



oil-wells-as-grid-scale-batteries-by-salgenx

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Turning Oil Wells Into Grid-Scale Saltwater Batteries - Salgenx introduces a revolutionary way to repurpose oil wells by transforming them into large-scale saltwater flow batteries for solar energy storage

Salgenx unveils a groundbreaking solution that converts oil wells into grid-scale saltwater batteries using chlorine redox flow technology, enabling solar energy storage and nighttime grid support with high efficiency and low cost.



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Turning Oil Wells Into Grid-Scale Saltwater Batteries

A New Era of Energy Storage

Salgenx is pioneering an innovative approach to grid-scale energy storage by transforming oil wells—active or abandoned—into high-capacity saltwater flow batteries. This breakthrough concept uses naturally occurring brine found in oil wells as the electrolyte and leverages proven chlorine redox chemistry to store and dispatch solar power with high efficiency.

As solar photovoltaic (PV) installations grow, so does the need for cost-effective, scalable storage solutions that can deliver power after sunset. Salgenx's membrane-free chlorine flow battery technology is ideally suited to meet this challenge, and oil wells provide the perfect underground storage medium for the electrolyte.

How It Works

1. Solar Charging (Daytime):

Solar PV panels generate electricity, which powers a modular electrolysis unit installed above ground in a standard shipping container. This unit oxidizes chloride ions (Cl^-) in the brine to produce chlorine gas (Cl_2), which is stored safely in an immiscible organic phase like oil.

2. Energy Storage:

The oil well serves as a natural reservoir for the saltwater electrolyte (brine). Chlorine gas is stored in sealed above-ground containers in oil, while sodium ions are stored in a solid-state electrode material.

3. Energy Discharge (Nighttime):

At night, the chlorine is reduced back into chloride ions, generating electricity to feed into the grid. The process is highly efficient, with round-trip energy efficiencies as high as 91 percent.

Converting Oil Wells into Saltwater Batteries

- Oil Well Reservoir: Stores natural brine (NaCl-rich water)
- Solar PV Array: Powers the electrolysis process during the day
- Electrolysis Container: Splits Cl^- into Cl_2 using chlorine redox flow technology
- Energy Storage Tanks: Store Cl_2 safely in an organic carrier fluid
- Nighttime Discharge Unit: Converts Cl_2 back to Cl^- to produce electricity
- Grid Interface: Delivers power when solar is unavailable

Technology Advantages

- Low Cost: System cost is estimated at just \$100 per kWh, well below industry averages.
- High Energy Density: 125.7 Wh/L, among the highest for aqueous flow batteries.
- Membrane-Free Design: Eliminates costly ion-selective membranes by using immiscible fluid phases.
- Safe and Scalable: Modular design in sealed shipping containers, adaptable to remote or urban sites.
- Environmental Benefit: Repurposes aging oil infrastructure while reducing brine waste and emissions.

The Science Behind It



