

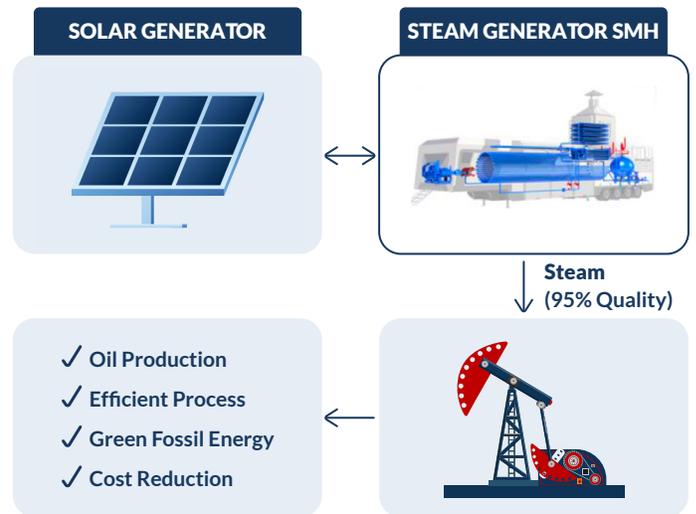
# > INTRODUCTION TO SOLAR THERMAL ENHANCED OIL RECOVERY



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The constant challenges of enhanced oil recovery projects are not only focused on the implementation of technically and economically efficient technologies. In the last decade to date, oil companies have been focused on incorporating environmentally friendly solutions. The reduction of fossil fuel consumption has become a real concern for service providers and an obligation for NOC's and IOC's to be aligned with the environmental regulations established by the different nations in the framework of sustaining effective measures to mitigate environmental pollution and the respective consequences for our planet. In another context, in thermal enhanced recovery processes, in economic terms, measures aimed at reducing the amount of fuel consumed for each ton of steam injected into the reservoir can significantly increase the profitability of the projects.

Consequently, the introduction of technologies such as Solar Thermal Recovery has been evolving rapidly. This technology is based on harnessing and concentrating solar energy in large receiver panels and then raising the temperature of the water sufficiently to generate steam. Solar energy as an energy source for EOR processes in isolated areas where fuel sources are not available, insufficient or their operating costs can be very high, would represent an optimal solution. At present, there are Thermal Solar Energy Recovery projects in Heavy Oil Fields in countries such as Oman, Kuwait and the United States.



One of the main challenges of this technology resides on the fluctuations of solar intensity that can be generated in some periods of the day or in those areas with seasons and climatic changes well marked. However, the greatest benefits are due to the reduction of costs due to lower consumption of fossil fuels and the lower environmental impact that would be generated during the execution of the project.

**"At Nakasawa we are committed to the evolution of technology towards environmentally friendly solutions".**