

Royal Norwegian Ministry of Petroleum and Energy

Valuation of State Direct Financial Interest, 2012

June 2012

Basis of Report

This report has been prepared for the Ministry of Petroleum and Energy by Wood Mackenzie Limited. The information upon which this report is based has either been supplied to us by Petro or the Ministry of Petroleum and Energy, or comes from our own experience, knowledge and databases. The opinions expressed in this report are those of Wood Mackenzie. They have been arrived at following careful consideration and enquiry, but we do not guarantee their fairness, completeness or accuracy. The opinions, as of this date, are subject to change. We do not accept any liability for your reliance upon them.

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Role of Wood Mackenzie

Wood Mackenzie Limited (Wood Mackenzie) has been appointed by the Ministry of Petroleum and Energy (MPE) to undertake a valuation of the State's Direct Financial Interest (SDFI) portfolio of oil and gas assets.

The principal aim is to quantify the change in value over the two year period from the start of 2010 to the start of 2012. As part of this process Wood Mackenzie has identified changes in value for individual assets and the reasons for those changes.

Approach

Wood Mackenzie has developed its approach in conjunction with the Ministry of Petroleum and Energy.

Petoro has provided Wood Mackenzie with datasets for SDFI assets at two points in time. The opening value in this report, the start of 2010 position, was evaluated in the previous report prepared for the MPE by Wood Mackenzie in June 2010. The start dataset for the opening valuation was based on the Revised National Budget (RNB) 2010 (generated in late 2009). The end dataset is based on the RNB 2012 (generated in late 2011).

In both cases the RNB data has been reviewed by Petoro and is based on production and cost profile information provided by field operators. Changes to the data between start 2010 and start 2012 may be based upon differences in the operators' expectations from year to year, or changes to field development plans.

The data has been run using the Wood Mackenzie's price assumptions, as described in the methodology section.

Summary and Conclusions

Wood Mackenzie has undertaken a valuation of the SDFI portfolio of oil and gas assets as at the start of 2012 and calculated the change in value over the two year period from the start of 2010. The final value of SDFI portfolio at the start of 2012 is **NKr 1,143.4 billion** (in 2012 terms).

The change in value of the SDFI portfolio from the start of 2010 to the start of 2012 ('the valuation period') has been calculated by running valuations using the start and end period datasets, as supplied by Petoro. From this analysis the value of the SDFI portfolio has increased by **NKr 375.2 billion** (in 2012 terms) during 'the valuation period'. The value, including higher realised cashflows in 2010 and 2011, would have increased by **NKr 72.5 billion** (in 2012 terms) had price assumptions remained the same as the Revised National Budget 2010.

Excluding the strong impact of forward price assumptions during 'the valuation period', several other factors have impacted the value. The main reason for the price independent increase in value is the addition of new commercial discoveries to the portfolio, most notably the giant Johan Sverdrup field. Although this was classified in the RK-5 ('development likely but not clarified') category by Petoro, Wood Mackenzie has included this, along with Skrugard, Maria and Asterix, in the commercial part of the valuation, as we believe that development is very likely. As well as new fields, some producing assets have increased in value. For instance, a large increase in remaining gas reserves at the Troll field - by far the highest value asset in the portfolio - has added value.

This increase in portfolio value has come despite increased cost assumptions for individual assets. Heightened activity and competition on the Norwegian Continental Shelf (NCS) have led to inflationary pressure on all aspects of the supply industry, resulting in increased exploration, development and operating costs.

Valuations

Summary - Value Change Comparisons

We have analysed the portfolio dataset to show the value of the start 2010 data at 1 January 2010 and that of the start 2012 data at 1 January 2012. The opening value for 2010 is sourced from the equivalent report prepared for the Ministry of Petroleum and Energy in June 2010. The oil prices used in this valuation are summarised in table 4.

To ensure comparability of the value of the datasets, we have made the following adjustments as described below and shown in table 1. The three parts are: Part 1, a calculation of the value change between the estimated cash flows from the previous year's study and the actual cash flows during 'the valuation period'; Part 2, the value change of the portfolio from start 2010 onwards including the value change due to constant prices and the value change due to increased prices; Part 3, the total value change for the portfolio.

All items are in 2012 terms unless otherwise stated.

Part 1

Part 1 calculates the value change between the estimated cash flow items for 2010 and 2011, as calculated in the previous year's study (step A), and the actual cash flows generated over the same period (step B). Taking the difference between the two (step C) we calculate that the increase in value for the cash flow items is **NKr 33.8 billion**.

Part 2

Part 2 begins with the start 2010 dataset value (as described in the previous study) in 2010 terms. This figure is inflated into 2012 terms (and discounted to 2012) to give a value of **NKr 1,027.4 billion** (step D). This is calculated by inflating 2010 values by 2.47% inflation and a 7% discount rate (to 2011) and then by 1.24% inflation and a 7% discount rate (to 2012). We then deduct the estimated cash flows for 2010 and 2011 (step A) from the inflated start 2010 value. This gives us a value of **NKr 802.0 billion** which is the start 2010 value from 2012 onwards (step F). The start 2012 value has been calculated to be **NKr 1,143.4 billion** (step G). The difference between the two figures of **NKr 341.4 billion** gives the value increase of the future portfolio from start 2012 onwards (step H).

