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Bjørn G. Bergem, Arild Hervik and
Oddmund Oterhals

SUPPLIER EFFECTS ORMEN LANGE 2008-2012

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Summary

This report summarises the results of a survey of regional supplier effects linked to investments and operations for the Ormen Lange project in the period 2008-2012. Of total expenditures amounting to NOK 35.8 billion in the period, 17 per cent are linked to regional deliveries of goods and services from Central Norway. The regional share is 12 per cent for investments, and 35 per cent for operations. Overall calculations reveal that the regional share associated with operations is consistently higher than for investments, and also consistently higher than the expectations in the impact assessments prior to the field development.

PREFACE

On assignment for the Ormen Lange licence, represented by the operator A/S Norske Shell, the Møreforsking research institute in Molde has surveyed regional supplier effects from operations and investments for Ormen Lange during the period from 2008-2012. These were the five first complete years since the field came on stream in October 2007.

Møreforsking Molde also conducted an analysis of ripple effects in 2007 to examine the initial development phase from 2003-2007. This study was commissioned by Norsk Hydro, the operator for the development of Ormen Lange.

This report summarises analyses from both the development phase (2004-2007) and the five first years (2008-2012) of operation and subsequent development on Ormen Lange. The analyses include both operations and investments associated with the subsea facilities offshore and the processing facility onshore at Nyhamna in Aukra municipality.

Communications Manager Kitty Eide and Finance Manager Marit Reitan have been the contacts for A/S Norske Shell.

At Møreforsking Molde, Professor Arild Hervik has been the technical manager, while Bjørn G. Bergem was project manager responsible for execution and progress in the project, as well as data collection, processing and analyses. Research manager in logistics, Oddmund Oterhals, has also contributed to the expert discussion.

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Molde, March 2014

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1 SUMMARY

The primary objective of this analysis has been to chart regional ripple effects associated with investments and operation for the Ormen Lange project during the period 2008-2012. Of total expenditures amounting to NOK 35.8 billion during this period, 17 per cent are value creation related to regional deliveries of goods and services from Central Norway. The regional share is 12 per cent for investments, and 35 per cent for operations. If we convert the total regional value creation of NOK 6 billion into full-time equivalents, the result is about 1 000 full-time equivalents as the average supplier impact per year in this period.

The measured regional supplier effects are compared with estimates in the impact assessments prior to the development of Ormen Lange. For investments in offshore development the estimated regional share was 2.6 per cent, while subsequent measurement shows that it was 5.7 per cent. For operation of the onshore facility, the impact assessment estimated the local share of deliveries from the Molde region at 29 per cent; while subsequent measurement shows this was 31 per cent. The Central Norway share for operations was 45 per cent, and this aspect was not discussed in the impact assessment. As regards onshore facility investments from 2008-2012, the regional share for Central Norway is calculated to 26 per cent and the local share for the Molde region at 8 per cent.

Overall, the calculations show that the regional share related to operations is consistently higher than for investments, and also consistently higher than the expectations in the impact assessments.

If we take a closer look at the activity in a normal year of operation at the land facility, we find about 520 full-time equivalents. Of these, 60 are commuters in rotation, and around 60 are employed in the operations organisation in Kristiansund. We find that about 240 full-time equivalents are carried out by employees residing in the Molde region. If we add the number of full-time equivalents calculated as a consequence of property tax, we now find a concentration of 440 local full-time equivalents. Annual purchases from local suppliers make up another 60 full-time equivalents, so that the total direct employment effect in the Molde region is around 500 full-time equivalents. In the impact assessment, this employment effect is composed of both the direct effect and the indirect effect created through consumer effects, estimated at around 400 full-time equivalents. If we add the indirect effect to the direct effect in the Molde region, we arrive at around 700 full-time equivalents, which are comparable to the figure estimated in the impact assessment, which were 400.

Nearly 20 companies with regional affiliation have developed as a result of deliveries to the Ormen Lange project in the construction period from 2004-2007, to the operations and investment phase from 2008-2012. Many of these companies cite Ormen Lange as an important project for the development of their business. The following development trends are highlighted:

- Development of expertise, learning processes and technology development
- Increased focus on Health, Safety, Environment, certification processes and quality development
- Increased sales and employment, which yield opportunities for further efforts
- Ormen Lange is an important reference project in relation to new assignments

Supplier effects Ormen Lange

The onshore processing facility at Nyhamna is now being upgraded to become a hub for several fields with investments up to 2017. The operations phase we are now entering, servicing several fields, yields increased potential for further development of regional ripple effects from the onshore facility.

2 INTRODUCTION

On assignment for the Ormen Lange licence, represented by the operator A/S Norske Shell, Møreforsking Molde has mapped regional supplier effects from operations and investments for Ormen Lange in the period 2008-2012. The regional dimension is restricted to Central Norway, which is, the Møre og Romsdal, Sør and Nord Trøndelag counties. For the onshore processing facility at Nyhamna, the 2002 impact assessment limited regional deliveries to the host municipality Aukra and five neighbouring municipalities, a fact which has also been taken into consideration in relation to analysis of supplier effects associated with operation of the facility.

Møreforsking Molde also conducted a ripple effect analysis in 2007, on assignment for Norsk Hydro, of investments in the development phase for the years 2004-2007. The main results of that analysis will also be repeated here, with the objective of examining links between the development phase and subsequent operations and investments.

Development of a competitive national supplier industry linked to the petroleum activity on the Norwegian shelf has been an important political ambition since the early phases in the beginning of the 1970s. During the last 20 years, these ambitions have been transformed into a clearly expressed objective of building domestic industrial expertise that contributes to long-term national welfare. The oil and gas activities' shift northward has been accompanied by growing focus on regional supplier development and employment. An important element in this context is that national or regional supplier firms must develop over time to become competitive in international markets in order to generate value creation that will benefit society in the long run (Heum, 2008).

The paramount objective in resource management is also stated in the Act relating to petroleum activities, where Section 1-2 reads: *"Resource management of petroleum resources shall be carried out in a long-term perspective for the benefit of the Norwegian society as a whole. In this regard the resource management shall provide revenues to the country and shall contribute to ensuring welfare, employment and an improved environment, as well as to the strengthening of Norwegian trade and industry and industrial development, and at the same time take due regard to regional and local policy considerations and other activities."*

The Government's stated objective is for development of new discoveries to create the greatest possible value for society, and that this can lay the foundation for profitable local and regional ripple effects. Documentation of such local and regional effects is another objective, and one that has also been flagged by the Ministry of Petroleum and Energy (MPE). The Storting report "An industry for the future – Norway's petroleum activities" (Storting White Paper 28 2010-2011) states i.e. that *"Operators of new independent developments must conduct an analysis of regional and local spin-off effects of the development within two years after the field comes on stream"*. Such a requirement will not apply for Ormen Lange, which was developed prior to the MPE's recommendation. The analyses carried out in connection with the development and now the operations phase for Ormen Lange are justified based on a policy on the part of the developer and the operations phase operators to contribute to regional ripple effects and supplier development in accordance with overarching political objectives.

Ormen Lange is Norway's second largest gas field, located in the Møre Basin in the southern part of the Norwegian Sea. The discovery was made in 1997, and the Plan for Development and Operation (PDO) was approved by the Stortinget in April 2004. The field is developed with subsea installations and processing facilities onshore at Nyhamna in Aukra municipality. The significant water depths on the field, up to 1 100 metres, along with demanding seabed conditions, made the development challenging, and entailed development of new technology. Gas and condensate from the wells on the field are routed through two multi-phase pipelines to the Nyhamna facility. There the gas is dried and compressed before being sent through the Langeled gas export pipeline to the United Kingdom. The field's operations organisation and the main supply base are located in Kristiansund.

