

# Foreword by the Minister of Petroleum and Energy Terje Riis-Johansen

The world needs energy – and over the short and medium term it is clear that much of our global energy consumption will come from fossil sources such as oil, gas and coal. Here in Norway, investments in the petroleum sector account for about one-fourth of total investments. One-third of the State's revenues come from this sector, value creation from the oil and gas industry accounted for one-fourth of the gross domestic product in 2008, and around 200,000 people are employed in petroleum-related activities. These figures highlight the importance and impact of the activity level in the oil and gas sector for the development of the Norwegian economy.

Greenhouse gas emissions are an unfortunate side-effect of these activities. We know that production of Norwegian oil and gas causes less emissions of greenhouse gases than production in other comparable countries, in part due to our strict regulations and advanced Norwegian technology. We should be proud of this, but we also need to look towards the future. The challenges on the horizon will demand even more commitment from both the authorities and the industry.

2009 will be an exciting year. The comprehensive management plan for the Norwegian Sea will facilitate value creation through sustainable use of resources, while at the same time maintaining the structure, functions and productivity of the eco-system. Our work to update the comprehensive management plan for Lofoten and the Barents Sea is also well underway.

We see the northern areas as Norway's most important strategic focus area in the years to come. The Government's goal is to strengthen Norway's sovereignty and ensure sustainable management of the rich fishery and petroleum resources in these areas. This will be accomplished by protecting the



environment, settlement and industrial development in the northern areas – in cooperation with Russia and other partners. The vulnerable marine environment presents a special challenge for industrial development in the Arctic region. It is essential that we ensure coexistence between environmental considerations, safe sea transport and the petroleum activities. This will require active measures from the authorities, who must set the framework for the various activities. Both now and in the future, the authorities and the industry need to coordinate their efforts in order to develop policies, technology, systems and knowledge so that petroleum activities can take place in Arctic areas in a manner that is both safe and sustainable. Further development of our knowledge base, more research in relevant areas and close cooperation between countries and industries are key elements in achieving this goal.

We need world-class oil spill preparedness in order for the petroleum activities to earn broad legitimacy in the population. The Government will make oil spill preparedness a higher priority, it will accommodate the need for resources in the form of training and drills, and it will help promote good interaction among the responsible players. We also know that it is extremely important that oil spill preparedness is firmly rooted in local communities and regions, as well as at the national level. Our role as government authorities requires that our expectations and demands for the petroleum industry are clear.

Extracting the resources beneath our seabed is a demanding task. Norwegian oil production is falling. The latest production forecasts show a sharper production decline than we had anticipated. But these are very uncertain estimates. The Ministry of Petroleum and Energy is focusing on measures that can help stem the decline in production. Gas production is expected to increase in the years to come, with the gas segment of total production growing from 40 per cent in 2008 to 48 per cent in 2012. This illustrates the necessity of adapting to new situations. As public authorities, we pledge to take this responsibility seriously, also in the months and years to come.

2009 will be a year marked by many challenges, but also many opportunities for the petroleum sector. The financial crisis and setbacks in the world economy have had a devastating impact on oil prices. Demand for oil has dwindled, in OECD countries to its lowest level in more than 30 years. The problem in today's market situation is no longer the high price of oil. There is a risk that weaker demand, lower prices, higher costs and difficult access to credit may impede investments in new oil projects. This will mean less oil on the market in the future.

The level of activities in 2008 has been very high. I believe this vigorous activity will continue in 2009. Projects have been started and contracts have been signed. However, the fact that a lot of activity is underway does not mean that individual companies or companies in certain markets will not experience a demanding period with few new assignments. Nor does it mean that projects won't be postponed. It means only that the total demand for goods and services for the offshore activities will still be very high in 2009. Nevertheless, if the financial crisis had not occurred, analyses predicted even stronger growth in the next few years, from an already record-setting level.

Other parts of the Norwegian economy must prepare for weak development and rising unemployment in 2009. An open economy such as ours will certainly feel the effects of the international economic downturn. In spite of this, Norway is well-equipped to meet the current demanding financial climate. Thanks to the revenues we have harvested from the petroleum activities, the Norwegian State has substantial freedom to manoeuvre; to take steps to soften the effects of a shaken world economy and to help bring about changes that allow Norway to emerge from these difficult times even stronger.