The next stage in part 2 is calculating the extent to which changes in oil and gas price assumptions have impacted on the value change. We have therefore run the start 2012 dataset using start 2010 oil and gas price assumptions, to isolate the impact of changes arising from different oil and gas price assumptions.

Using start 2010 price assumptions, the value of the start 2012 dataset falls from **NKr 1,143.4 billion** (calculated with 2012 Wood Mackenzie price assumptions, step G) to **NKr 840.7 billion** (calculated with 2010 budget prices, step I). By changing the assumptions during the 'valuation period', the value of the portfolio has therefore risen by **NKr 302.7 billion** (step J).

To calculate the total value change due to revised prices we must also subtract the value increase in the portfolio including the estimated cash flow items of **NKr 33.8 billion** (step H). Thus the value increase of the underlying asset base (from start 2012 onwards) excluding the impact of changes to the assumptions is **NKr 38.8 billion** (step K).

The start 2012 dataset value is reconciled by taking the start 2010 value from 2012 onwards (step F), adding the value increase due to revised prices (step J) and finally adding the value increase based on constant prices (step K). This reconciles the start 2012 portfolio value of **NKr 1,143.4 billion** (step G).

Part 3

The impact of these adjustments is such that if the 2010 and 2011 actual cash flows and future expectations at the start of 2012 were in line with those predicted at the start of 2010, there would be no change in value. A higher value for the end year dataset than the start year dataset plus the change in cash flow value would show value increase. By contrast a lower value for the end year dataset would show value decrease. As a result of our valuation analysis, a value increase of **NKr 375.2 billion** has been calculated (step L) which is the summation of the increase in value between the estimated and actual cash flows items and the change in value of the portfolio from 2012 onwards.

Table 1. Reconciliation Between the Start and End Year Valuations of Commercial Assets including the Impact of Oil Price Assumptions on the future portfolio value*

Value Component	Value** (Nkr billion)	Value** (Nkr billion)	Value** (Nkr billion)	Steps
Part 1 - Cash Flow Items				
Estimated Cash Flow 2010	110.6			
Estimated Cash Flow 2011	114.8			
Estimated 2010+2011 Cash Flow		225.4		A
Actual Cash Flow 2010	122.1			
Actual Cash Flow 2011	137.1			
Actual 2010+2011 Cash Flow		259.2		B
Increase in value between estimated and actual Cash Flows			33.8	C
Part 2 – Change in Future Value of Portfolio				
Start 2010 (from previous study) (2010 terms)	865.0			
Start 2010 (from previous study) (2012 terms)	1027.4			D
Estimated 2010+2011 Cash Flow	225.4			A
Start 2010 Value from 2012 onwards		802.0		F
Start 2012 Value		1,143.4		G
Value increase of the portfolio from 2012 onwards			341.5	H
Impact of Oil Price on the future portfolio value				
Start 2012 Value	1,143.4			G
Start 2012 using start 2010 prices	840.7			I
Value change due to revised prices		302.7		J
Value Increase from 2012 onwards		341.5		H
Value increase based on constant price assumptions			38.8	K
Reconciled Value Change in the Future Portfolio during 'the Valuation Period'				
Start 2010 Value from 2012 onwards	802.0			F
Value Increase due to revised prices		302.7		J
Value increase based on constant price		38.8		K
Start 2012 Value			1,143.4	G
Part 3 – Total Value Change				
Realised change in value from 2010 and 2011 cash flows		33.8		C
Value Increase from 2012 onwards		341.5		H
Total Portfolio Value Change compared to 1 Jan 2010			375.2	L

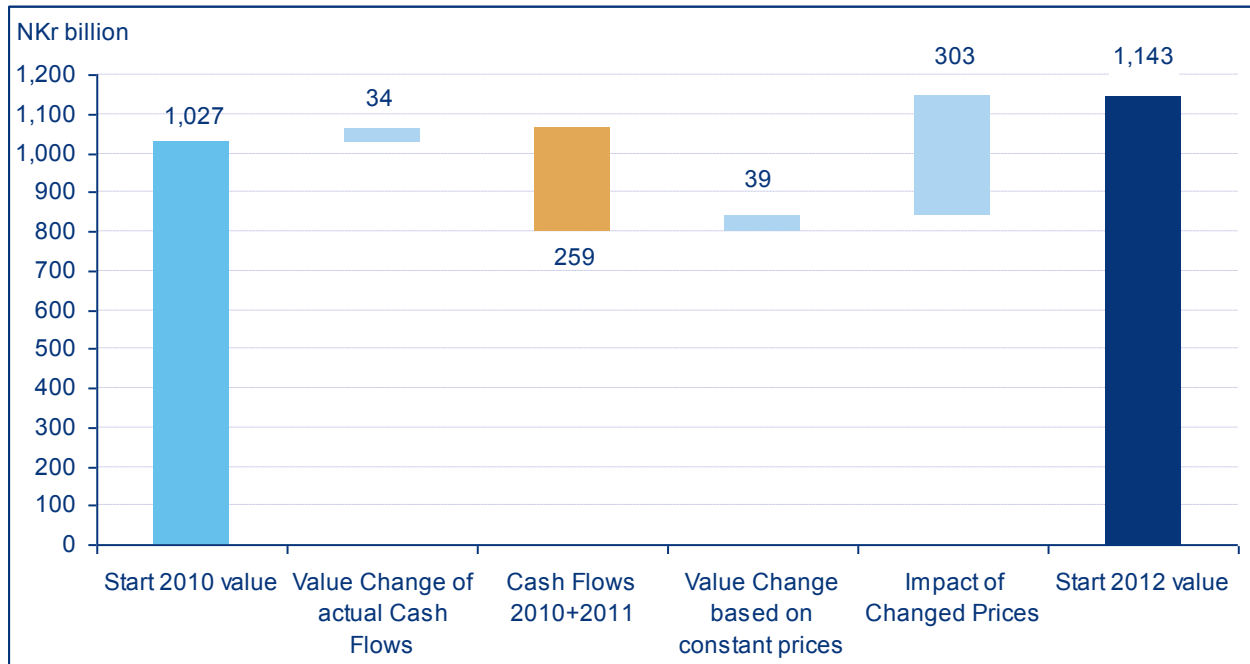
**All items are in 2012 terms unless otherwise stated

