

Life cycle carbon intensity, water use and EROI of upgraded shale oil products using the Enefit280 technology

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Outotec and Enefit have jointly developed the Enefit280 technology for oil production from oil shale. The new process combines Enefit's proven solid heat carrier technology and Outotec's experience and knowledge in fluidized bed technology. The new Enefit280 technology has a higher unit capacity, energy efficiency and lower environmental impact. Jacobs Consultancy has recently calculated life cycle CO₂ emissions for the oil products derived from Estonian oil shale using the Enefit280 technology. "Mine to wheel" carbon intensity values were calculated for the 20,000 BPD Estonian oil shale processing industry. CO₂ credits were assumed for the CO₂ emissions avoided by generating power from waste heat in the Enefit280 unit, rather than by power generated by power plants. It was assumed that part of the process ash will be sold for cement production as a clinker substitute therefore, offsetting CO₂ emissions from cement production. The life cycle greenhouse gas emissions for producing raw shale oil, upgrading it to final products and transporting it to filling stations for combustion as motor fuel will be presented. Enefit has also estimated and will present results for water consumption and Energy Return on Investment for the production of upgraded shale oil products derived from Estonian and Green River oil shale using the Enefit280 retorting technology.