

Screening Countries to Implement Concentrated Solar Power to Improve Steamflood EOR Project Economics

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Abstract

The major drawbacks of steamflood enhanced oil recovery (EOR) schemes are their environmental footprint and the high cost of generating steam for injection. This has led some operators of such projects located in sunnier climates to consider concentrated solar power (CSP) as an alternative to burning gas to convert water into steam. The technology is proven to work, but not all countries are blessed with the combination of heavy oil fields with suitably shallow reservoirs and enough sunshine of a given strength to allow CSP to be implemented. The renowned biannual EOR survey of the OGJ reports over one hundred potential steamflood candidates worldwide, yet there are relatively few instances of CSP being used. This paper describes how to screen countries to assess their CSP-EOR potential and to consider the replacement of conventional gas-burning steam generation with CSP technology. Analytical modeling provided forecasts of potential heavy oil recovery from which the associated profiles were used to estimate solar collector area requirements. Economic analyses of ongoing projects were used to compare the impact of CSP on steam flood OPEX. Government subsidies undoubtedly help to reduce the high CAPEX outlay required by CSP projects and increases steam flood net present value. While there is an undoubted lowering of a steamflood's carbon footprint if CSP is used, this is offset somewhat by the increased land use needed to deploy the solar collection equipment. CSP is a relatively new technology, but its potential is beginning to be appreciated by the traditionally conservative oil sector and it is envisaged that the process will be increasingly adopted for improved heavy oil extraction.