* Discounted at 7% in real terms.

Totals may not add due to rounding

Chart 1 graphically shows the steps from the start 2010 value to start 2012 value (all in 2012 terms).

Chart 1. Value Change During ‘the valuation period’



**All values are in 2012 terms*

Key Value Change Drivers

By far the biggest reason for the change in asset values is the Johan Sverdrup field, discovered in late 2010. Since then it has become clear that the field holds massive reserves of oil, and is one of the largest ever discoveries in the North Sea. Although the field is classified as RK-5 at present, Wood Mackenzie views this as a valuable commercial asset which will be developed. It has therefore been included in the valuation using the supplied dataset. Other key new developments that provide additional value to the portfolio include: Asterix, Maria and Linnorm. Like Johan Sverdrup, these are at the planning stage, but Wood Mackenzie views them as commercial assets. As development plans have yet to be submitted for these fields, the data and valuations are preliminary.

Skrugard is also a new asset, but it does not appear in the value change chart below, because based on the 2010 prices the NPV would be negative. However, using 2012 prices the project is commercial (and the 2012 Havis discovery, not covered in this dataset, will add further value).

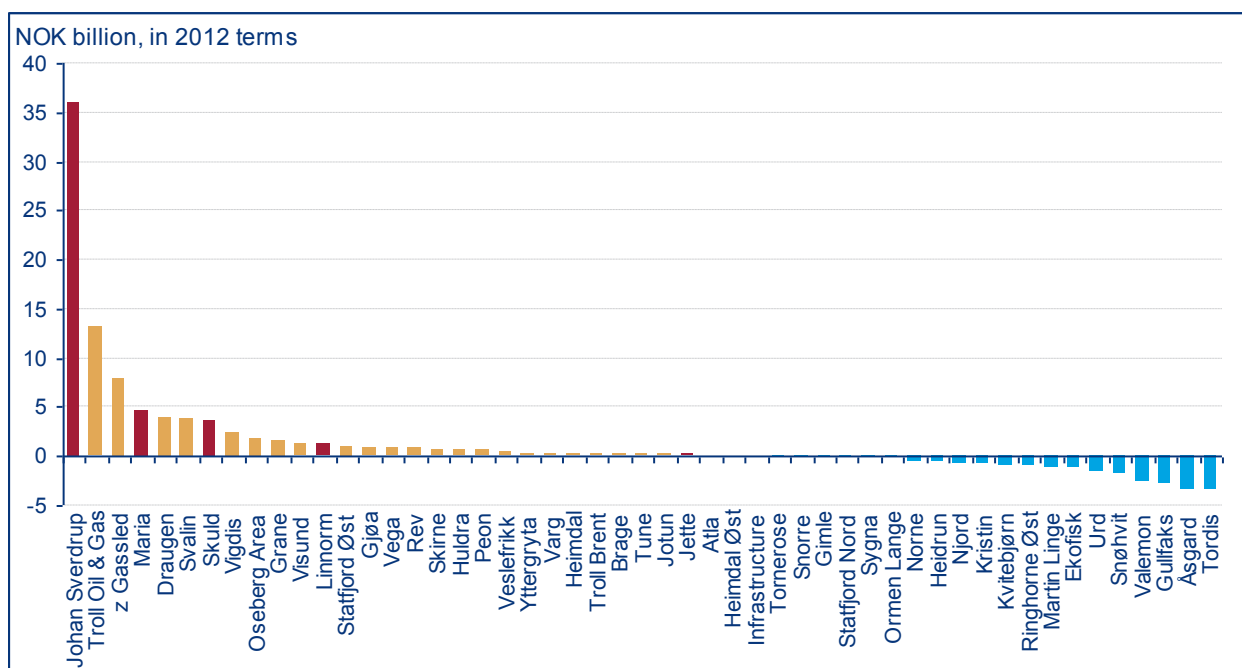
Troll has provided the highest value increase among the producing assets in the SDFI portfolio. The gas reserves have been increased, and higher production is expected from 2012 onwards. This is partly due to reservoir management to enable maximum oil production. Gas market considerations have also meant that the field, which acts as a swing producer, produced less in 2010/11 than previously expected.