The licensees on the field are A/S Norske Shell, DONG E&P Norge AS, ExxonMobil Exploration & Production Norway AS, Petoro AS and Statoil Petroleum AS.

Throughout the development phase up to production start in the autumn of 2007, Norsk Hydro (which was awarded a production licence for one of the blocks in the field in 1996) had operator responsibility, while Norske Shell took over as operator for the operations phase from 1 December 2007. Hydro's oil and gas activities were split off, and merged with Statoil in 2007.

The decision in June 2013 to develop the Aasta Hansteen field with the Polarled export line to Nyhamna entails significant investments in expansion of the process facility up to 2017. Nyhamna's status as a gas hub implies that developments of new gas fields in the Norwegian Sea can be tied in to Polarled.

3 METHODOLOGICAL APPROACH

The methodical approach for the empirical survey of regional supplier impact follows the framework outlined in Hervik et al. (2007).

Mapping regional effects from overall investments and operating costs in the order of NOK 36 billion over the five year period from 2008-2012 is a demanding task. The starting point for the analysis of supplier effects for Ormen Lange in this period is based on a complete supplier database from the operator, Norske Shell. This database covers all expenses associated with purchasing goods and services that are directly included in Ormen Lange operations and investments from suppliers in what we call Tier 1 in the value chain. However, one will not be able to capture the total regional supplier effects using only data from this level, as purchases by regional companies further down in the value chain are not highlighted. In order to provide a more complete picture of the supplier effects, one must therefore collect data from players down in the value chain that have deliveries to contractors on Tier 1. In order for the survey to capture as many as possible of the regional effects that emerge from investments and operation associated with Ormen Lange, interviews have been carried out with several of the largest suppliers at Tier 1, both national and regional. Interviews have also been conducted with a selection of regional companies where direct deliveries in the period have been modest, but where these are, to a greater extent, subcontractors at Tier 2 or further down in the value chain.

In connection with the evaluation of supplier effects related to investments in the development phase up to 2008, the analysis followed the complete supplier chain in three levels, as well as an estimation of the fourth level. The development phase analysis particularly mapped the contract structure for the processing facility at Nyhamna, with a "from the bottom-up" approach. The data from Hydro's purchasing database provided a good overview over the contract values for the main contracts, and the purchasing packages at Tier 1. Supplemented with overviews from the main contractors regarding which subcontractors they used, interviews were conducted with many of the Tier 2 suppliers. Questionnaire surveys were also conducted via the Ormen Lange Supplier Network (now Navitas) which yielded data about deliveries at the third tier, primarily for local and regional suppliers.

The mapping of supplier effects in the development phase was thus largely a "bottom-up" approach. The analysis of supplier effects in 2008-2012 is more of a "top-down" approach, but where interviews of major national and regional suppliers ensure a certain consistency in relation to "top-down" data.

In calculations of the percentages of regional deliveries of goods and services, value creation associated with this formed the basis, as it is this value creation that yield social effects. In a "top-down" analysis, the best approach for calculating "local content" from delivery of goods would be to take a point of departure in the overall value of the goods, with deduction of purchase price on "imported" input factors. The difference can then be viewed as addition of local value through local processing, assembly and testing, assuming that the labour used in the transformation is performed by local manpower. For deliveries of services, the approach will be to include total wage expenses, with the deduction of wage expenses for employees who reside outside the region. We find this perspective in the World Bank study (Tordo et al., 2013) where "local content" is discussed based on a methodical perspective with recommendations and guidelines for such ripple effect analyses.

The analysis of regional value creation linked to Ormen Lange 2008-2012 takes its point of departure in a complete supplier database with total deliveries from all suppliers in the period, distributed by operation and capital expenditures. Wage costs for Shell's own employees are also included, based on charging hours against Ormen Lange. The supplier survey was based on all companies that had deliveries worth at least NOK one million in the period, i.e. around 340 companies, of which 280 with addresses in Norway. Sixty of the companies have addresses in Central Norway, while quite a few companies with invoice addresses outside Central Norway do have regional departments that contribute whole or partial deliveries of goods and services.

In order to calculate regional value creation, a point of departure was taken in the total deliveries from the respective company, which can include both the value of goods (equipment, material, components, etc.), wage costs associated with processing, assembly, testing of goods and equipment, as well as wage costs associated with services provided. The companies in the survey were therefore asked to state the percentage of wage costs for their own employees associated with the total delivery, as well as the share that resided in the region out of the total full-time equivalents related to own employees. The wage costs for own employees residing in the region thus constitutes regional value creation. In addition, the companies were asked to state the total purchase of goods and services linked to own deliveries, and the percentage purchased from regional subcontractors. The expenditures on goods and services purchased from suppliers outside the region have thus been deducted from the total deliveries in order to estimate regional effects.

The analysis for Norsk Hydro estimated the effects from the workforce that commuted in North Sea rotation during the construction period. Construction workers were estimated to spend around NOK 5 000 per full-time equivalent, and with 1 000 full-time equivalents in the construction period, this yields a total local ripple effect of NOK 5 million. We opt to disregard such an effect in this analysis because the effect is so small; however the expenses associated with catering, accommodation services, etc. that are found in the purchasing database are included.

Common practice in this type of ripple effect study is to use direct and indirect employment effects. Direct employment effects are referred to in Figure 3-1 as supplier effects at different levels. Different analyses take different approaches as regards over how many levels the supplier effects are traced. Our understanding of indirect employment effects is those which, in the figure, work through consumer effects where local residents create ripple effects through how they dispose of their income, and pay taxes to cover public expenditures. It is common to use empirical estimates from this type of analysis where the multiplier effect can vary significantly from analysis to analysis. In this connection, we have chosen a moderate level for the multiplier effect, estimated at a 40 per cent addition to the direct employment effect.

