

Public–private partnership for improved hydrocarbon recovery – Lessons from Norway’s major development programs



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ABSTRACT

Oil and gas field extraction strategies built on win–win public–private partnerships facilitate adaptation to new opportunities created by developments in science, technology and social structures. Such partnerships produce far more effective and efficient solutions than what may be achieved through neutral or confrontational partnerships. We define partnership broadly; to include both fiscal and regulatory interactions, development of hard and soft infrastructure as well as formal partnerships between public and private entities engaged in technology and field development. The partnerships are shaped to respect the obligations that each party has to their constituencies. The analysis uses Norway to illustrate how both government and industry can adapt to the geologic, technical, and commercial realities to enable more effective oil and gas recovery projects and thus increase the total economic value captured. The collaboration process we describe is comprehensive and long-lasting. It depends critically on integrative dynamic capabilities of both the public and the private side. We show that effective public–private partnerships greatly reduce the risks to each partner by shaping conditions that minimize uncertainty in the behavior of all partners. Strategy can then focus on getting the job done.

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1. Introduction

This article highlights how the alignment of incentives and development of capabilities of the various parties of public–private partnerships may enhance resource recovery in the energy sector. A key dimension of such partnerships is what Farouk Al-Kasim (Director of Resource Management at the Norwegian Petroleum Directorate 1973–1990) called enterprising capacity [1], comprising a set of integrative dynamic capabilities of both government and industry as elaborated by Garcia et al. [2] and by Shuen et al. [3] and Feiler & Teece [4]. Dynamic capabilities help

build an efficient industrial ecosystem to enhance the potential of both government and industry. To excel in safe and efficient resource extraction with the minimum environmental impact (no flaring, no spills, no methane leaks) requires a comprehensive process that spans decades. Late efforts cannot remedy early failures. As we shall see, public–private partnerships can provide the incentives as well as the industrial ecosystem to stimulate optimized hydrocarbon extraction.

Norway is a particularly interesting case because it has:

- 1) Achieved a total public take from its hydrocarbon resources that is considered exceptionally high by most standards. This has been effectuated by exacting a

large public share in a way that preserves the incentives of private investors to produce reserves efficiently, thereby maximizing the value to be shared.

- 2) Created a technological ecosystem that supported this development and brought high value added activities to Norway.
- 3) Limited the negative environmental impacts associated with this production by:
 - a. Implementing high HSE standards that in the process also enhanced productivity and de-risked investments to some degree.
 - b. Avoiding gas flaring, by banning it and ensuring a positive value of gas at the source through comprehensive resource management.
 - c. Taking other proactive steps that reduced environmental impacts.

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Norway’s success is the result of a collaboration process that is comprehensive and long lasting. It depends critically on integrative dynamic capabilities on both the public and the private side. We show that effective public–private partnerships greatly simplify strategies to enhance the energy sector. This is caused by the reduction of risks to one by uncertainty in the behavior of the other. Strategy can then focus on getting the job done.

We proceed as follows. Section 2 contains an analysis elaborating the dynamic capabilities relevant for developing successful public–private partnerships for the oil and gas sector. Section 3 outlines the performance success of Norwegian oil and gas development programs. Section 4 goes into detail using as examples five major oil and gas field developments involving a total of about 24 billion barrels of recoverable oil equivalents from Norway. Section 5 extracts the principles. Section 6 outlines our conclusions. Appendix A provides a comprehensive description of the framework that emerged for the successful development of the Norwegian industrial ecosystem.

2. Enhancing resource recovery

2.1. Alignment efforts

Enhancing resource recovery is all about efficiency in a broad sense. This includes first and foremost aligning stakeholders’ interests in creating value at the source of production (the wellhead) to allow recovery technologies to become commercially viable. The development and maintenance of robust global standards that enhance productivity and de-risk

investments is an enabler to achieve this. Standards also help resource extraction respect the environmental constraints efficiently. Efficient value based uncertainty reduction, opportunities capture and risks mitigation through partnering is equally necessary to de-risk investments and attract low cost finance. Economic rent must be acceptable to financiers and host countries. This requires alignment of interests and a balanced distribution of profits. The alignment effort must take into account the regional and global exogenous power structures and abide the accepted ethics and cultural norms.

Well-head values are helped by international cooperation to enhance technology and to enhance both supply and product chain efficiency. Likewise, well-head values are enhanced by efficient infrastructures and common operations. Stable and profitable partnerships benefit from an environment of trust and cooperation built on the rule of law and predictable flexibility; predictable and appropriate framework conditions, including legal, regulatory, fiscal and contractual frameworks; alignment of interests through choice of participants; diligent design of the industrial dynamics of large development programs and public–private partnership in research, development and education.

