Case Study:
75 HP Pump Jack in McKenzie County, ND

The Solar Jack Energy Management System
On-Site Storage Model Compared to a Lufkin System

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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; 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.

Visit **www.solar-jack.com** or contact us at **888.562.1005** to learn more.

Overview

In November of 2014 a Solar Jack Site Evaluation Trailer (SET) equipped with one of our Energy Management Systems (On-Site Storage model) was set up on a 75 HP pump jack at a well site in in Watford City, McKenzie County, ND. The well was equipped with an existing Lufkin VFD and a Lufkin Well Manager™. Data was collected using an Accuenergy Acuvim II Series Power Meter (ANSI rated, utility grade).

Three tests were conducted: the first was a baseline data sample with the Lufkin system prior to the Solar Jack system being connected, the second was with the existing Lufkin VFD and Well Manager along with our On-Site Storage Module, and finally we bypassed the existing Lufkin system and connected the complete Solar Jack system.

Results

In the baseline sample with the existing Lufkin system this well used 502 kWh/day of import power. The pump jack is generating 13% of the power needed each day of operations, but this regen energy is currently being pushed back to the utility and the operator is receiving no credit. Basically, the owner is giving the utility 65 kWh/day and then buying it back from them.

For the second, test the Solar Jack On-Site Storage module was added to the existing Lufkin system. Due to the parameter settings on the Lufkin drive, the On-Site Storage module was only able to recycle 18% of the available regen energy.

In the third test, the existing Lufkin Well Manager and VFD were bypassed and the complete Solar Jack Energy Management System was connected to the pump jack. The On-Site Storage model of the system was used since North Dakota does not have a net meter (or power purchase) program. The On-Site Storage model of our system allows the pump jack creating the regen to immediately recycle the power, in a "push-pull" model. The data from this test showed that 347 kWh/day of import power was used. This is **31% more efficient** than the existing Lufkin system the operator is using at this site. With the Solar Jack system no regen is being given to the utility, it is all being recycled to reduce the amount of import power required to operate the pump jack.

Test		Import Power	Regen Pushed to the Utility
1	Baseline – Existing Lufkin System	502 kWh/day	65 kWh/day
2	Existing Lufkin System with Solar Jack On-Site Storage Module	494 kWh/day	53 kWh/day
3	Complete Solar Jack Energy Management System (bypassing Lufkin System)	347 kWh/day	0 kWh/day

Conclusion

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 that is more efficient than current Lufkin systems on the market.

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.

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