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The Potential Socio-economic Impacts of Gas Hydrate Exploitation

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Gas hydrate has garnered significant interest as a possible clean fossil fuel resource, especially in countries with limited energy supplies. Whilst the sector is still in its infancy, there has been escalating development towards commercial production. To the best of our knowledge it appears that, despite its potential, existing analyses of the social and economic impacts of hydrate exploitation have been very limited. Before any viable commercial production commences, the potential impacts across society must be considered. It is likely that such impact assessments will become a legislative requirement for hydrate exploitation, similar to their requirement in conventional oil and gas projects. Social impact analysis should guide hydrate development to have the highest possible net benefits to the human and natural environment.

Without active commercial hydrate operations, potential socio-economic impacts can only be inferred from other fossil fuel resource focused communities, including those directly or indirectly affected by the oil and gas industry either in the vicinity of the well or further afield. This review attempts to highlight potential impacts by synthesising current literature, focusing on social impacts at the extraction stage of operation, over time. Using a DPSIR (Driving forces; Pressures; States; Impacts; Responses) framework, we focus on impacts upon: health and wellbeing, land use and access, services and infrastructure, population, employment opportunities, income and lifestyles. Human populations directly or indirectly related with fossil fuel extraction activities often show boom and bust dynamics, and so any impacts may be finite or change temporally. Therefore potential impacts have to be reassessed throughout the lifetime of the exploitation.

Our review shows there are a wide range of possible positive and negative socio-economic impacts from hydrate development. Exploitation can bring jobs and infrastructure to remote areas, although the labour supply may not fit with the labour demand. In regions with an existing strong fossil fuel energy sector, hydrate development would prolong the timeframe for which this sector could significantly contribute to the local and wider economy. In unexploited areas the industry can provide considerable income to an otherwise undeveloped region. Industrialisation tends to increase regional population, pressuring existing public services, such as healthcare and transport infrastructure. Immigrant fossil fuel sector workers are predominantly young, male and single. Their presence may be linked to elevated levels of certain social issues seen as undesirable problems by the community at large, such as drug usage or alcoholism. Hydrate development provides limited benefit to indigenous communities who are still following a traditional cultural lifestyle in the proposed development area, as many opportunities are not compatible with their way of life. Additionally, industry associated infrastructure can reduce the ability of the indigenous population to utilise the land directly, or as an access route elsewhere. The range of possible impacts show that any hydrate development must be carefully managed to maximise its potential, whether this takes the form of using the revenue from hydrate exploitation to try and counter the associated issues, or whether there needs to be specific limits placed on locations where extraction can occur.