Contributions of Off-Grid Applications: Solar powers the "digital oilfield"

At remote oil & gas fields requiring critical power for operations, solar electricity isn't just a solution—in many cases it's **the** solution

A paradoxical relationship:

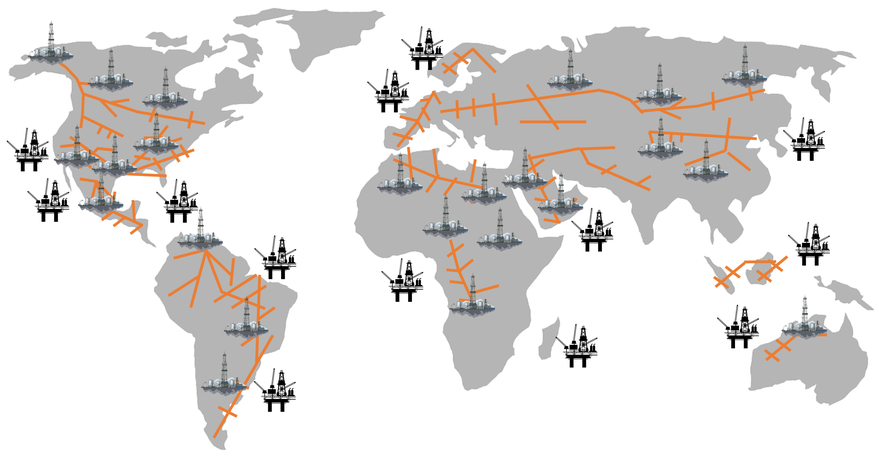
The fossil-fuel extraction industry depends on solar electricity for critical "Digital Oilfield" operations in the field.

Why?

Because solar is more cost-effective than diesel and gas generators for remote power. Unlike generators (and wind turbines), solar has no moving parts and requires almost no maintenance. And solar electric systems never need fueling.

The remote powering challenge:

With over 2 million miles of oil and gas pipelines and over 65,000 extraction sites—and over 9,000 of those off-shore—the vast majority of extraction operations aren't near an electrical grid and need local powering solutions.



What is meant by the "digital oilfield?"

The automation, control, and optimization of nearly every process in oil & gas production—both upstream (exploration, development, and production) and midstream (transport and storage). Initially adopted for deep-water facilities where remote, hazardous operations made automation desirable, Digital Oilfield technology now applies to all aspects of on and off-shore production, including:

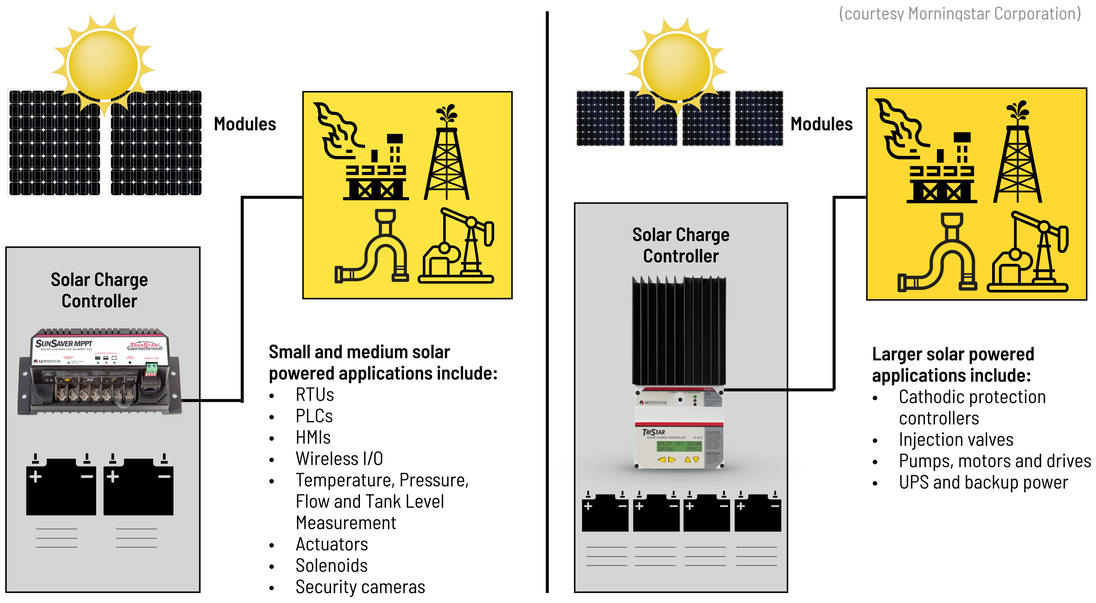
- Data management
- Pipeline integrity, including cathodic corrosion protection
- Process automation
- Drilling and production optimization
- Control and monitoring
- Sensors and instrumentation
- Robotic drilling and "smart wells"
- Security
- Lighting (fields and platforms)
- Safety management

The Benefits:

Oilfield technology delivers on the average an 11% bottom-line improvement and 7% increase in productivity. Example: automating pipeline integrity monitoring can reduce the time needed for a full inspection from one week to just 30 minutes. Digital Oilfield technology reduces the need for "hands on" monitoring and maintenance, greatly improving operational safety and efficiency.

Solar electric system implementation on the Digital Oilfield

(courtesy Morningstar Corporation)



Case studies:

Off-shore platform helideck lighting system in Brunei, Southeast Asia, powered by Morningstar charge controllers.
Courtesy ORGA BV, Shell

North Sea platform using solar electricity with Morningstar controllers to power telecom, navigation aid, bird deterrence, foghorn, and other critical systems.
Courtesy JCE Energy

Solar-powered Remote Terminal Unit (RTU) at a pumping site, using HazLoc-rated electronic components.
Courtesy SunWize

Solar in Hazardous Location (HazLoc) applications— for oil & gas and other uses where hazardous gasses and liquids might be present (such as mines), proper certifications for hazardous location use is critical. Solar charge controllers and other critical system components should carry the following certifications:

- North America: UL (Underwriters Laboratories) and CSA (Canadian Standards Association): meets Class 1/Division 2 (areas where explosive concentrations of gasses, vapors and liquids are not normally present but may accidentally exist) and Groups A-D substances including Acetylene, Hydrogen, Propane, Gasoline and Methane
- Rest-of-World: IECEx (International, various agencies) and ATEX (Europe, also various agencies): meets Zone 2 approval for areas where an explosive atmosphere could occur for short periods from hazardous gasses and vapors

(Left) Morningstar's line of ProStar™ (upper) and SunSaver™ (lower) solar charge controllers with UL/CSA and IECEx/ ATEX Hazardous Location certifications, used in on and off-shore oil & gas operations around the globe

(Above) SunKeeper™ UL/CSA-rated controller for small, single-panel systems

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