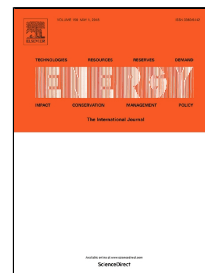


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Thermal oil recovery from fractured reservoirs: energy and emissions intensities

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1 **Thermal oil recovery from fractured reservoirs: energy and emissions intensities**

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6

7 **Abstract**

8 Increasingly, more focus has been placed on recovering heavy oil from fractured reservoirs. The  
9 key challenge of these reservoirs is the nature of the rock with its geological and rock-fluid  
10 complexities as well as the viscosity of the oil itself and the difficulties of lowering the viscosity  
11 of the oil. The research documented here presents an analysis of the energy and emissions impact  
12 of thermal (steam-based) oil recovery from naturally fractured carbonate reservoirs. By using a  
13 combination of the dual porosity concept and energy balance, the method offers a solid analytical  
14 approach to evaluate the ideal performance in terms of both energy utilization and greenhouse gas  
15 (GHG) emissions for thermal recovery from naturally fractured reservoirs. The results provide a  
16 limit on energy efficiency and emissions when recovering oil from these systems by using steam.  
17 The results reveal that the energy efficiency and GHG emissions per unit oil produced should be  
18 improved for thermal recovery processes operated in fractured reservoirs.

19 Keywords: fractured reservoir; heavy oil; energy efficiency; GHG emissions; Grosmont  
20 Formation

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