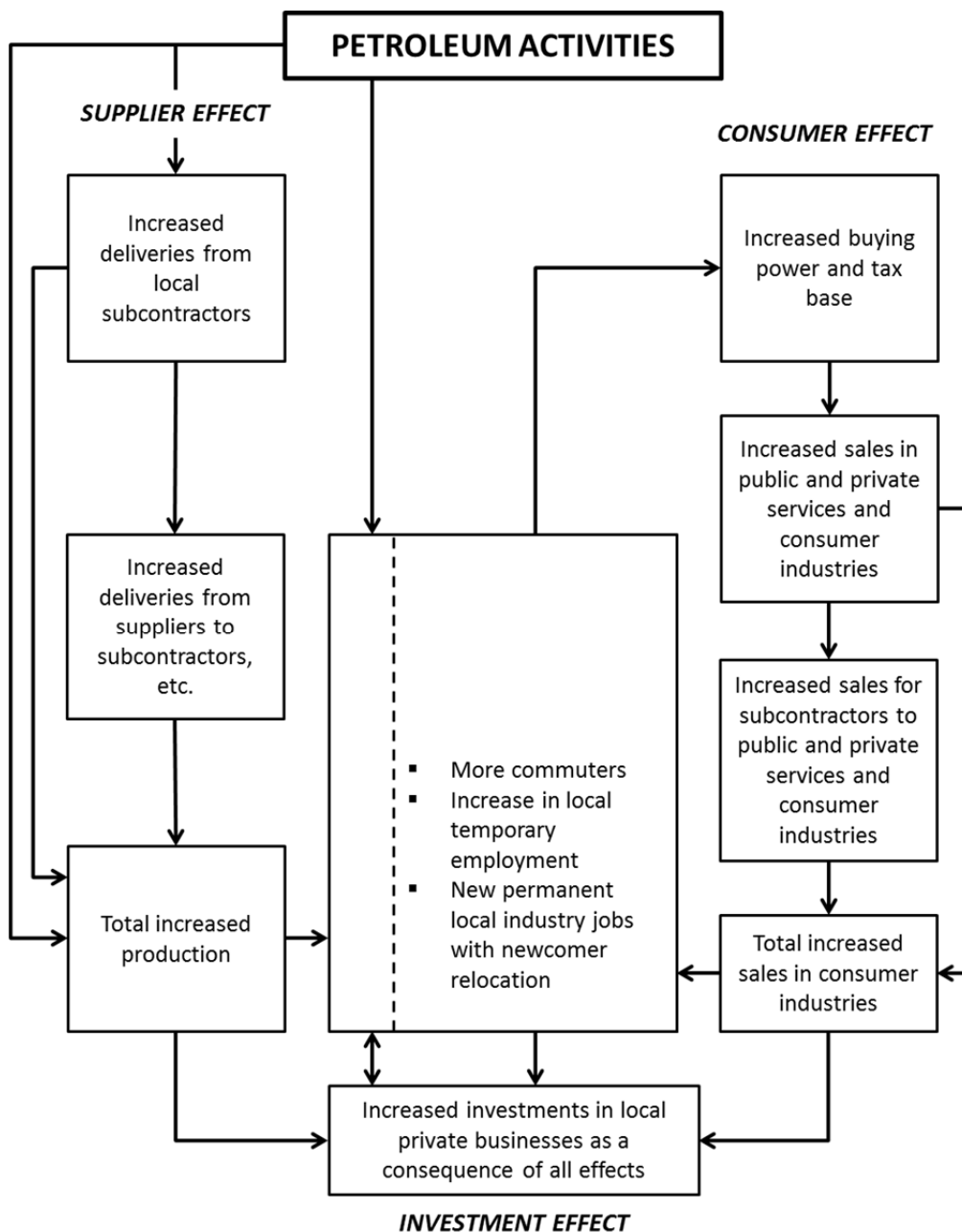


Figure 3-1 Ripple effects from the petroleum activities.

4 RESULTS

4.1 Impacts assessments 2002/2003

Two impact assessments of social effects were performed in connection with the plans for development and operation of Ormen Lange, including deliveries of goods and services for the onshore processing facility at Nyhamna (Agenda Utredning & Utvikling, 2002) and offshore field development and landing (Agenda Utredning & Utvikling, 2003), both for investments and operations. The impact assessments considered the expected Norwegian and regional shares of value creation from the delivery of goods and services to Ormen Lange. The focus on value creation is key, as it is value creation rather than contract amount that yields employment effects and other indirect effects for business in general. The assessments were based on experiences from previous development projects of the same type, but not necessarily directly comparable projects. Assumptions on the use of framework agreements and Norwegian suppliers' ability to deliver, competitiveness and expertise were also used as a basis for the evaluations. The impact assessments underscored that the evaluations in an early project development phase were associated with uncertainty, and could change along the way.

In the study on field development and landing from Ormen Lange, the regional level was restricted to Central Norway (Møre og Romsdal, Sør- and Nord-Trøndelag), while for the onshore facility, it was restricted to the Molde region. The reason for restricting the regional effects for the onshore facility to the Molde region was particularly related to the operations phase, where the issue was more local in nature. The regional housing and labour market around the processing plant was considered to be the natural day commute area, and in practice limited to a travel time of 45 minutes from the facility. Therefore, for statistical reasons, the Molde region was defined as the host municipality Aukra and the five neighbouring municipalities Fræna, Eide, Midsund, Sandøy and Molde. The 'Molde region' name was selected based on a regional centre standpoint. While the assessment of regional effects was restricted to the Molde region, it was also emphasised that the onshore facility would also have an impact on a larger regional area, including the Ålesund and Kristiansund region, both in the development and operations phase.

4.2 Development phase 2004-2007

As regards the onshore processing facility at Nyhamna, the investment need up to commissioning in 2007 was estimated at 11.1 billion 2002-NOK in the impact assessment. The estimated share of value creation linked to Norwegian deliveries of goods and services was 51% of the total investment need, and equivalent to 7.7% for the Molde region (or 15% of Norwegian deliveries). On assignment for Norsk Hydro, which at the time was responsible for the development, Møreforskning (Hervik et al., 2007) conducted a comprehensive analysis of the contract structure for the onshore facility, with the objective of mapping the scope of value creation for Norwegian, Central Norwegian and local deliveries.

Figure 4-1 shows the result of the analysis for investments in the onshore facility at Nyhamna and percentage of value creation, distributed geographically. Total value creation from Norwegian deliveries was estimated at 75.6% of total investments as of September 2007. The share for Central Norway was estimated at 13.7% and for the Molde region 5.5%. In relation to the impact assessment, the Norwegian share of value creation for the onshore facility was far higher, while it was slightly lower for the Molde region. While the estimated share for the Molde region was less than in the impact assessment, the scope of value creation in NOK was still somewhat higher than assumed.

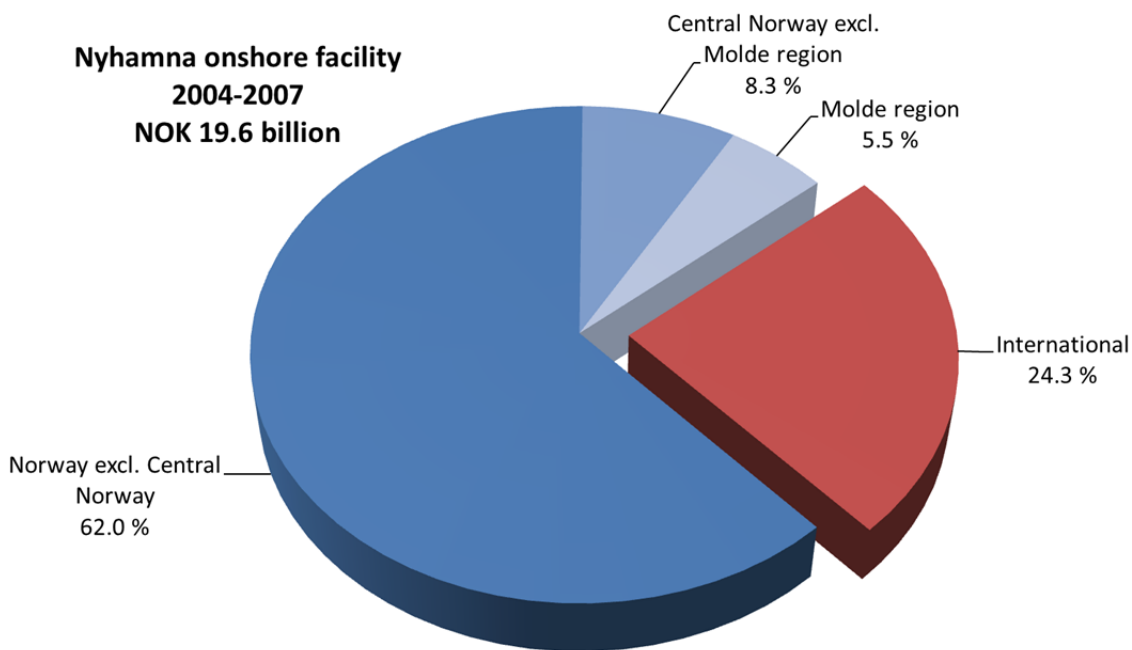


Figure 4-1 Investments in the Nyhamna land facility 2004-2007.

