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Strategic environmental assessment opportunities and risks for Arctic offshore energy planning and development

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ABSTRACT

Canada's Arctic environment is rich in hydrocarbon resources. As international attention turns to the Arctic to meet global energy demands there is increased recognition of the need to advance upstream impact assessment and decision-making to plan for energy development. There have been several applications of strategic environmental assessment (SEA) over the past decade in the international offshore energy sector; however, SEA remains underdeveloped offshore in comparison to project-based environmental impact assessment and unchartered territory in Canada's Arctic. This paper examines stakeholder perceptions of the opportunities and risks of advancing SEA for offshore energy planning and development in Canada's Beaufort Sea. Results indicate a number of perceived opportunities for SEA, including improved regulatory efficiency, better regional baselines and planning practices, an opportunity to assess cumulative effects, more meaningful project-based assessment, and greater certainty for industry stakeholders. At the same time there are a number of perceived risks, including foregoing anticipated development opportunities, the loss of flexibility in decision making, adding another layer of bureaucracy, and the added uncertainties of a novel approach. The implications of these findings for advancing SEA in the offshore energy sector are discussed.

1. Introduction

Environmental issues are defining a new agenda for offshore energy research and development. There is increasing recognition of the need to address the environmental implications of energy development early in the planning process, before irreversible decisions are taken and energy projects become a reality, at the strategic tier of policies and plans [1–3]. This higher-order environmental assessment, known as strategic environmental assessment (SEA), has gained considerable momentum in recent years and is now adopted in approximately 60 countries globally [4]. However, research on, and experience with, SEA in the offshore energy sector remains limited in comparison to traditional project-based environmental impact assessment (EIA), and the role of SEA offshore is neither well established nor understood [2,5]. This is the case in Canada's Arctic, where there is no system of SEA offshore for energy planning, exploration and development.

Canada's Arctic is rich in hydrocarbon resources and there is a renewed interest in Arctic energy development. Development in the high Arctic Islands and channels may be in the more distant future but plans for energy development in the Beaufort Sea-Mackenzie Delta Basin of Canada's western Arctic are advancing. Between 2008 and 2010, for example, Imperial Oil Ltd., British Petroleum, Chevron, and Exxon Mobil all purchased offshore exploration leases in the Canadian Beaufort Sea, and the federal government continues to sell offshore exploration licenses for Arctic energy exploration.

As international attention turns to the Arctic offshore to meet global energy demands, there is increased recognition of the need to advance a more strategic approach to impact assessment and decision-making to plan for offshore energy development prior to making decisions about individual energy project proposals [1,2,6]. However, notwithstanding the contributions of SEA offshore internationally [2], SEA remains unchartered territory in Canada's Arctic. In Canada's Arctic both industry and government remain skeptical about SEA offshore, noting its unproven benefits [7]. This is disconcerting in that major energy resource development is looming in Canada's western Arctic, and there is a recognized need for an improved environmental assessment process; yet there is little understanding of the perceived benefits or risks of SEA.

This paper examines the perceived opportunities and risks of SEA to offshore hydrocarbon exploration and development in Canada's western Arctic. Although focused on Canada's Beaufort Sea, results emerging and the implications for advancing SEA in the offshore hydrocarbon sector are broadly applicable internationally.

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2. Strategic environmental assessment

Environmental impact assessment has been subject to much criticism for its focus on individual project actions, its reactionary approach to impacts, and inadequate consideration of regional and cumulative effects [8–10]. The limitations of EIA in marine environments have also been noted [2,10]. In their review of the effectiveness of EIA for dredging and ocean disposal in Korea, Lee et al. [11] report that notwithstanding the inter-relatedness of the marine environment EIA applications remain focused exclusively on the local, proposed undertaking. The World Wildlife Fund [5] report a limited scope of EIAs conducted for the Baku–Tbilisi–Ceyhan pipeline project, from the Caspian Sea to the Turkish Mediterranean coast, and Sakhalin II, a system of offshore oil and gas platforms and pipelines off Russia's Pacific coast, in comparison to the network of infrastructure and impacts associated with the undertakings. Budd [12] identified similar concerns offshore of Great Britain, noting the lack of consideration of alternative locations for offshore development, so as to avoid sensitive marine areas; and under Norway's former offshore EIA regulatory system Kinn [3] noted the limited scope of EIA for oil and gas projects, focused on the specific development field and not on cumulative impacts to the offshore region.

Emerging out of the constraints of project-based approaches to planning for, and assessing the impacts of development actions, SEA is a tool for integrating environmental considerations at the earliest possible stages of decision-making [4]. As a higher order environmental assessment process, SEA occurs before irreversible development decisions are made, at the level of regional policies, plans and programs, when alternative futures and options for development and conservation are still open. In principle, the benefits of early environmental thinking should cascade downward resulting in more informed, efficient, and focused project-level assessments and decisions [13]. SEA thus ensures the consideration of environmental issues at the outset of the decision-making process and can detect potential environmental impacts at an early stage, before the projects are designed [14].