The Draugen field value has increased, mainly due to the expectation of a longer life and related increased oil reserves. As well as benefitting from further development drilling, the field will receive Linnorm gas for processing. This will bring tariff income and some fuel gas for the facility.

Several general factors have lowered value across the SDFI portfolio. Some portfolio value additions have been offset by a rise in costs in Norway. Also, the levels of maintenance on some of the older platforms in Norway has been higher than expected, resulting in higher costs and increased production downtime. Examples include: problems with seawater exchangers on Snøhvit which led to long shut in periods, Snorre was shut in for periods due to infrastructure issues and output on Gullfaks was reduced due to well integrity issues.

The main fields to drop in value were: Tordis, Åsgard, Gullfaks and Valemon. Tordis' value has been affected by the inclusion of extra costs for development drilling up until 2016, as well as correspondingly higher operating costs. The Valemon decrease is mainly due to a reduction in expected gas reserves, combined with the discounting effect on a longer life at lower production levels. Åsgard's value has been affected by higher costs associated with the groundbreaking planned compression project, and the Gullfaks value has been affected mainly by increases in planned development drilling.

Chart 2. Value Change by Asset start 2010 to start 2012 - Excluding Impact of Changed Price Assumptions*

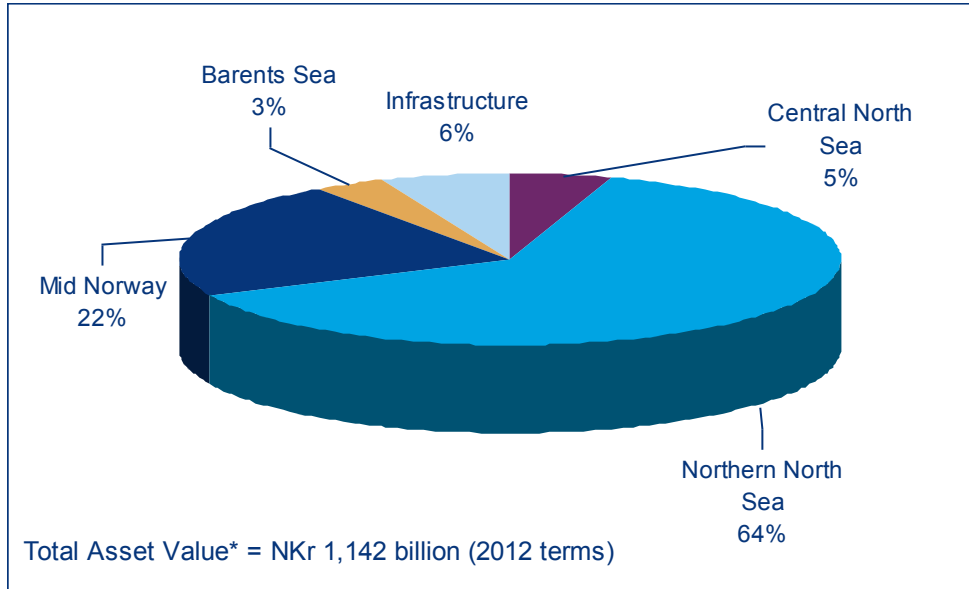


*discounted to 1 January 2012. The red category represents new fields in the portfolio. Corporate items such as Petoro's budget, insurance provisions and marketing activities have not been included in the chart. Only includes fields, not infrastructure.

Portfolio Analysis

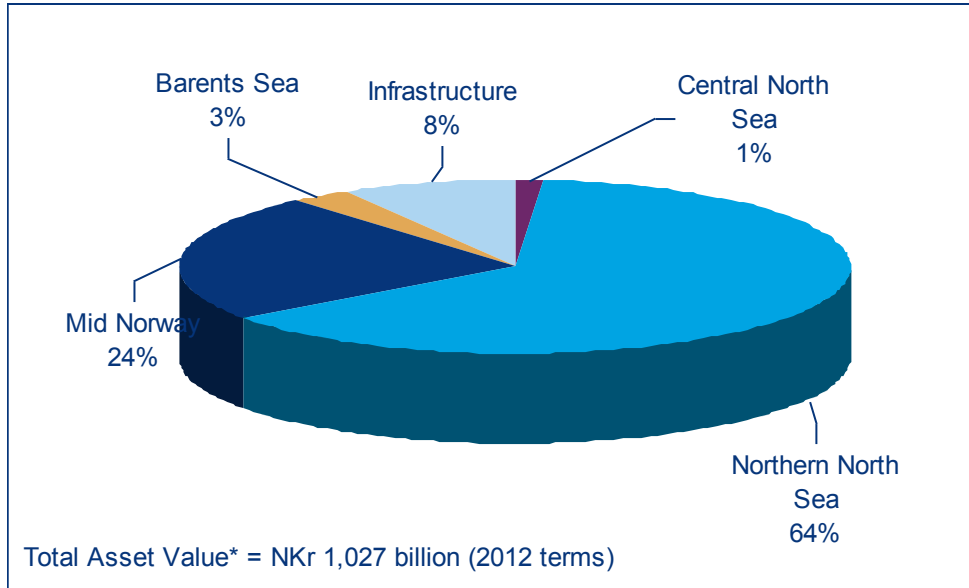
Charts 3 and 4 show the value distribution of the SDFI portfolio by location (excluding insurance, marketing and budget items) on the Norwegian Continental Shelf at the start of 2012 and start of 2010 respectively. Chart 5 shows the split by core asset area.