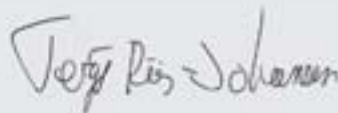
We can choose to look on this period of decline as a time of new opportunities and a new framework for action that is different than before. Resources can be transferred and injected into areas where work needs to be done. One such area is climate and the environment. The companies on the Norwegian shelf have paid a CO<sub>2</sub> tax since 1991, and this tax has been instrumental in the work to decrease greenhouse gas emissions. Starting on 1 January 2008, the petroleum activities were included in the Norwegian quota system, and must thus purchase emission quotas. The

Government will also continue to work on large and small measures that can boost energy efficiency and cut emissions from the Norwegian shelf. The Government is also positioning the full weight of its support to stimulate development of technology for capturing and storing CO<sub>2</sub>.

The Government is devoted to ensuring that the petroleum sector creates regional and local ripple effects. The petroleum activities can lead to greater economic growth and local and national business development. Ripple effects can include direct effects such as contract awards to national, regional or local supplier companies, or indirect effects in the form of more robust local buying power and demand for goods and services.

The ripple effects from the oil and gas activities are about much more than just the resources mobilised for individual field developments. The oil industry needs the efforts of a number of different sectors and expert communities, and it helps stimulate their further development. One shining example of this is the Norwegian supplier industry, which is now one of Norway's foremost export industries, second only to oil and gas. Another example is the relevance for Norwegian research and technology, and for the interplay between the industry and the Norwegian research community in nearly every conceivable discipline. A third example is the need for transport services, maintenance services, catering and logistics. We estimate that nearly 150,000 people have jobs that are directly linked to the Norwegian oil and gas activities. These figures do not include general subcontracts such as administrative support, accounting, IT services, canteen services and transport. If we add the number of people employed in all types of subcontracts to the number of people who work directly for the industry, we are probably talking about well over 200,000 people.

In any event, the most important effect of the petroleum activities is the combination of profitable developments and the fact that the public purse receives a large portion of the proceeds from this production. This provides us with good opportunities to pursue an active welfare policy for the benefit of the entire population. We plan to hold steady on this course.



The Minister of Petroleum and Energy

# Foreword by Director General Bente Nyland

This year marks the 40th anniversary of the discovery of the Ekofisk field in the North Sea. This was the start of developments that have made petroleum activities Norway's most important industry. In January 2009 a new milestone was reached when production licence no. 500 was awarded to Det norske oljeselskap (operator) and the newcomers Skeie Energy and Spring Energy.

In addition to the petroleum activities' great importance for the Norwegian economy and for local communities where many are employed in this industry, the activities have also led to major investments in and use of technology, making Norway a major exporter of technology.

The global economy has been in crisis since the autumn of 2008. Last summer, oil prices peaked at USD 146 a barrel. By the end of the year, however, the price had fallen to USD 40 a barrel, and so far in 2009, prices have ranged between 40 and 55 dollars a barrel. In conjunction with a high cost level in the industry, plummeting oil prices have led some major oil companies to signal cutbacks and the possible postponement of projects due to a lack of capital. In this situation, the Norwegian Petroleum Directorate sees it as important that the oil industry does not make hasty decisions that might have a permanent, negative effect on resource recovery from the Norwegian continental shelf.

Gas production on the Norwegian shelf continues to increase, and in 2008 gas sales amounted to nearly 100 billion Sm<sup>3</sup>. This figure is expected to rise to 112 billion Sm<sup>3</sup> over the next five years. Norway will be an important gas supplier in Europe for many decades to come.

Oil production on the Norwegian shelf is falling. This is in line with the Norwegian Petroleum Directorate's forecasts, but the forecasts for 2009 indicate a steeper decline than previously expected. This trend could deepen if the oil price remains at



its current level. While oil production in the peak year of 2001 amounted to 3.1 million barrels a day, forecasts for 2009 are 1.9 million barrels a day.

The most important measures in reducing the decline in oil production will be to discover and develop new resources and to produce more from existing fields, not least through cost efficiency measures and by approving profitable projects. By closely following the oil companies, the NPD is working to ensure that necessary measures are implemented.

## **Improved oil recovery**

No other oil-producing country recovers more oil from its offshore fields than Norway. Nevertheless, approximately 54 per cent of the oil will remain underground when the fields are closed down according to today's plans. That is too much. The largest remaining oil resources are found in fields where oil production is declining. Over the next

few years, important choices will therefore need to be made if we are to extract significantly more oil and gas. The NPD wants to increase recovery, provided it creates added value. In light of this, the NPD has revitalised enhanced recovery efforts in cooperation with FORCE, the industry's own cooperation forum for technology development. The NPD believes cooperation is the operative word if we are to progress in the qualification of technology that can boost oil recovery in the longer term. If large-scale tests could be conducted on producing fields, that would be a big step in the right direction. This is a major effort, however, requiring the backing of the industry in general. The NPD will do what it can to make this happen.

