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Original Article

The role of regulatory frameworks and state regulation in optimising the extraction of petroleum resources: A study of Australia and Norway

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ABSTRACT

When a State permits the extraction of its petroleum resources, it essentially liquidates an asset. However, in some states, a large percentage of the resource is left behind, with resource companies taking the 'easy oil', leaving recoverable resources remaining in the ground. For example the average recovery from Norwegian fields stands at around 50%, whilst recovery from similar Australian and USA offshore fields averages 35% or less. Such recovery of easy oil may lead to sterilised fields, where petroleum resources are stranded in situ, and the cost of recovering the resource becomes uneconomical. Furthermore some regulatory frameworks are inherently uneconomical since they create regulatory burden, which significantly contributes to increased costs in resource extraction. In order to optimise the recovery of petroleum, the State can utilise a number of legal tools, such as the legislative structure, and the legal regulation of petroleum activities and participants. By incorporating the concept of optimal recovery of petroleum into the regulatory framework, and structuring the regulatory framework based upon the concept of principle or objective-based regulation, where the State constructs its legislation based of overarching principles, it is possible to optimise the extraction of petroleum resources from a field. Furthermore, strong State regulation of petroleum activities and participants also contributes to optimising the extraction of petroleum resources from a field.

1. Introduction

When extracting petroleum[1] resources, the goal for any State, where the State is the owner of the petroleum resource, is to balance the extraction of resources for the benefit of the citizens with the need to attract oil companies to recover those resources. In order to balance these two oft-competing interests, and optimise recovery, the State requires a suitable policy as well as a legal framework to implement the policy, whilst enabling petroleum companies to access and extract these resources.

Petroleum reserves are extracted from individual fields by different companies, often with little knowledge of the overall aquifer or regional field structure, or rates of recovery from nearby fields. It is the role of the State, rather than individual companies operating in their licence area, to coordinate the development of fields to ensure that recover is optimised both from individual licence areas, fields and reservoirs, and resource sterilisation is prevented or reduced. Resource sterilisation (also known as a stranded field) occurs where some petroleum is unable to be developed due to reservoir geology, access to the field, or access to facilities for development, or when individual companies develop fields on an individual basis with the combined effect of stranding some petroleum in the reservoir (Schulte and Asshert, 2012). The potential for sterilised fields presents challenges for regulators, and requires timely development of fields if it is to be avoided (Ministry of Petroleum and Energy, 2002, p. 17). Companies extract petroleum from individual fields, often with little knowledge of the overall aquifer or regional field structure, or rates of recovery from nearby fields. In addition, extraction from one portion of a reservoir typically affects other sections of the reservoir. Therefore, a coordinated approach to reservoir depletion is necessary to ensure maximum recovery (Ministry of Petroleum and Energy, 2002, p. 17). This regional view is essential to ensure that reservoir development is coordinated by a body that has the regional data and technical knowledge to assess the development, as well as the

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[1] Petroleum is defined by the Schlumberger Oilfield Glossary (http://www.glossary.oilfield.slb.com/en/Terms/p/petroleum.aspx) as a complex mixture of naturally occurring hydrocarbons found in rock. Petroleum can range from solid to gas. In the context of this paper, petroleum will refer to the range of hydrocarbons, with gas and crude oil identified where appropriate.

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authority to implement changes where required (Western Australian Department of Mines and Petroleum, 2009). Generally, it is the state that has the authority and resources to take this 'big picture' approach to resource development, and a lack of State coordination may contribute to resource or field sterilisation (Ministry of Petroleum and Energy, 2002, p. 17).

Added to the individual development by companies is the impact of ageing petroleum installations (petroleum facilities), which generally only have an optimal field operating life of 20–30 years, after which they need to be decommissioned and removed (Ministry of Petroleum and Energy, 2002, p. 17; Health and Safety, 2012). In mature provinces, such as the Norwegian North Sea, and some petroleum fields in Australia, the fields and installations are towards the end of their life. If the development of small and stranded fields is to occur, it needs to take place whilst existing infrastructure, although aged, is still functional. Otherwise, the infrastructure will be removed, and it will no longer be cost effective to develop small or stranded fields if new installations have to be constructed. In order to optimise[2] the extraction of petroleum, from both new fields and mature fields, the legal framework has an important part to play. Such legal tools that can encourage the optimisation of resource extraction include the structure of the regulatory framework, and the role of the State in regulating the extraction of the petroleum.