For offshore field development with establishment of subsea facilities and pipelines in the first phase through 2007, the estimated investment need in the impact assessment was 8.7 billion 2002-NOK. The Norwegian share of value creation for the field development in this period was estimated at 48.6% and for Central Norway corresponded to 1.5%. Calculations performed in the autumn of 2007 revealed a Norwegian value creation percentage of offshore investments of 52%, and 6.1% for Central Norway. Compared with the 2003 impact assessment, the percentage of value creation from Central Norway deliveries to the offshore development in this phase were far higher than estimated.

For overall Ormen Lange investments (excluding the Langeled export pipeline), see Figure 4-2. In the 2004-2007 period, the calculated percentage of value creation for Norwegian deliveries was 70.5%, while value creation linked to Central Norway was calculated at 11.5%.

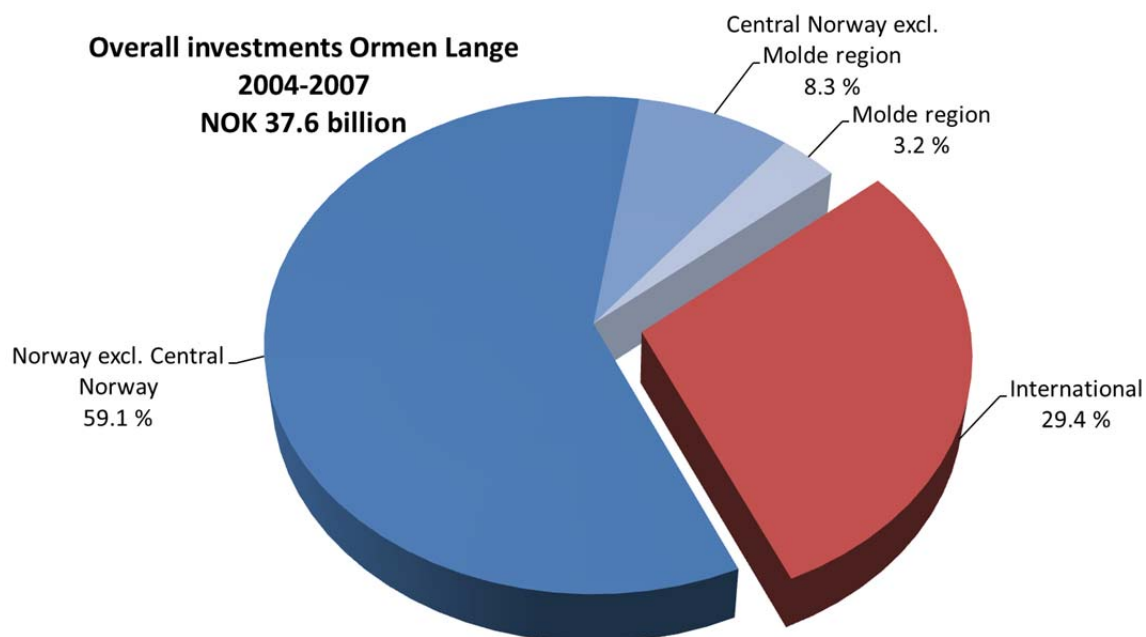


Figure 4-2 Overall investments Ormen Lange 2004-2007 (excluding Langed pipeline).

4.3 Investments and operation 2008-2012

Ormen Lange came on stream in September 2007 and Norske Shell took over operator responsibility on behalf of the licence. Based on accounting data from Norske Shell and surveys of the suppliers, value creation was mapped for regional and local deliveries associated with operation and investments in the period 2008-2012. The results of the survey have also been compared with estimates from the impact assessments.

The impact assessments did not assume additional investments for the processing facility at Nyhamna after 2007. Investment needs for the second phase of offshore development in the 2008-2013 period, with establishment of additional wells and subsea facilities, were estimated at NOK 9.8 billion 2002-NOK. The Central Norway share of overall investments offshore in this period was estimated at a modest 2.3%, and the Norwegian share at about 60%.

In the impact assessment, estimated deliveries of goods and services in connection with operation of the land facility in a normal year were 654 million 2002-NOK, of which 600 million were associated with the terminal location, and the rest with support functions in Kristiansund and Stavanger. More than half of the estimated annual operating costs for the onshore facility were linked to power supply, while property tax was estimated at 61 million 2002-NOK. The regional deliveries (from the Molde region) to the land facility were estimated at 192 million 2002-NOK, or 29% of total operating costs. As regards employment, it was estimated that the onshore facility would require an operations staff of around 140 full-time equivalents distributed between 90-100 full-time equivalents at Nyhamna, 30 full-time equivalents at Shell's operations organisation in Kristiansund, and an additional 15 full-time equivalents in support functions from Stavanger. The total local employment effects in the Molde region, both direct and indirect through consumer effects, were estimated at 405 full-time equivalents.

Annual operating costs associated with maintenance of the subsea facilities up to 2016 were estimated at 182 million 2002-NOK in the impact assessment. Regional deliveries (from Central Norway) for offshore operations were estimated at 18% (33 million 2002-NOK per year). The employment effects in Central Norway as a consequence of maintenance offshore up to 2016 were estimated at around 75 full-time equivalents, distributed between 45 in direct production effects and the remainder in indirect supplier and consumer effects.

Accounting data from the operator Norske Shell reveals that total expenditures for operation and investments on Ormen Lange in the years 2008-2012 were NOK 35.8 billion nominal. Of this, 27.8 billion related to investments and 8 billion to operations. Based on the supplier survey carried out in the autumn of 2013, it is estimated that around 12% of the investments in this period were value creation linked to deliveries of goods and services from Central Norway. Of the total operating expenditures in this period, value creation in Central Norway accounted for an estimated 35%.

Table 4-1 Investments and operations Ormen Lange 2008-2012.

2008-2012	Total BNOK	Central Norway	
		BNOK	Share
Ormen Lange total	35.8	6.0	16.9%
Investments	27.8	3.2	11.6%
Operations	8.0	2.8	35.3%

Overall expenditures associated with investments and operations of the onshore facility at Nyhamna for the period 2008-2012 have been NOK 14 billion nominal, cf. Figure 4-3. Based on the survey of supplier companies, the share of value creation in Central Norway is estimated at around 34%, while the Molde region's share of the total expenditures for the onshore facility has been around 18% in the period.

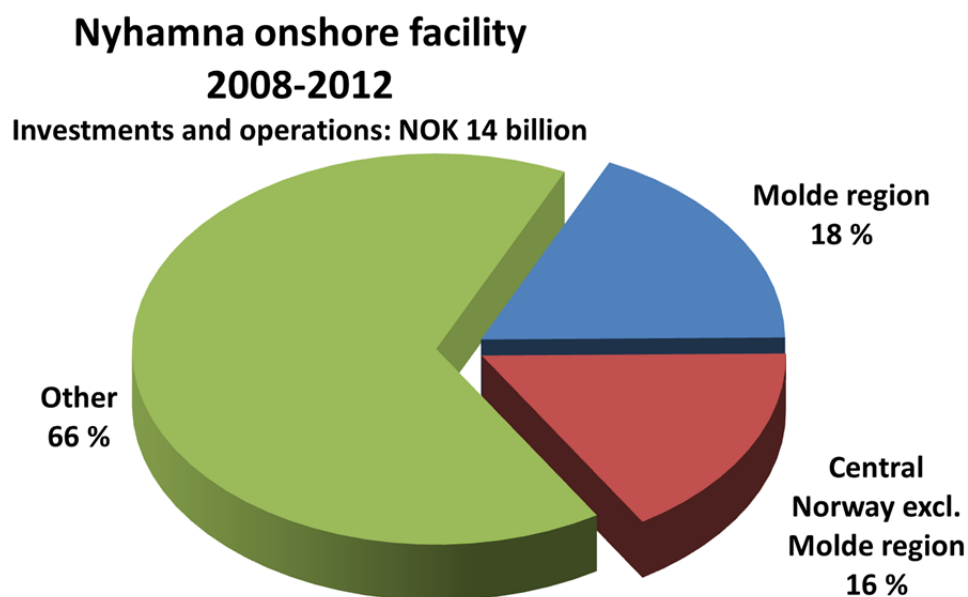


Figure 4-3 Investments and operating costs for the Nyhamna onshore facility 2008-2012

