KEM Energy

Background

KEM Energy Inc is a midsize oil and gas company with assets in Texas, Oklahoma, and Kansas. Their George Ranch Lease, located in Fort Bend County, consists of 14 wells producing primarily oil. The company wishes to implement a surveillance system in order to reduce the labor costs required to visit the wells for route inspection and data gathering. While the central control facility has access to commercial electricity, the widely scattered well sites lack connection to the power grid. As a result, regular visits to each well site are required to ensure the proper functioning of the wells. To reduce the labor cost required for such tasks, the company is considering the utilization of renewable energy solutions. We proposed an off-grid photovoltaic (PV) system capable of powering the necessary devices to monitor the wells as a proof-of-concept.

Site Map

Below is the site map for the George Ranch Lease.

A typical well site size is shown below.

The communication network will need to cover 500'-700' reliably.

Design

Since there are no telephone lines available on-site, a WiFi hotspot can be used to provide both a Local Area Network (LAN Connection) and internet access to upload data. However, the central facility spans 500 ft by 700 ft, out of the range of the hotspot. As a result, we need to add a WiFi range extender to increase the coverage.

For the Proof of Concept, we rely on real-time video feed to read the meter values and visually monitor the equipment at the sites. Therefore, an off-grid PV system is needed to fulfill the energy requirements of both the network and video monitoring systems. The equipment used to satisfy the objectives of our project are detailed below.

Video Monitoring Systems

- NETGEAR Arlo Pro Outdoor Security System
- Arlo Pro Cameras with standalone solar panel recharger

