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A review of global gas flaring and venting and impact on the environment: Case study of Iran

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After a brief review of the global gas flaring and venting in oil industries including the emission of air pollutants and greenhouse gases and the amount of energy resources wasted, the focus is on Iran as a major oil producing and the world's third largest gas flaring country. Gas flaring is also practiced in natural gas industries, petroleum refining and petrochemical plants, although the level of emission is very low compared with emissions from oil production. The historical emission of these gases globally and Iran specifically, geographic location of emission sources, composition of gases, environmental impacts of gas flaring and the current and future projects to mitigate emissions are evaluated and discussed. Emission factor, an indication of efficiency in oil production, varies widely among oil production sites around the world, from near zero to more than 50 standard cubic meters of flare gas per barrel of oil produced with an average value of about 5. Iran's emission factor has fluctuated from around 1 to more than 16 according to the data of 1980–2012 with higher emission factors for offshore oil production. Data also show an increasing trend during 2010–2012 which could be due to the several technical reasons in oil productions as well as economic sanctions imposed on Iran. In addition, there is a great amount of uncertainty and discrepancies among various data sources in the emission factors due to the lack of actual measurements of the volume and composition of flare gas and the uncertainties in the data sources.This requires regulatory measures, investment by oil companies and international collaboration. The economic and technological constraints in implementing or delaying the gas flare reduction projects are evaluated and addressed, with successful case studies and best practices reviewed. In particular,the techno-economic constraints in implementing gas flaring reduction projects caused by international sanctions on Iran are analyzed. It is shown that despite the great loss of energy resources due to gas flaring, its adverse impacts on the local and global environment and the availability of the technologies to reduce emissions, flaring is still practiced in many parts of the world, which can be avoided if the necessary regulatory policies and measures are established at national levels and international collaboration can facilitate the investment by providing the required finance and technologies. At present the international activities to implement gas flaring project activities under the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) are very limited, but could be very effective in reducing emissions, if implemented.

Biography

Mohammad Javad Gholipour has Master's degree in Industral Engineering from Industrial Management Institute (IMI) in Tehran. Also he has BSc in Mechanical Engineering from Tehran Azad University. He has more than 18 years work experience in different projects in National Iranian Oil Company (NIOC) specially in gas gathering and emission reduction projects. He had been CDM Projects Coordinator under Kyoto protocol between 2007 and 2015 and he had two presentations in OPEC forums in 2005 and 2013. His information and knowledge about Iranian oil and gas indutries helps some university researchers to complete their research and studies.

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