Operating expenditures for the onshore facility amounted to NOK 6 billion, cf. Figure 4-4, an average of about NOK 1.2 billion per year in the period. The share of value creation related to delivery of goods and services from Central Norway is estimated at around 45%, while the Molde region's share of value creation related to operation and maintenance of the onshore facility is estimated at nearly 31%. Extraordinary maintenance and other investment projects at the onshore facility amounted to NOK 8 billion in the period from 2008-2012. The Central Norway value creation is estimated at about 26% of the overall investments for the onshore facility in this period, and is to a greater extent linked to deliveries from the Kristiansund and Trondheim region.

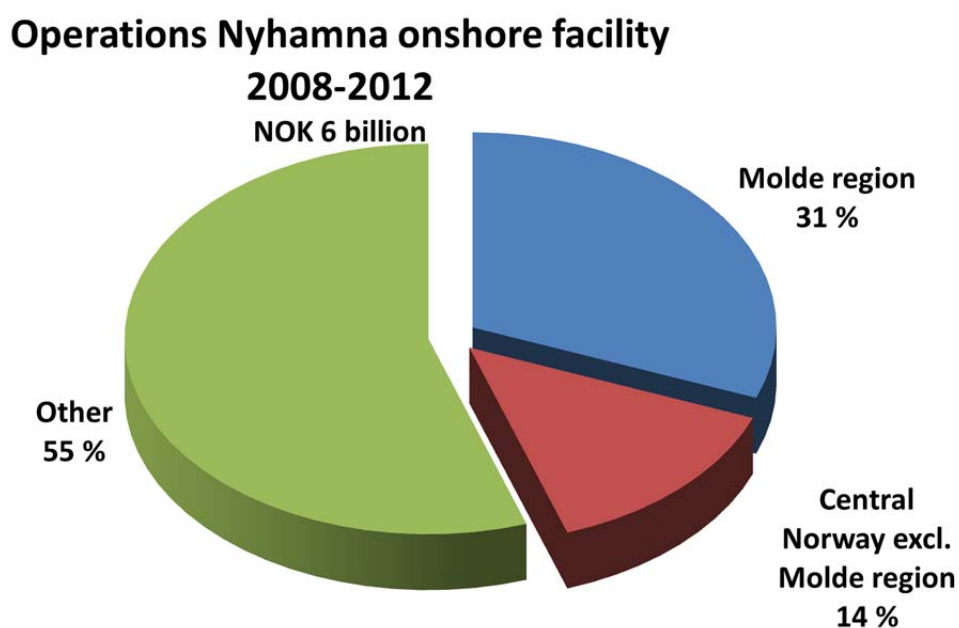


Figure 4-4 Operating costs for the Nyhamna onshore facility 2008-2012

4.4 Overall results

Table 4-2 shows the overall results from supplier surveys carried out in relation to investments in connection with development in the period 2004-2007 (carried out in 2007) and further investments and operation in the period 2008-2012 (carried out in 2013) where the measured regional shares are compared with estimates from the impact assessments from 2002/2003.

The investment need indicated in the impact assessments for the land facility and offshore development in the period from 2004-2007 is adjusted for inflation here to 2007-NOK for a more real comparison with actual investments accrued as of September 2007. The supplier survey linked to investments for the onshore facility at Nyhamna revealed a local value creation share from the Molde region of 5.5%, while the impact assessment had an estimate of nearly 8%. While the percentage share for local value creation was lower than estimated, the value creation from local deliveries of goods and services was around NOK 150 million higher. The value creation from Central Norway deliveries of goods and services associated with constructing the onshore facility amounted to NOK 2.7 billion, or around 14% of total investments. For investment projects linked to the onshore facility in the period from 2008-2012, value creation from Central Norwegian deliveries is estimated at around 26%, or about NOK 2.1 billion. The regional percentage of deliveries from Central Norway to the onshore facility in the development phase from 2004-2007 was 14%, while the percentage for investments in the onshore facility in the period 2008-2012 increased to 26%. Similarly, we also find an increase in the percentage of deliveries from the Molde region, which was 5.5% in the development phase and became 8.2% in the last five-year period.

In the impact assessment, Central Norway value creation linked to investments in the first phase of offshore development was estimated at 1.5% of the total investment need. Estimated regional value creation in connection with the supplier survey in 2007 revealed a share of around 6% of accrued investments. Measured in NOK, Central Norway value creation for offshore development in this period was about NOK 500 million higher than anticipated. For the second phase of offshore development (2008-2012), the impact assessment estimated regional value creation at around 3%, while the supplier survey and subsequent calculations show an estimate of almost 6% and in terms of percentage share, about the same level as in the first development phase.

Total operating expenditures for Ormen Lange in the period from 2008-2012 have been NOK 8 billion (nominal), where the value creation linked to Central Norwegian delivery of goods and services is estimated at around 35% (NOK 2.8 billion). The impact assessment for the onshore facility estimated annual operating costs at NOK 654 million 2002-NOK. Adjusted for inflation to 2010-NOK, which is halfway through the analysis period 2008-2012, this amounts to around NOK 765 million. Actual operating costs for the land facility have averaged NOK 1.2 billion annually, including property tax. Total figures for operations also include preliminary studies for new projects, and entail a higher level for operations in this period, which is not directly comparable with the level in the impact assessments.

Table 4-2 Overall statement of investments and operation Ormen Lange 2004-2012.

Investments		Impact assessment		Measured regional shares – result		
	Investment need (2007-NOK)	Estimated regional share ¹⁾	Total investments ²⁾	Share Central Norway	Share Molde region	
2004-2007						
Onshore facility	12.0 BNOK	7.7%	19.6 BNOK	13.7%	5.5%	
Offshore	9.4 BNOK	1.5%	10.1 BNOK	6.1%	1.2%	
	Investment need ³⁾ (2010-NOK)	Estimated regional share ¹⁾	Total investments	Share Central Norway	Share Molde region	
2008-2012						
Onshore facility			8.0 BNOK	26.3%	8.2%	
Offshore	10.6 BNOK	2.6%	19.8 BNOK	5.7%		
Operations		Impact assessment		Measured regional shares – result		
	Operating costs normal year (2010-NOK)	Estimated regional share ¹⁾	Average operating costs	Share Central Norway	Share Molde region	
2008-2012						
Onshore facility	765 MNOK/yr	29.4%	1 198 MNOK/yr	44.8%	30.9%	
Offshore	213 MNOK/yr	18.1%	398 MNOK/yr	6.6%		

¹⁾ For the onshore facility, the regional delimitation in the impact assessment was the Molde region, while for the offshore segment it was delimited to Central Norway. ²⁾ Investments as of September 2007 (nominal). ³⁾ The impact assessment indicates the second phase of investments for offshore development for the period 2008-2013. Based on estimated Norwegian deliveries over time and the percentage of Norwegian deliveries, the investment need is stated here as an estimate for the period 2008-2012.