### **Extensive exploration activity**

A total of 56 exploration wells were drilled during 2008. This is the highest number of exploration wells ever on the Norwegian continental shelf. Twenty-five new discoveries were made, mainly smaller discoveries in the vicinity of existing infrastructure. According to the plans reported to us by the oil companies in late autumn 2008, exploration activity will remain high in 2009.

The great majority of exploration wells are drilled by StatoilHydro, the biggest player on the Norwegian shelf. However, the new companies that came to the shelf after 2000 have also begun to make their mark in exploration. Altogether between 55 and 60 new companies have been prequalified as operators or licensees in the course of the last ten years.

The player scenario offshore is reflected in the number of applications for APA (Awards in Pre-defined Areas) and the ordinary licensing rounds. There were 47 applicants for APA 2008, with awards made in January. For the 20th licensing round, which was announced last year and will be

awarded in the first half of 2009, there was also a total of 47 applicants.

The Norwegian Petroleum Directorate believes considerable oil and gas resources are still to be found on the Norwegian shelf, but there is great uncertainty concerning the estimates. On the basis of the NPD's anticipated estimates, around 25 per cent of the shelf resources remain to be discovered, with a third each in the North Sea, the Norwegian Sea and the Barents Sea.

### **CO<sub>2</sub> storage**

In Norway, oil and gas production accounts for about 31 per cent (2007 values) of total CO<sub>2</sub> emissions. The government's ambition is a further reduction of the overall emissions of greenhouse gases. Even though significant steps have already been taken to reduce CO<sub>2</sub> emissions, additional cuts are needed. More efficient energy on existing fields, and power from land to new fields, are among the measures under consideration. The capture and storage of CO<sub>2</sub> is another area where the NPD has been and will be involved. Safe storage of CO<sub>2</sub> under the seabed requires knowledge of the properties and storage capacity of the different types of rocks. The NPD has extensive expertise on geological conditions on the Norwegian shelf. This expertise is now being used to survey possible storage sites for CO<sub>2</sub>.

During the autumn of 2008, the Government launched the Climate Cure project. The purpose of the project is to identify measures that will make it possible to reach the Government's climate targets. This is a joint effort by the Norwegian Pollution Control Authority, the Norwegian Petroleum Directorate, the Norwegian Water Resources and Energy Directorate, the Norwegian Public Roads Administration and Statistics Norway. The NPD

is assessing possible measures in the petroleum sector, one of them being the capture and storage of CO<sub>2</sub>.

### **Coexistence**

The increased activity on the Norwegian shelf has led to more conflict between the two principal users of the sea, the petroleum industry and the fisheries. The fishermen find that there is less room to manoeuvre because of the steady increase in seismic surveys. On this basis, a working group was appointed in 2007 with members from the Directorate of Fisheries and the NPD to assess measures to improve conditions. A number of measures have been implemented, e.g. mandatory courses have been established for fishery experts, the NPD has introduced an improved announcement system and the regulations have been amended. Work has also been conducted to assess the status of research into the effects of seismic surveys on fish and sea mammals, as part of the work to agree on a minimum distance between fishing in progress and seismic work.

The Norwegian Petroleum Directorate will complete the acquisition of seismic data in Nordland VII and Troms II during the summer of 2009. The data acquisition began in the summer of 2007 at the request of the Government. The purpose is to obtain knowledge of any petroleum deposits in these waters, and such knowledge will be used when the Integrated Management Plan for the Barents Sea and the waters off Lofoten and Vesterålen is revised in 2010. In connection with the acquisition of 3D seismic data in the summer of 2009, NPD has commissioned the Institute of Marine Research to research the consequences of this by studying the startle response on fish and how sound from seismic sources travels through water.

### **Future vision**

In 2008, the Norwegian Petroleum Directorate was awarded the Norwegian Petroleum Society's prize for its importance as a technical contributor to policy formation and for its work on scenarios. We believe a crucial element in making good decisions is the ability to envisage not just one, but several future scenarios. By combining our factual knowledge of the petroleum resources on the Norwegian shelf with knowledge of the world around us, the Norwegian Petroleum Directorate hopes that our scenario work will provide input and ideas for those responsible for making decisions concerning our future.



Director General