Chart 3. Value Distribution by Region (Start 2012 value in 2012 terms)



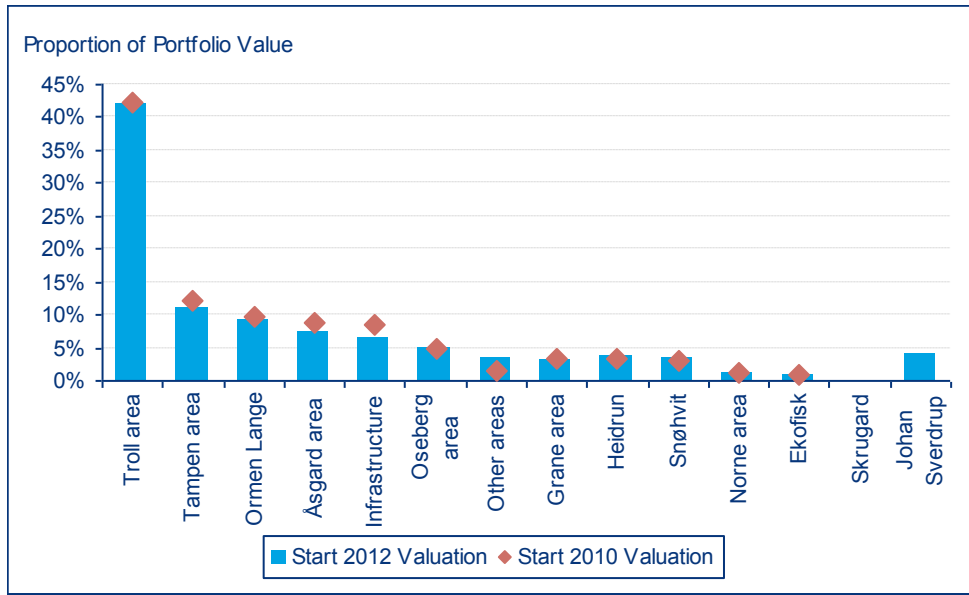
*Asset value only - excludes budget, insurance and marketing items

Chart 4. Value Distribution by Region (Start 2010 value in 2012 terms)



*Asset value only - excludes budget, insurance and marketing items

Chart 5. Value Distribution by Core Area



Comparison of Production Profiles for Start vs. End Year Datasets

The start 2012 liquids production profile for the near term is higher in every year except 2012, reflecting the addition of the new projects and better than expected production from producing assets.

The start 2012 gas production profile reflects higher predictions of gas output – mainly from Troll and Ormen Lange. The oversupply into the European gas market has seen some companies defer gas sales in order to attain better prices at a later date. The forward profile is a reflection of deferrals in 2010 and 2011 for a mixture of market considerations and unexpected platform maintenance.

Charts 6 and 7 show the future liquid and gas production profiles for the start and end year datasets.

