Improved Technology Portfolio Management via Sustainability Analysis

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Abstract : The oil and gas industry has played a major role in improving the prosperity of mankind and driving the world economy. According to the International Energy Agency (IEA) and Integrated Environmental Assessment (EIA) estimates, the world will continue to rely heavily on hydrocarbons for decades to come. This growing energy demand mandates taking sustainability measures to prolong the availability of reliable and affordable energy sources, and ensure lowering its environmental impact. Unlike any other industry, the oil and gas upstream operations are energy-intensive and scattered over large zonal areas. These challenging conditions require unique sustainability solutions. In recent years there has been a concerted effort by the oil and gas industry to develop and deploy innovative technologies to: maximize efficiency, reduce carbon footprint, reduce CO_2 emissions, and optimize resources and material consumption. In the past, the main driver for research and development (R&D) in the exploration and production sector was primarily driven by maximizing profit through higher hydrocarbon recovery and new discoveries. Environmental-friendly and sustainable technologies are increasingly being deployed to balance sustainability and profitability. Analyzing technology and its sustainability impact is increasingly being used in corporate decision-making for improved portfolio management and allocating valuable resources toward technology R&D.This paper articulates and discusses a novel workflow to identify strategic sustainable technologies for improved portfolio management by addressing existing and future upstream challenges. It uses a systematic approach that relies on sustainability key performance indicators (KPI's) including energy efficiency quotient, carbon footprint, and CO_2 emissions. The paper provides examples of various technologies including CCS, reducing water cuts, automation, using renewables, energy efficiency, etc. The use of 4IR technologies such as Artificial Intelligence, Machine Learning, and Data Analytics are also discussed. Overlapping technologies, areas of collaboration and synergistic relationships are identified. The unique sustainability analyses provide improved decision-making on technology portfolio management.

Keywords : sustainability, oil& gas, technology portfolio, key performance indicator

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