efficient than our Net-Meter model. This is consistent with other tests we have performed comparing the two models in which the On-Site Storage model is on average 10% more efficient than the Net-Meter model.

1) ENERGY USE REDUCTION:

- a) 35% Reduction of energy use with the Solar Jack Net Meter model with Solar included
- b) 46% Reduction of energy use with the Solar Jack On-Site Storage model system with Solar included

- 2) **STROKES PER MINUTE REDUCTION:** This pump jack was originally set at 9.4 strokes per minute (SPM), running 100% of the time. Significant maintenance savings will be realized from the reduction in strokes that can be easily achieved with Solar Jack Energy Management Systems (fewer strokes = less wear and tear on the pump jack). “Dialing in” on the optimal number of strokes per minute will result in a substantial reduction of overall strokes, with no loss in production. For example, for this test we reduced the SPM by 1 stroke 8.4:
- a) Reducing the SPM by one stroke to 8.4 SPM @ 100% runtime = elimination of 1,440 strokes/day and 525,600 strokes/year
 - b) No loss in production
 - c) No expensive sheave changes required to adjust SPM, speed changes are done by simply turning a dial with the Solar Jack system

Conclusion

The harnessing of energy inefficiencies in the operation of pump jacks in the oil & gas industry will yield substantial cost savings to pump jack operators. With each stroke of a pump jack, operators are losing energy that could otherwise be used to offset energy costs. Solar Jack offers the industry a cost effective answer in the form of a solar enhanced, zero-waste energy solution that allows the regenerative energy and solar energy captured by the Solar Jack system to accrue to the benefit of the pump jack operator.

By combining the benefits of variable speed “soft start” technology, regenerative energy, solar power, and custom energy management the Solar Jack EMS reduces the overall lifting cost for the pump jack operator. Solar Jack’s patent pending solar enhanced variable speed system allows pump jack operators to reduce power usage and maintenance costs using a clean, renewable solution.

Solar Jack is a solar enhanced, variable speed energy management system that gives oil producers the ability to capture the regenerated energy from their pump jacks, combined with solar energy, to offer a solution for reducing energy consumption and energy cost, as well as reducing maintenance downtime and cost. Solar Jack is a joint venture formed by North Creek Energy, LLC and P&J Energy Services, LLC.

Solar Jack, LLC
929 New Leicester Hwy, Suite 7
Asheville, NC 28806
888.562.1005
www.solar-jack.com