Chart 6. Liquids Production

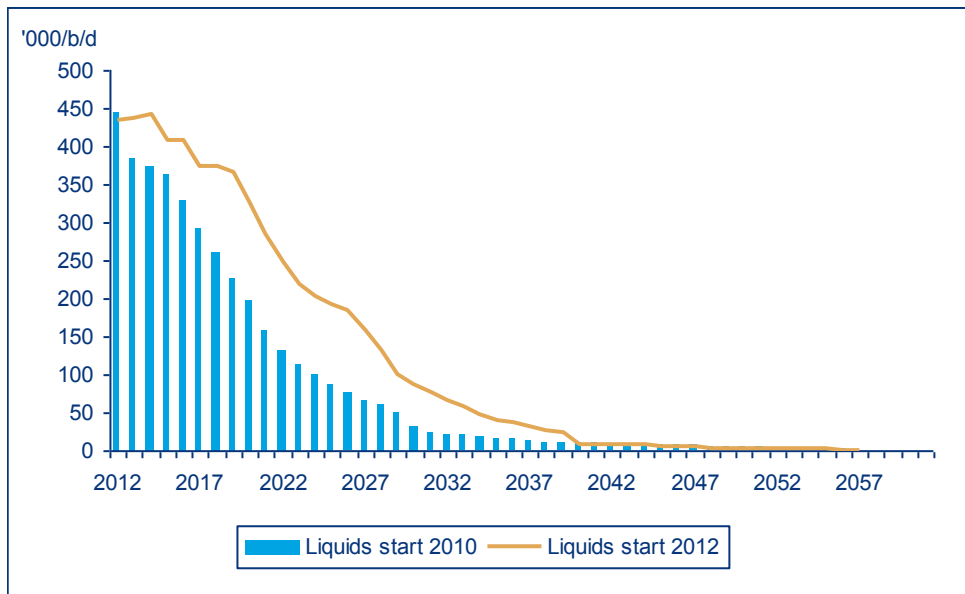
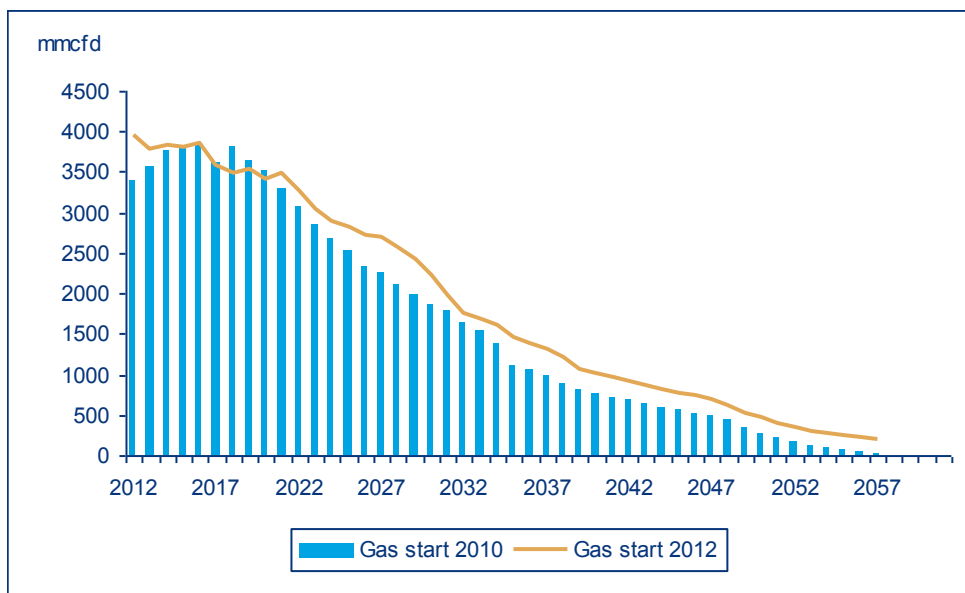


Chart 7. Gas Production



Comparison of Cost Profiles for Start vs. End Period Datasets

The capital investment profile in chart 8 shows a significant increase in near to medium term expenditure, primarily based on continuing effect of cost inflation experienced within the oil and gas sector, especially in the rig market. However, the increase also reflects new development projects and a substantial increase in capital expenditure for investing in and maintaining ageing facilities. Several existing fields are expected to see significant investment in new drilling, accommodation and increased recovery facilities in an attempt to prolong their operational life. The majority of capital spent on Norwegian fields in recent years has been on more mature assets. As the SDFI portfolio is largely comprised of mature fields, the costs associated with lifetime extensions have increased accordingly.

Operating cost estimates have also seen a substantial rise compared with the 2010 projections. This is due to a mixture of cost inflation, new fields, increased maintenance costs on facilities and higher abandonment cost projections.

Chart 8. Capital Investment

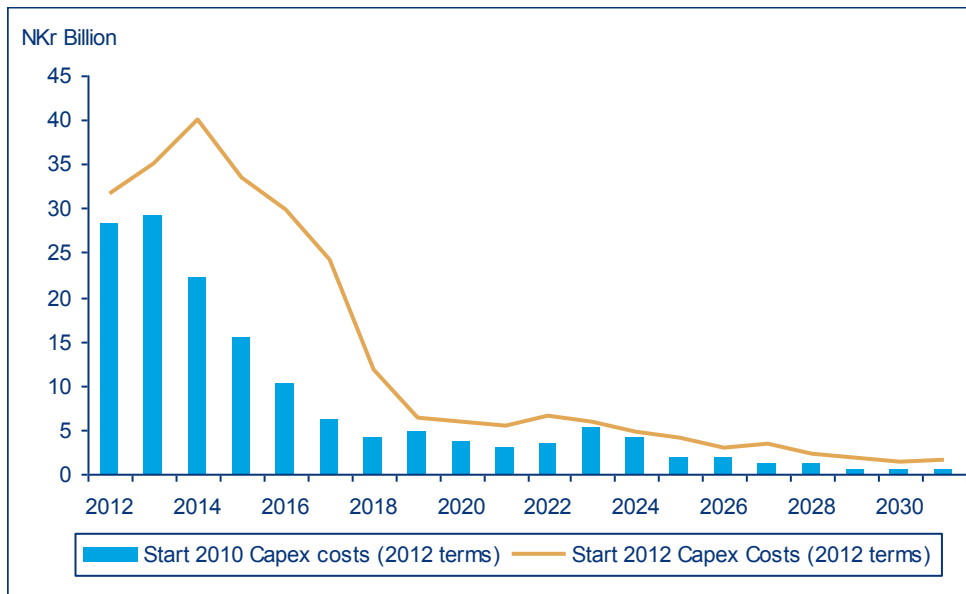
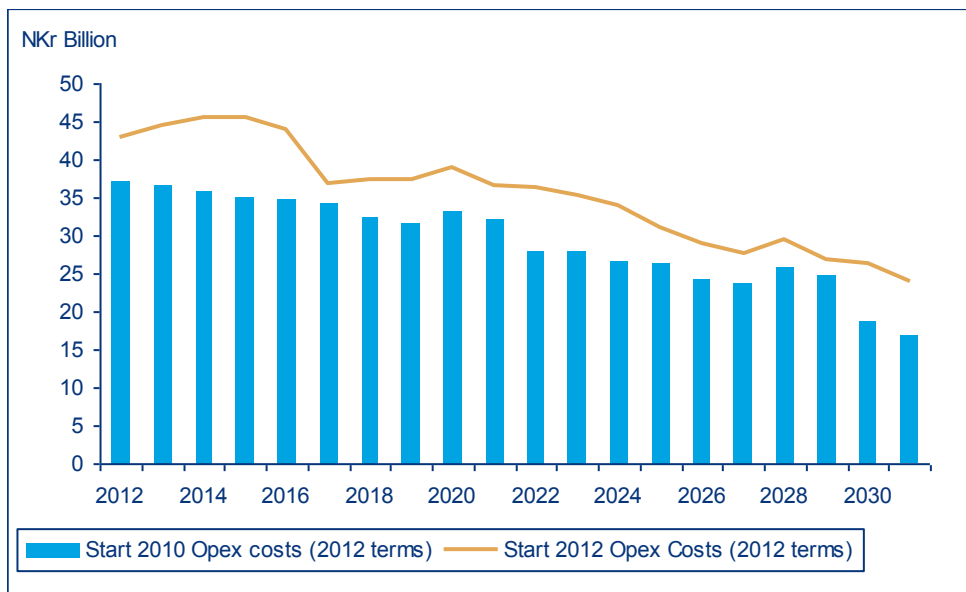