This paper considers how the legal framework within which petroleum recovery occurs can influence the recovery of petroleum. It seeks to highlight that the legal framework a State creates for petroleum extraction can play an integral role in optimising the amount of petroleum resources recovered. To demonstrate how the legal framework can assist in optimising petroleum extraction, this paper will comparatively analyse the regulatory framework for petroleum resource extraction in two developed petroleum-producing States – Australia and Norway. Initially it will compare the petroleum production of the two States, in order to demonstrate that whilst they differ in terms of production capacity and market capture, they are similar constitutional democracies where the export of petroleum plays an important part in that State's economy. This paper then compares and contrasts the structure and function of the legal framework for the extraction of petroleum in both States, assessing whether the framework optimises the recovery of extraction of petroleum resources from the field. Finally, this paper will analyse State regulation of petroleum activities and participants, to demonstrate whether strong State regulation can assist in optimising the extraction of petroleum from reservoirs.

2. Petroleum in Australia and Norway

Oil does not play the same role in the Australian economy and society as it does in Norway. Australia is not a player in the global petroleum market. It has proven petroleum reserves of 3.9 billion barrels (bbl), only 0.2% of the total global proven reserves (BP, 2013, p. 68). However, with the development of vast onshore and offshore gas resources (including unconventional gas resources), gas is playing an increasingly important part of the Australian economy. At present Australia is the fourth largest LNG gas exporter (US Energy Information Administration, 2012), and is poised to become the world's biggest LNG exporter by 2020 (The Economist, 2013).

Norway is a large player in the global oil market. It has over 60 fields in production, producing approximately 2 million bbl and 99.3 billion standard cubic metres (scm) of gas per day (Norwegian Petroleum Directorate, 2011, pp. 22–23). It is the seventh-largest oil exporter and second-largest gas exporter, accounting for approximately five per cent of the world crude market (Norwegian Petroleum Directorate, 2011, pp. 22–23). Petroleum is an important part of the Norwegian economy, comprising 21% of GDP, 26% of State revenue, 26% of total investment and 47% of total exports. (Norwegian Petroleum Directorate, 2011, pp. 22–23). The sector employs about 206,000 people (of a population of 4.5 million). Through 40 years of petroleum activities, the industry has created values in excess of 9000 billion NOK (approximately A$1700 billion) in current terms (Norwegian Petroleum Directorate, 2011, pp. 22–23).

Both Australia's and Norway's petroleum resources are a mix of mature fields and frontier regions (Norwegian Petroleum Directorate, 2011, p. 22; Arnesen et al., 2007, p. 882). Australia has some mature fields, particularly the Gippsland and Otway Basins in southeastern Australia. There are large frontier areas, particularly in northwestern Australia, which accrued to Australia (an additional 2,500,000 km^2 of continental shelf) as a result of the successful submission to the United Nations Commission on the Limits of the Continental Shelf in April 2008 (Geoscience Australia, 2008). This frontier area requires extensive exploration to realise possible petroleum reserves.

The Norwegian Continental Shelf is also characterised by mature provinces, particularly in the North Sea, with highly developed infrastructure and declining fields.[3] Norway also has a number of frontier areas, particularly the Barents Sea area in northern Norway. As such, Norway faces a similar need for resource management of mature fields as well as frontier tracts. Both jurisdictions require a resource management and development strategy that encompasses these differing areas with the aim of sustainable development

3. Petroleum policy in Australia and Norway

According to legal philosopher Ronald Dworkin, the law contains not only the rules (or statute) but also the principles, which are an integral part of the legal system (Dworkin, 1977). Dworkin differentiated between principles as standards that are to be observed, and policies that are the kind of standards that set out a goal to be reached, generally an improvement in some economic, political or social feature of the community (Dworkin, 1967, pp. 22–23). He set both policy and principle apart from rules, which are the legislative instruments, that outline what the law is (Dworkin, 1977).

Dworkin noted that policy relates to an economic political or social goal that is to be reached for the good of the community. This notion has been legally defined by Justices Crennan and as 'a principle or course of action which is adopted or proposed, particularly by the legislature and by the executive in its administration of legislation' (Thomas v Mowbray, 2007, para: 80). It is essentially a course of action that is intended to influence, determine and guide the decisions, actions and legislative process of a government (Paolo de Sa, 2007, pp. 494–495). In the context of natural resource development, policy is the current position or focus of a government in developing a natural resource, and usually encompasses political and fiscal policies. Such policy attempts to balance the needs of the State as owner and regulator of the petroleum resources, with the needs of the oil companies, and is determined by the complex interaction of many factors, including a country's mineral potential, location in the world,

[2] The term *optimise* in this paper is given means to extract the most amount of petroleum from the field as possible.

[3] In particular the North Sea area, south of 62° N. Exploration activities in this area include the award of licenses in special licensing rounds to ensure that there is access to critical infrastructure before the end of the life of that infrastructure. The areas awarded are tailored so that companies get the acreage when they have specific production plans, ensuring that maximum recovery of petroleum occurs.