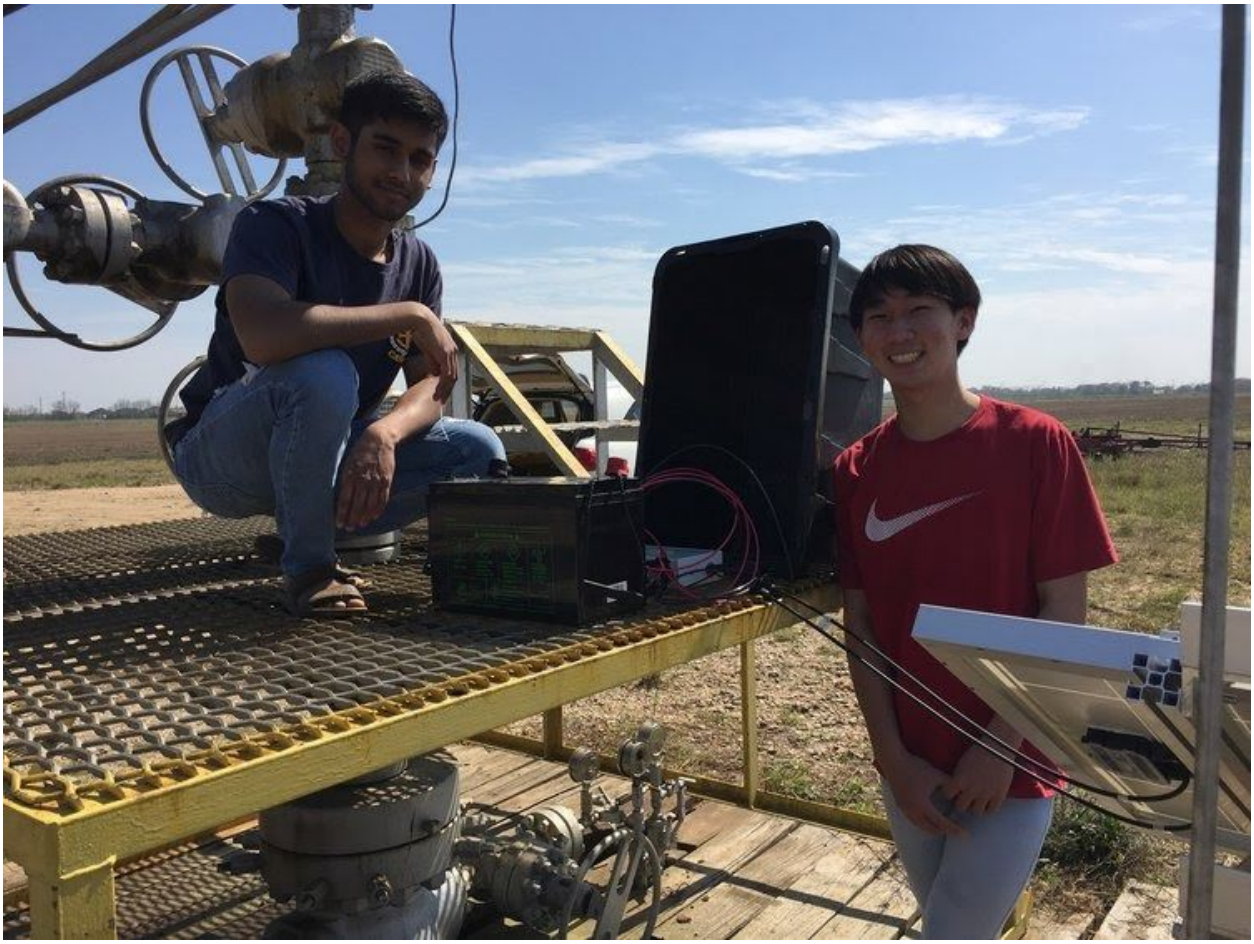
Off-Grid PV System

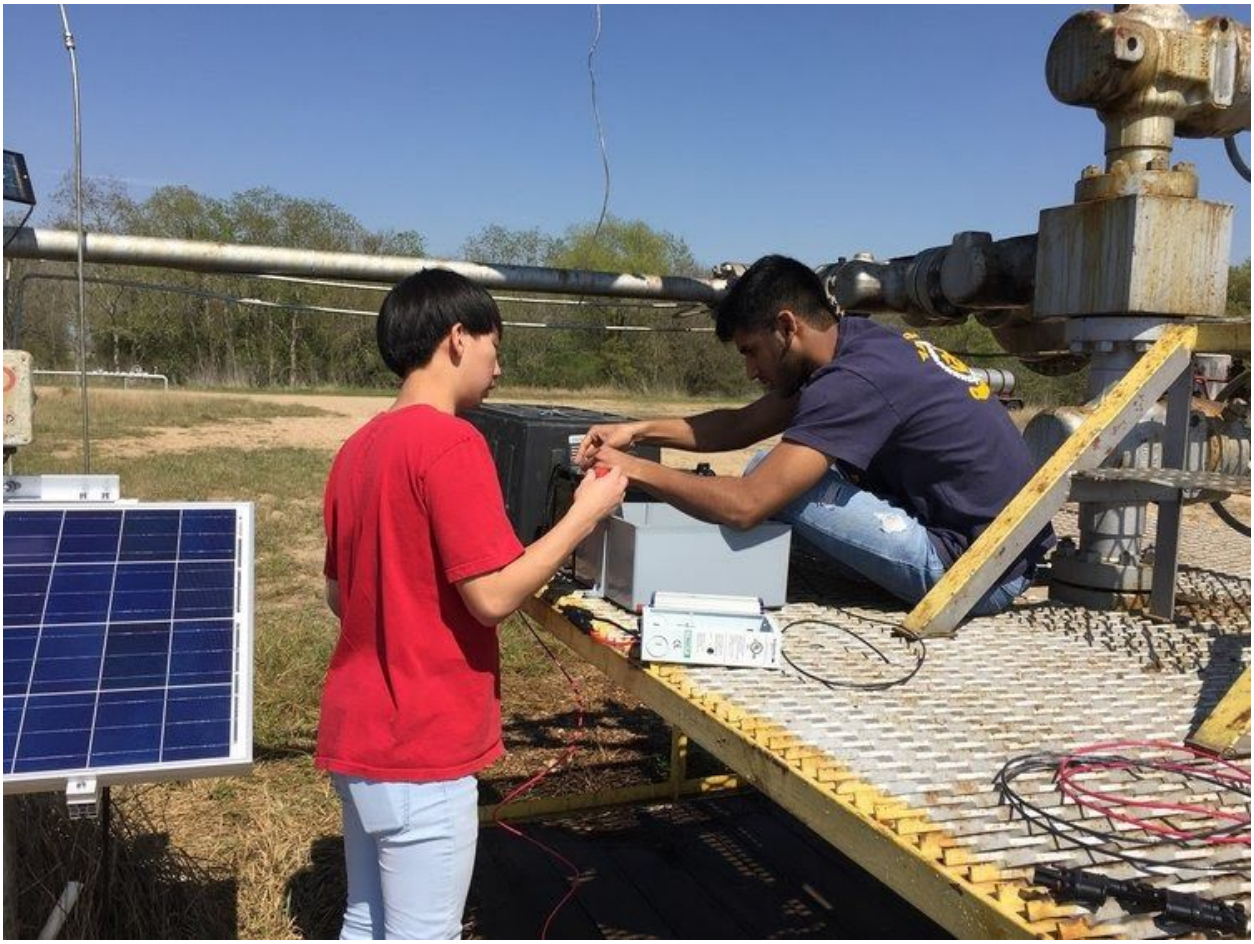
- Grape Solar GS-STAR-100W solar panel
- APEX APX12-120S Rechargeable Battery
- Schneider C35 Charge Controller

- Xantrex XPower 450 Inverter

- Renogy Pole Mount Support for Solar Panel

Implementation





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