Produced water treatment technologies: how to compare by LCA methodology

V. Piemonte, G. Losito, L. Di Paola, M. De Falco, M. Capocelli, M. Prisciandaro

Faculty of Engineering, University Campus Bio-Medico of Rome, via Alvaro del Portillo 21, 00128 Rome, Italy, email: v.piemonte@unicampus.it (V. Piemonte), losito.giovanni3@gmail.com (G. Losito), l.dipaola@unicampus.it (L. Di Paola), m.defalco@unicampus.it (M. De Falco), m.capocelli@unicampus.it (M. Capocelli)

Department of Industrial and Information Engineering and of Economics, University of L’Aquila, viale Giovanni Gronchi 18, 67100 L’Aquila, Italy, email: m.prisciandaro@univaq.it

Received: 13 September 2016; Accepted 10 March 2017

ABSTRACT

Due to its complex and polluting composition, norms regarding the discharge of produced water into the environment have gradually become more and more limiting. The costs of appropriate produced water treatments amount to about 40 billion dollars per year and they weigh clearly on the price of final products. For a sustainable water use in the Oil and Gas sector, especially in arid places where water is a valuable and precious asset, it is necessary to reuse the water after a primary treatment. The aim of this work is to present a life cycle assessment (LCA) to highlight the importance of treating the produced water and to understand its importance from the environmental point of view. The LCA analysis compares 6 different processes of produced water treatment in order to find the best in terms of low environmental impact, with a special focus on effects on human health. The use of innovative biological treatments, such as the two phase-partitioning bioreactors, able to remove dissolved BTEX from produced water, appear to be a reliable solution to reduce the impact of produced waters treatment.

Keywords: Produced water; TPPB; Membrane; LCA

*Corresponding author.