Chart 9. Operating Costs

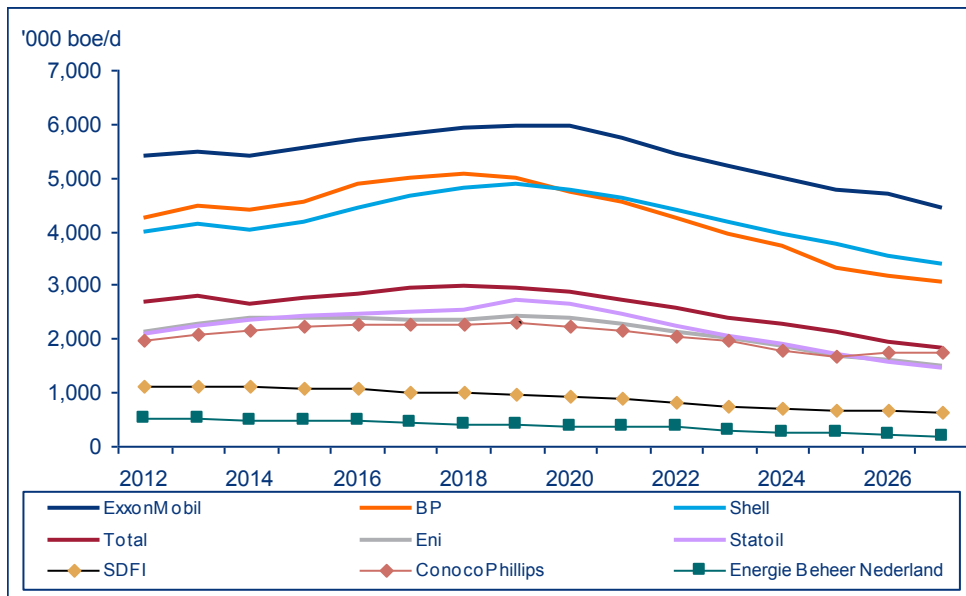


Benchmarking of Future Production Profile

In chart 10 we benchmark the forward entitlement production profile of the SDFI portfolio against a peer group consisting of the global portfolios of the main Norwegian player Statoil and the major international players ExxonMobil, Shell, BP, Total, ConocoPhillips and Chevron, as well as the Dutch state company EBN. The production profiles are based on output from each company's current portfolio of commercial fields and do not take account of likely additional production from discoveries that are categorised as technical discoveries or from yet to find reserves.

The SDFI's future production profile demonstrates a very similar trend to that of Statoil, albeit at a lower level. However, in the medium term we forecast that the underlying decline from Statoil's legacy oil assets will be somewhat offset by its exposure to large new developments. This faster decline of the SDFI production profile (44% compared to Statoil's 54%, from 2012 to 2027) reflects lower interests in growth assets, and its higher exposure to mature assets.