Based on accounting data and the 2013 supplier survey, the share of value creation for the Molde region linked to operation of the onshore facility is around 31%, while for Central Norway as a whole, it is around 45%. The impact assessment from 2002 estimates value creation from local deliveries at around 29%, and the estimated share has since proven to be slightly higher. On average, value creation linked to operation of the onshore facility for the Molde region has been around NOK 145 million higher per year than estimated in the impact assessment. On average, operating expenditures associated with offshore installations have been around NOK 400 million (nominal) in the period 2008-2012. The percentage of value creation for deliveries from Central Norway is estimated at around 7%, and pro rata somewhat lower than the estimate in the impact assessment, which is 18%. Measured in NOK, deliveries from Central Norway here are around NOK 10 million kroner lower per year than assumed in the impact assessment.

Calculations for the development phase from 2004-2007 showed that the shares of value creation for local deliveries linked to the onshore facility were a little lower than first assumed, but still higher measured in NOK. The development of offshore installations in this period also yielded far greater regional value creation than originally assumed. The investments associated with the onshore facility in the period 2008-2012 show that the percentage of value creation for deliveries from both Central Norway and the Molde region were higher than in the development phase 2004-2007. The offshore development in the period 2008-2012 also shows that the share of value creation for Central Norway is at the same level as in the first development phase. For operation of the onshore facility, the calculations have subsequently revealed that value creation from local deliveries of goods and services is at the level estimated in the impact assessment.

4.5 Activity level at the Nyhamna onshore facility

The activity level tied to the processing facility at Nyhamna in Aukra municipality has varied over time in the first five years of operation, which is due to the varying scope of extraordinary maintenance and investment projects during the period. In 2013, which can be considered to be the first year of "normal" operation for the facility, the direct employment was around 520 full-time equivalents. These employees were divided between operators employed by Shell with their daily work at Nyhamna, support functions from Shell's operations organisation in Kristiansund, security guard services and catering, and not least, employment related to delivery of maintenance services. Figure 4-5 shows that 46% of the full-time equivalents linked to the terminal facility in 2013 were performed by persons residing in the Molde region, and another 43% residing in Central Norway in general. This means that personnel residing in Nordmøre in particular, and Trøndelag, are well-represented in connection with operations and maintenance at Nyhamna.

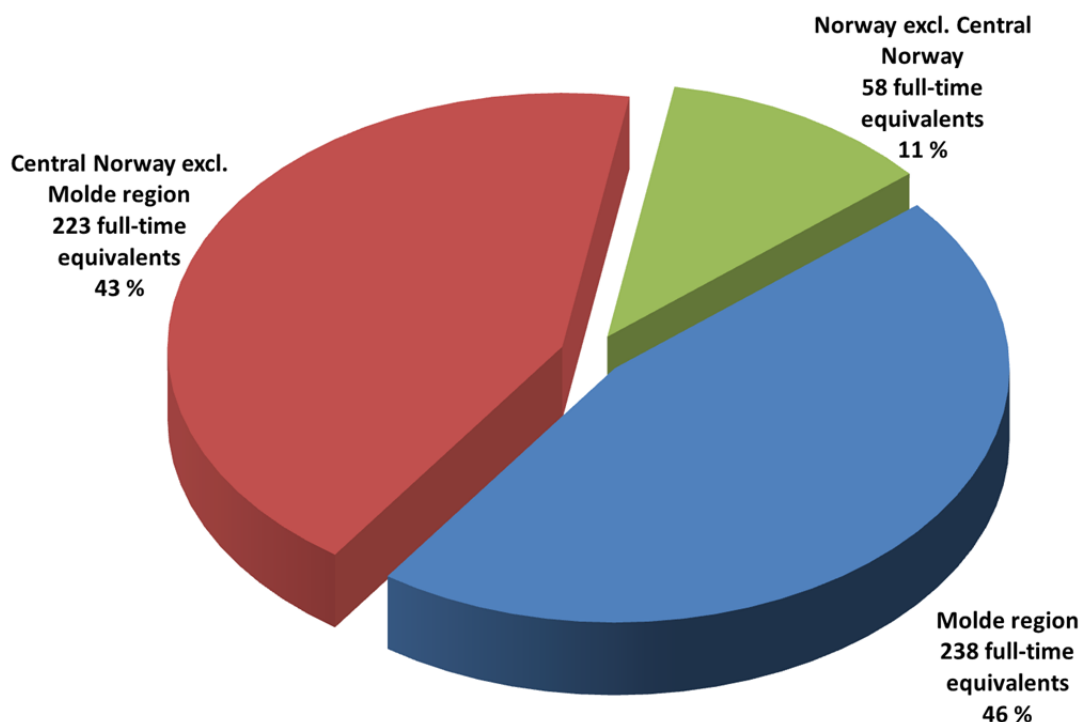


Figure 4-5 Activity level at the Nyhamna onshore processing facility 2013.

If we calculate the employment effect from the property tax and add it to the 240 full-time equivalents registered as residing in the Molde region, we get 440 full-time equivalents. If we convert the annual purchases by companies in the Molde region into full-time equivalents, the resulting number is 60. This means, overall, around 500 as the direct employment effect. With an indirect effect in addition which comprises consumer effects as discussed in the introduction, we find a total of around 700 full-time equivalents, which is significantly higher than the 400 full-time equivalents estimated in the impact assessment.

Figure 4-6 shows that the number of employees in Norske Shell whose daily jobs are at Nyhamna has doubled from 71 in 2008 to nearly 150 employees today, including apprentices. The growth in direct employment at Nyhamna in recent years is due to both more insourcing of services and an increased commitment to apprentices.

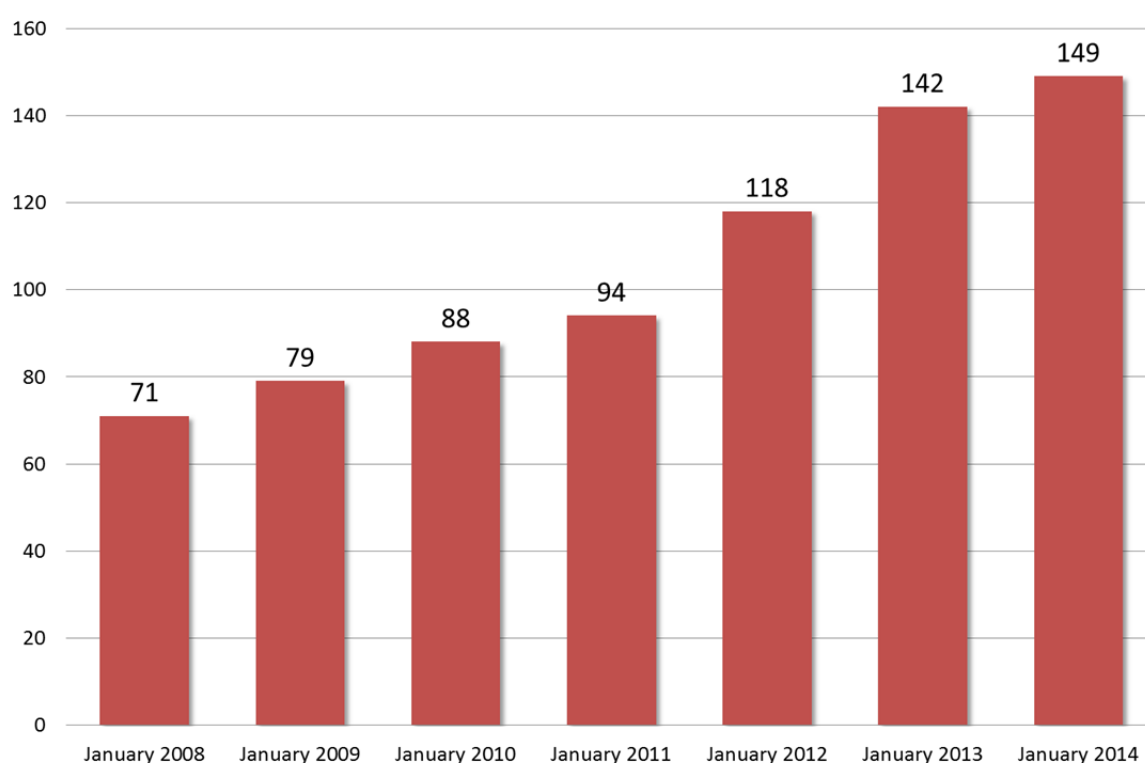


Figure 4-6 Norske Shell employees at Nyhamna 2008-2014.