It is fundamental that the value of oil and gas at the source is sufficient to justify the recovery efforts. Add to this that the recovery processes are largely irreversible. Efficient recovery will therefore often involve investing early in measures that may not affect production until much later. An obvious example is investment early to avoid gas flaring, saving it for later sales. Similarly, early investment in

injection capacity to manage reservoir pressure and to ensure the efficient displacement of oil and gas prevents underground waste.

In fact, oil and gas recovery activities are awash with economically marginal investment opportunities to enhance recovery, many of which need to be captured early when the projects otherwise generate profits. Tail end production–prolongation may not be the most effective mode of development, because the generation of economic rent is low at the economic limit where revenues approach costs. While it may be more profitable to recover as much as possible of the oil and gas quantities at high rates, there will of course always be a period of economically marginal production at the end. Full field depletion is favored both by job markets and for securing oil and gas supplies. It will always take place, often with strong political support, but is no alternative to high life cycle performance.

Cooperation between the public and private sectors transcends national boundaries. This is important for host countries and oil and gas companies alike. Not only do qualified personnel, harmful emissions and some hydrocarbon fields cross international boundaries, also knowledge, standards, industries and markets (particularly the financial markets) are supranational. National industries can use partnerships with international companies to provide their competitive supply activities access to the global markets through entering the supply chains of the international companies. The international companies may strengthen the industrial clusters they manage in the process as explained by Shuen et al. [3] and Feiler & Teece [4].

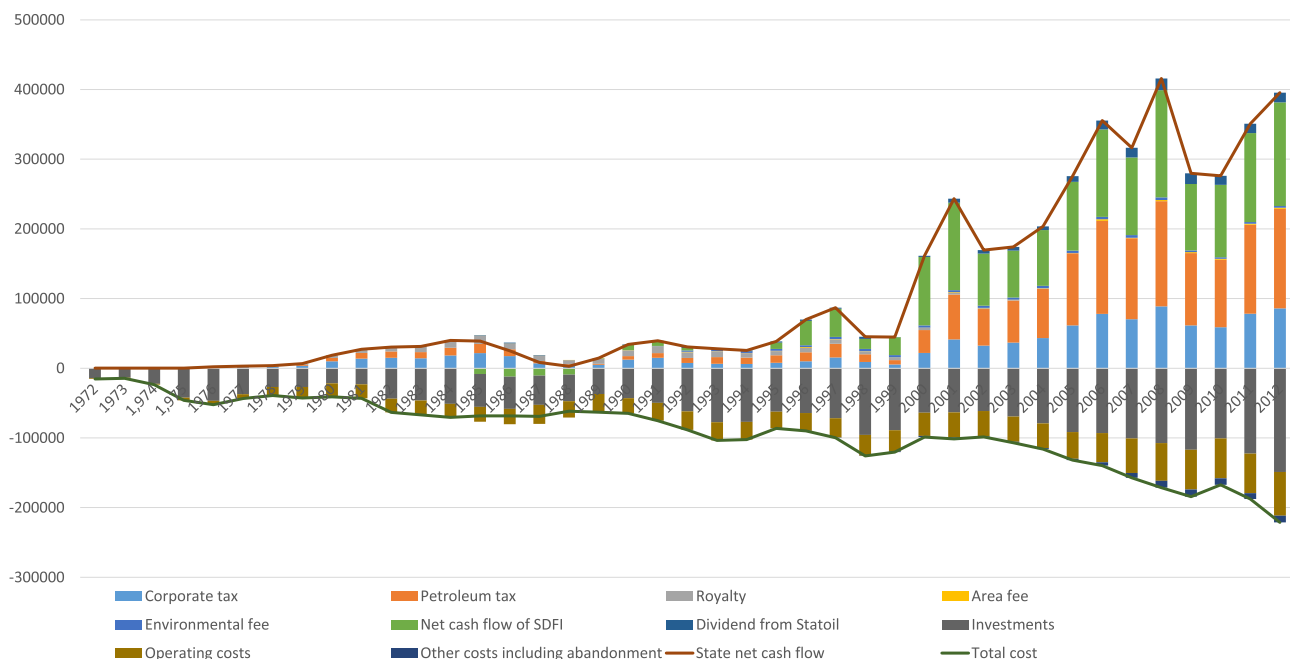


Fig. 1. Net government cash flow, total investments and operating costs in mill. NOK [16,27].

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