The easy oil is gone

Oil companies are increasingly producing heavy oil, which accounts for 70% of today’s remaining reserves. Heavy oil is abundant, but thick—like tar—and difficult to extract.

The leading method of producing heavy oil is steam injection, a type of thermal enhanced oil recovery (EOR) that injects steam into a reservoir to heat the oil making it easier to pump to the surface. Steam injection can boost well productivity by up to 300%, but it’s an energy intensive process.

Using sunshine to produce oil

To produce the steam for EOR, oil companies burn an enormous amount of gas—a valuable resource that’s in short supply in many oil-producing regions. Solar EOR replaces burning natural gas with concentrated solar power.

Solar can provide up to 80% of an oilfield’s steam needs, significantly reducing the amount of gas consumed. To maintain steam injection around the clock, solar steam is injected during the day, and steam produced by burning natural gas is injected at night.

Made for the oilfield

GlassPoint’s enclosed trough technology is the only solar thermal solution built to meet the unique needs of the oil industry. Curved mirrors inside a glasshouse track the sun, focusing heat onto a pipe containing water. The concentrated sunlight boils the water to generate steam. The glasshouse protects the mirrors from wind, dust and sand. It has an automated washing machine to maintain performance in harsh desert environments.

Saving valuable natural gas

By using solar for EOR, the gas saved can be exported or redirected to higher value uses such as power generation or industrial development. As a result, solar EOR can boost the local economy and help create jobs too.

Solar EOR produces steam with zero-emissions, helping supply our world’s energy needs more sustainably.
Frequently Asked Questions

Q. What is enhanced oil recovery (EOR)?
A. Enhanced oil recovery (EOR) is a set of techniques used by oil producers worldwide to increase production from mature or unconventional resources, such as heavy oil. Thermal EOR is the most common form of EOR, which injects high-pressure steam deep into an oil reservoir. The steam heats the formation and reduces the viscosity of the oil, making it easier to pump to the surface. Thermal EOR can boost well productivity by more than 300%.

Q. What effect does EOR have on oil supply?
A. More than 70% of today’s remaining oil reserves are classified as heavy oil, which will require EOR to produce. Heavy oil is similar in texture to tar and has been traditionally very difficult to produce. Typically, only about 5 to 8% of the heavy oil in a reservoir can be recovered using conventional means. However, thermal EOR can recover an additional 50 to 70% of the original oil in place. By deploying EOR, oil producers can significantly increase the world’s oil supply.

Q. What is solar EOR?
A. Thermal EOR is a highly energy intensive process. To produce heavy oil, it takes roughly the energy in one barrel of oil to produce five barrels of oil. Large amounts of fuel, typically natural gas, are burned to generate steam for thermal EOR. In solar EOR, concentrated sunlight is used to generate steam, replacing natural gas. In sunny locations, solar EOR can provide up to 80% of a field’s annual steam needs.

Q. What are the economic advantages of solar EOR?
A. Solar EOR can reduce the amount of a gas an oilfield consumes for EOR by up to 80%. The gas saved can be used for higher value applications, such as electricity generation, desalination, industrial development or export as LNG, boosting total economic activity.

Q. What are the environmental benefits of solar EOR?
A. Solar produces steam with zero emissions. Solar EOR can improve local air quality by eliminating nitrogen oxides (NOx), particulate matter and carbon dioxide (CO2) emissions associated with fuel combustion. If just 2% of the steam used at today’s oilfields were produced using solar energy, the reduction in CO2 would be larger than the emissions saved from all the electric vehicles in the world today.

Q. How does GlassPoint’s technology work?
A. Unlike photovoltaic panels that generate electricity, GlassPoint’s technology generates steam directly from sunshine. GlassPoint designed a solution specifically for the oil and gas industry. The enclosed trough technology houses thin, curved mirrors inside a glasshouse structure. The mirrors track the sun throughout the day focusing sunlight on a pipe containing water. The concentrated sunlight boils the water to produce high-pressure steam, which is injected into the reservoir using the same pipes and injector wells as steam made from gas.

Q. What are the benefits of the glasshouse structure?
A. By bringing the system indoors, GlassPoint has achieved a number of capital and operating cost savings. The solar collectors are completely sealed from the wind, dust and sand common in oilfield environments. As a result, the mirrors and components inside the glasshouse are very lightweight and inexpensive—a fraction of the cost of exposed mirror designs. The self-cleaning glasshouses have an automated washing unit that eliminates the need for manual cleaning labor and saves scarce water supplies.

Q. What are the advantages of GlassPoint’s technology over other solar designs?
A. GlassPoint’s enclosed trough technology is the only solar thermal design:
- Delivering steam at costs competitive with natural gas
- Proven to withstand harsh oilfield environments
- Equipped with a proven, automated washing system
- Developed using oilfield best practices, using the same brackish feed-water, pumps and pipes used for thermal EOR operations today

Solar-Powered Oil Production

- Expands heavy oil production
- Reduces natural gas consumption
- Redirects gas to power local economies
- Reduces emissions