5 SUPPLIER DEVELOPMENT

5.1 Sample survey

In the Ormen Lange supplier database we find around 340 companies with total deliveries of NOK 1 million or more in the period from 2008-2012, of which 280 with invoice addresses in Norway. Sixty of the companies are located in Central Norway, while quite a few companies with invoice addresses outside Central Norway nevertheless have regional divisions that provide all or partial deliveries of goods and services. As part of the supplier survey, the companies were also asked to indicate their participation in the development phase of Ormen Lange and the importance of the Ormen Lange project for development of the company. Not all companies that contributed key financial figures have responded to this part of the survey, so that the number of respondents here is somewhat limited.

Of 32 responses, 69% indicated that they had deliveries also in the development phase of Ormen Lange, from 2004-2007. Of those with deliveries in this period, 95% report that they regarded this as having great importance for continued deliveries to Ormen Lange in subsequent years. According to the companies that were asked, the first development phase gave them the opportunity to establish a "track-record" and prove their capabilities to deliver and their expertise. For equipment suppliers, the establishment of service agreements for maintenance and modifications after the development phase was also an important continuation of the deliveries to Ormen Lange. 67% of those asked state that deliveries to Ormen Lange have been very important for development of the company, and another 27% state that it has been of moderate importance. This importance has particularly been linked to:

- Development of expertise, learning processes and technology development
- Increased focus on Health, Safety and Environment, certification processes and quality development
- Increased sales and employment, which yield opportunities for further efforts
- Ormen Lange as an important reference project in relation to new assignments

Table 5-1 show selected examples of companies that took part in the development of Ormen Lange during the years from 2004 to 2007, and that have participated in the operations phase and further investments from 2008.

Table 5-1 Examples of regional companies from development phase to operations phase.

	Development phase 2004-2007	Operations phase 2008-
Aker Midsund Aukra	Separation equipment and scrubbers MEG	Separation equipment Subsea compression test-pit
Odd Småge Aukra	Groundwork in Main EPC, Civil contract	Minor Civil Services
Sikkerhetssenteret Aukra Aukra	Construction services	Front Safety, Aukra HSE course Shell
Solid Engineering Molde	Construction management for Aker, Civil engineering	Construction management civil works
Linjebygg Offshore Molde	Construction services	Nyhamna EPCm
Vigor Kristiansund	Pressure tanks	Subsea compression test-pit
Norsk Gjenvinning Industri Kristiansund	Deliveries Main EPC	Waste management and sanitation
IKM Testing Kristiansund	Deliveries Main EPC	Maintenance/operations
TESS Møre Kristiansund/Ålesund	Tools, materials	Materials
Vestbase Kristiansund	Base and logistics services	Base and logistics services
FMC Technologies Kristiansund	FMC Technologies, Kongsberg Subsea production systems	Ormen Lange Development, modifications/maintenance
Aker Solutions Kristiansund	Aker Kværner Stord, main contract Main EPC (Engineering, procurement, and construction)	Nyhamna EPCm
Havila Supply Fosnavåg	Pipeline transport Langeled	Ormen Lange Development
MainTech Trondheim	Inspection program	Inspection, engineering
Reinertsen Trondheim	Pipeline engineering (Reinertsen Anlegg main contract administration building Nyhamna)	Ormen Lange Development
NTNU, Sintef Trondheim	Offshore studies, marine archaeology	Subsea operations, HSE

5.2 In-depth interviews with selected trend-setting companies

5.2.1 FMC Technologies, Kristiansund

FMC Technologies is the world's largest supplier of subsea production systems to the petroleum industry. At Ormen Lange, Europe's deepest subsea field at 1 000 metres, FMC Technologies has supplied subsea systems in three phases, including xmas trees, manifolds, production control systems and hook-up equipment. FMC Technologies has also delivered subsea equipment to several fields in the Norwegian Sea, including Åsgard, Heidrun and Norne.

The division in Kristiansund is one of FMC Technologies' service bases, with responsibility for operation and maintenance of subsea installations in the Norwegian sector. The equipment is manufactured at Kongsberg and in Scotland and sent to Kristiansund for commissioning and testing prior to shipping. The facility at Vestbase has various support functions for the offshore operations. The 10 departments in Kristiansund perform services in machining, riser maintenance, periodic inspection and recertification of lifting equipment, non-destructive testing, structural welding, logistics, surface treatment and repair and maintenance of hydraulic equipment.

The division in Kristiansund was established in 1998, with a background in the maintenance contracts for Statoil on the Åsgard, Heidrun, Norne and later Mikkel and Tyrihans, fields. In 2005, FMC Technologies was awarded a contract with Shell for Ormen Lange subsea maintenance. In March 2013, Statoil renewed its framework agreement with FMC Technologies for installation and maintenance of subsea equipment on the Norwegian Shelf (duration up to 15 years, including options).

The Kristiansund division has grown from 20 employees in 2006 to 73 employees at the end of 2013. The development in recent years has added more functions and more expert engineering services to FMC Technologies in Kristiansund. Increasing activity has also entailed a greater need for more space. In addition to existing facilities, a new building at Vestbase will be completed in May 2014, including two workshops, receiving area, storage warehouse and offices.

FMC Technologies' objective is to use local suppliers for requested services, assuming that the suppliers meet FMC Technologies' requirements regarding HSE, quality and price. The division largely uses suppliers located at or around Vestbase, such as painting and surface treatment services, welding and structural modifications. Local recruiting is another important objective for FMC Technologies. The Kristiansund division currently has 8-9 apprentices, which means that more than one in ten employees is an apprentice. These apprentices largely come from three educational institutions in Kristiansund, such as the petroleum logistics programme at the University College Centre, vocational college programme in petroleum technology and the technology and industrial production line of study at Kristiansund upper secondary school. Many of the apprentices at FMC Technologies in Kristiansund get hired permanently after completing their education.

Ormen Lange has been very important for the development in activity at the Kristiansund division. Many forthcoming decades of operating both Ormen Lange and the other fields in the Norwegian Sea will yield stable framework conditions for the activity. Future subsea developments with tie-in to existing fields, such as the Smørbukk Sør Extension to Åsgard, can also make a positive contribution to the local supplier industry.

5.2.2 Front Safety AS, Aukra

Front Safety is a centre of expertise, offering company-tailored training and consulting to the oil and gas sector, land-based industry, the public sector, and other defined industries. This was originally Aukra Safety Centre, which was engaged in safety and preparedness training since 1983, first within shipping, and subsequently also in relation to offshore personnel. The company was acquired by Front Group in January 2012. Front Safety currently has six employees, and has cooperated with other local companies and expert personnel to secure top-notch expertise and good capacity within the relevant disciplines.