Competing interests for marine resources, including increasing pressures and potential risks associated with offshore hydrocarbon activities [15,16], have resulted in a recognized need for a more comprehensive and regional approach to impact assessment, especially in the context of offshore energy planning and development [2,3,5]. Offshore hydrocarbon projects operate in a large network of infrastructure and the risks to marine environments are high on a global scale [17]. There has been some progress in advancing SEA offshore internationally. Fidler and Noble [2] report on SEA experiences offshore of Norway, the United Kingdom and Atlantic Canada but note the limited influence on SEA on marine resource planning and hydrocarbon development. Even in countries such as Canada that have already in place directive-based SEA requirements, SEA offshore has yet to advance to same extent as EIA. The WWF [5], for example, report that large hydrocarbon programmes continue to unfold offshore without adequate strategic thinking. Part of the challenge is that SEA in the offshore sector has received only limited attention. As a result, although the need for SEA is well argued [13,18,19], the opportunities and risks associated with SEA offshore are unclear and linkages between SEA and other forms of planning and impact assessment remain elusive. Practical experiences with SEA in the offshore energy sector are relatively limited.

3. Methods

3.1. Beaufort sea study area

The focus of this study is the Inuvialuit Settlement Region (ISR) of Canada's Beaufort Sea (Fig. 1). The ISR is a result of the 1984

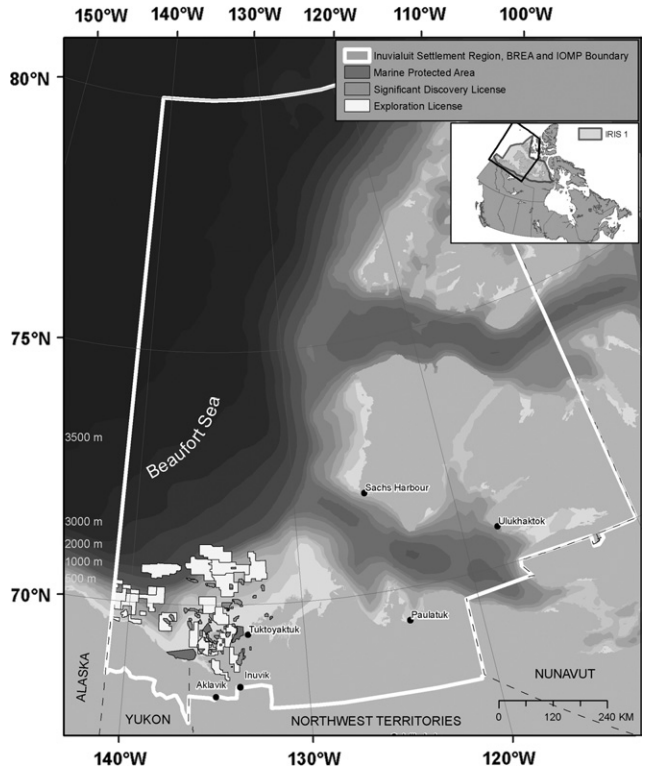

Fig. 1. Inuvialuit settlement region of the Beaufort Sea in Canada's western Arctic. *Source*: Map produced by Michael St. Louis, University of Saskatchewan.

Inuvialuit Final Agreement (IFA), a negotiated land claims agreement between the Inuvialuit of Canada's Northwest Territories and the Government of Canada. The IFA applies to the whole of the ISR, including both land and water. Terrestrial and marine resources in the ISR are managed under a co-management structure, consisting of numerous boards that represent the Inuvialuit communities and the government of Canada. There are approximately 11,500 people residing in the ISR, of which 73% are Inuvialuit, First Nations, or Métis [20]. Fishing and hunting provide sustenance and have been part of local culture for centuries [21]. The Beaufort Sea region is the only Arctic area designated for integrated management under the legislative framework of Canada's Oceans Act. The Beaufort Sea 'large ocean management area' covers an extensive area (1.1 million km^2) of northwestern Canada and encompasses the marine portion of the ISR. Within this region is the Tarium Niryutait Marine Protected Area, consisting of three sub-areas at the edge of the Mackenzie River Delta, created to conserve and protect the habitats of beluga whales, anadromous fishes and seabirds [15]. Recent surveys of the marine fauna inhabiting the continental shelf of the eastern Beaufort Sea and Amundsen Gulf have identified an ecologically and biologically significant area, characterized by high benthic productivity, situated along the western margin of the Cape Bathurst Polynya [22,23]. This marine habitat is believed to provide an important food resource for migratory populations of gray whales, walrus and eider ducks [22].

The economy of the ISR depends largely on non-renewable resources, including oil and gas. The Beaufort Sea is rich in hydrocarbons. The ISR itself is estimated to contain 40×10^7 l of potential oil and 680×10^{12} l of potential natural gas [24]. The Beaufort Sea and Mackenzie Delta have been subject to cycles of energy exploration and development for decades, primarily in coastal and near-shore regions. In 2007, however, due to increasing global oil prices and federal political efforts to build Canada's energy economy, exploration licenses were let in the deep