



Mitigation of Methane at Oil and Heavy Oil Production Sites in Alberta: A Techno-Economic Analysis of Industry Reported Data



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Abstract

A site-by-site net present value (NPV) based techno-economic study of over 9000 conventional light and heavy oil sites (i.e. excluding mined oil sands) in Alberta was conducted to assess the cost of mitigating methane emissions using currently available technologies. Using site specific industry reported flaring and venting activity data, this analysis considers technical applicability and predicted costs for various mitigation options including: (i) installing infrastructure to tie-in excess gas to nearby pipelines, (ii) installing a flaring system (if not already present) to combust otherwise vented gas, (iii) use of catalytic conversion units or internal vapour combustors to combust vented casing gas at heavy oil sites, and (iv) use of two different line heaters technologies at heavy oil sites that allow the use of excess casing gas for onsite fuel demands (e.g. pumping and tank heating demands). At each site the economics are evaluated by assigning the least costly mitigation option (i.e. best NPV).

Under current economic conditions a small number (~300) heavy oil sites in the Peace River and Lloydminster regions exhibit economic (positive NPV) mitigation opportunities. However, for the majority of light and heavy oil sites, the current and foreseeable future price of natural gas implies mitigating methane comes at a cost to industry. This cost and associated methane reductions are explored on a cost per tCO₂e basis over a range of imposed carbon prices. In addition to the base analysis, the impact on mitigation and implications for overall provincial flaring are considered under: (i) a hypothetical tie-in policy and (ii) adjusting gas volumes to match recent airborne measurements.