Today, the company's activity is focused around services related to HSE (health, safety and environment), emergency and preparedness management, as well as gas safety. As regards HSE, the company provides basic and continuing training within specific disciplines, manager training and tailored course packages for all levels in the customer organisation. Other services offered include education, training and drills within emergency and preparedness management, as well as consulting services in emergency planning work. Front's fire and gas centre offers courses and training in subjects such as gas safety and gas management. Front's ambition is to further develop the fire and gas centre into a full-scale national expertise centre, where the facility can be configured for different needs and offer e.g. practical training within various gas management disciplines. The expertise centre will also be a training centre for emergency and preparedness training, including everything from specific industrial safety exercises to strategic preparedness drills.

In 2011, Front Safety was awarded a framework agreement with Shell which included courses and training for personnel who would work at the process facility for Ormen Lange at Nyhamna. A large number of different course modules are offered, allowing for customising course packages according to specific needs. The same arrangement is also offered to other business and industry, as well as public enterprises. The higher activity level at Nyhamna in the coming four-year period, in connection with the expansion into a gas hub, will also contribute to greater activity for Front Safety and form the basis for more long-term commitments.

The requirement for proven HSE expertise and certification of personnel, as well as maintenance of this expertise, is becoming increasingly important. This does not just apply in the oil and gas industry; land-based industry has also experienced stricter regulatory requirements and an awareness of own reputation has led to greater focus on HSE. Emergency and preparedness management, both in business and industry, institutions and public agencies, is another area subject to growing attention. This contributes to more areas of opportunity for Front's expertise. Growing application of gas within the transport sector, particularly shipping, along with industrial application of gas, are other areas where Front's gas safety expertise was beneficial.

Front emphasises the cooperation with Shell and their willingness to carry out HSE development, as well as Shell as a demanding customer and an important driver for the company's growth and development process. Established infrastructure in the form of facilities for theoretical and practical teaching, as well as further development of this, yields advantages in the development of HSE services in general for both land-based and offshore activity.

In cooperation with Front, Shell will develop content for a training centre, in connection with the Nyhamna facility, with physical installations and equipment comparable to what is found at the facility. The objective is to give Nyhamna personnel the opportunity to carry out practical assignments in a simulated environment equivalent to what is found inside the facility.

The intention is that Front Safety will administer and operate the training centre as a part of the HSE training and expertise development for personnel who will be involved in the Nyhamna Expansion project for Shell.

5.2.3 MainTech AS, Trondheim

MainTech was established in 2000, and has since worked to become a leading service supplier in operations and maintenance, inspection and material technology, for the oil and gas industry, as well as for the energy sector and process industry.

MainTech has cooperated closely with Norske Shell since 2001, with a framework agreement for inspection of equipment on the Draugen platform. From 2005, MainTech contributed by developing strategies and a philosophy for inspection and maintenance management on Ormen Lange, as well as establishing a maintenance and inspection programme, and a corrosion management system. In December 2012, AS Norske Shell extended the framework agreement for another 5 years, including an option for additional extension. The agreement covers planning and execution of inspections on Draugen and the process facility for Ormen Lange at Nyhamna, along with all subsea installations linked to Draugen and Ormen Lange. This also includes tasks related to materials technology and corrosion services.

Analyses play an important role in the inspection and maintenance management loop. Continuous analyses of technical integrity are performed to maintain an optimal safety level and achieve safe operation of the facilities. Verification data on technical condition is analysed and re-used as management parameters to support Shell's operations organisation. Risk-based inspection starts with the materials' degradation processes, and MainTech's expertise within materials technology and corrosion constitutes the core expertise for optimising the inspection programmes. The affiliation with the parent company Linjebygg Offshore provides access to expertise in performing inspections, and contributes to offering complete solutions within inspection and inspection management.

In 2011, Linjebygg Offshore lead a development project on assignment from Shell to demonstrate and qualify new technology for visual inspection in process vessels at Nyhamna with the aid of remote-controlled inspection tools. The concept eliminates the need for personnel exposure inside tanks and enclosed spaces, and yields both safety advantages and cost savings. MainTech's expertise and experience from Ormen Lange also contributed to the success of a pilot project. The project was nominated for the ONS Innovation Award 2012 and received Shell Europe's 2012 Regional UI Impact Award in the category Innovation, Sustainable Development and Reputation.

MainTech contributes technical expertise to Norske Shell within various disciplines, and at a relatively high level in the operations organisation. The experience gained from Ormen Lange has contributed to enhanced expertise within the core areas of inspection, materials technology and corrosion, both onshore and in particular relates to subsea installations. At the start in 2000, MainTech had six employees, gradually grew to 20 employees in 2006, and currently numbers 38 employees. The contracts with Shell have been an important contribution to the company's growth. The company also emphasises Shell's ability to commit to local players and build up local expertise, as well as Shell's open and inclusive way of doing business. In the autumn of 2012, MainTech established a branch office in Molde, in part to provide additional local assistance for Shell, but also based on the general market opportunities for local maintenance and inspection services.

5.2.4 Langset AS, Molde

The Langset group consists of ten industrial companies that provide products and services for the oil and gas industry, the shipping industry, and process and industrial staffing. The head office is located in Molde, with activity at a number of locations in Norway, as well as workshops in Sweden and Poland. The Langset group currently employs a total of 1 000 people, of which 650 are affiliated with the local companies in Molde.

The companies in the oil and gas business include AMOF, Langset Engineering, Langset Mek with divisions in Sunndal and Moss, and Hammerfest Industriservice. AMOF (Aukra Midsund Offshore) designs and manufactures pressure tanks, process tanks and heat exchangers. Langset Mek supplies maintenance and modification services and workshop services, mainly to the process industry, oil and gas. Langset became the majority owner of Hammerfest Industriservice (HIS) in 2009, where the enterprise carries out fabrication and installation within mechanical disciplines. HIS has contracts with Aibel (Snøhvit) and Apply Sørco (Goliat), and has ambitions for future growth connected to the oil and gas activity in the north. Langset Engineering provides engineering services for land facilities and offshore, and cooperated with HIS in 2013 to deliver an EPCI assignment with Kaefer Energy on Statoil's Troll B platform.

Brødrene Langset AS, the largest company in the group with around 500 employees, supplied personnel and services for development of the process facilities for Snøhvit on Melkøya and Ormen Lange at Nyhamna. During the development phase for the Nyhamna process facility (2004-2007), Langset supplied personnel within the plate, welding, mechanical, HWAC, scaffolding and commissioning disciplines to Skanska, Aker Kværner and Aibel. Overall, Langset had deliveries worth approx. NOK 150 million in connection with this development.

Langset has secured a five-year contract with Shell (plus options), which was initiated in December 2012. The contract entails deliveries of personnel and services for building maintenance and janitor services at Nyhamna.

Health, environment and safety (HSE) is a prioritised area within the Langset group. This includes continuous processes to prevent injury and accidents involving people, materials and the environment, as well as certification processes vis-à-vis ISO systems for quality and environmental management, and management systems for the working environment. The internal course and expertise centre (certified through ASAS) carries out knowledge dissemination and safety training to ensure enhanced expertise as compared with the requirements stipulated by customers and the authorities. Brødrene Langset AS received Aker Solutions MMO's HSE award for 2013, a prize awarded annually to suppliers who can claim best practice or improvement within HSE work. Langset is also pre-qualified through Achilles and Sellihca.

Langset states that its cooperation with Shell has contributed to making Langset better as regards HSE, and also emphasises Shell's ability to include supplier companies in its organisation, and its way of running the business.

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