Chart 10. Future Production – Comparison with Companies' Global Profiles



* Source Wood Mackenzie CAT product Q1 2012, SDFI data refers to start 2012 dataset

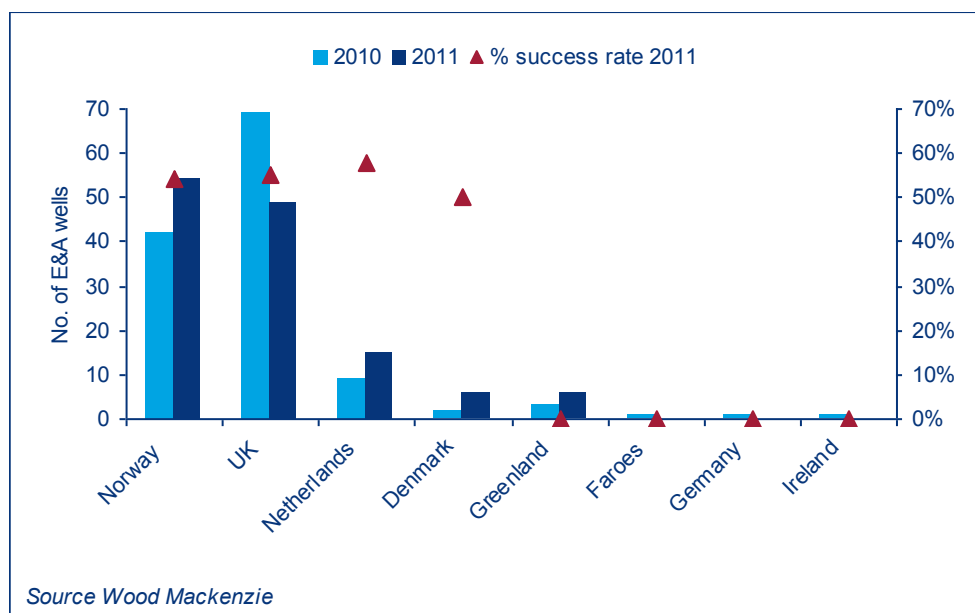
Key North West Europe themes in 2010/2011

Exploration continued to be a big story in North West Europe during 2010 and 2011. In Norway, drilling activity in 2011 was up by around a third compared with 2010, with 54 wells drilled in total, 15 of which were appraisals. The uptick was mainly attributable to the increased activity of Statoil as operator, as it upped its global strategic focus on exploration.

The clear standout story in the period was the giant Johan Sverdrup discovery. At the upper range of reserves estimates, the field would be the third largest Norwegian find of all time and the seventh in the wider North Sea. This story overshadowed what were average success rates in Norway, of 47% and 54% in 2010 and 2011 respectively. Johan Sverdrup made up the majority of the combined 4 billion barrels of oil equivalent discovered during 2010/11. This compared very favourably with 440 million barrels of oil equivalent discovered in the UK and around 200 million barrels of oil equivalent in the rest of offshore North West Europe over the same time.

E&A in the UK was at its lowest level since 2003, reflecting a shift in focus for many companies onto development projects in the UK and pursuing opportunities elsewhere in their portfolios. Drilling in the rest of offshore Europe continued at relatively low levels. Cairn Energy drilled the first Greenland wells in 10 years, but exploration there has so far proven unsuccessful.

Chart 12. Norwegian annual combined (commercial & technical) success and discovery rates (1967-2011)



Capital investment in the North Sea has been high, and has continued to grow with a high and stable oil price. In Norway, eight developments received PDO approval in 2011, up from six in 2010. The largest of the developments given the go-ahead was the Statoil-operated Valemon field. In the UK, 22 new fields were granted development approval by the Department of Energy and Climate Change in 2010/11. In the rest of the offshore sector in Europe, only two fields were given development consent: one each in The Netherlands and Denmark.

In Norway, average gas production declined against expectations for the first time in 10 years, as output in 2011 fell five percent to 9,822 mmcf. The decline was due to a combination of field outages and operators withholding volumes to attain better prices at a later date. In the UK, gas production declined 21% to 4,478 mmcf. Average liquids production in the UK and Norway continued to decline due to natural decline from maturing fields combined with periods of heavy maintenance and delays to developments. Norway's liquids production declined 5% from 2010 to 2011, averaging just over two million barrels per day. The UK's liquids production declined 18% over the same period, to average just over one million barrels per day.

The M&A market in Norway showed real signs of picking up, particularly in 2011. Statoil made its first material upstream divestment in Norway, when it agreed a US\$1.6 billion deal with Centrica in late 2011. This underpinned a record year for asset trades worth US\$2.3 billion, the highest ever seen in Norway and double the 2010 figure. Petoro also made a landmark swap deal with Faroe Petroleum. Norway remains vital to both Statoil and the State DFI for meeting future growth targets, but major discoveries make the divestment of non-core assets viable.

In 2011, over US\$4.0 billion of assets were traded in the most active UK deal market since 2005. Significant premiums were attached to our valuations of two stand out deals in 2011: Apache's acquisition of a package of assets, including the Beryl, from ExxonMobil, and Perenco's acquisition of Wytch Farm from BP. However, other mature assets have languished on the market. Companies continued to consolidate interests in growth assets which will help push many of these developments forward. Deal activity in the rest of Europe was slow over 2010 and 2011, with only a few deals of note taking place, including: Dana's acquisition of a package of Suncor's assets and Tullow Oil's acquisition of assets from Vattenfal, both in The Netherlands.

Methodology and Assumptions

The SDFI portfolio has been valued by Wood Mackenzie based on the methodology outlined below and in accordance with assumptions which are also set out in this section.

Standard Valuation Methodology

Wood Mackenzie's standard methodology for valuing oil and gas assets is designed to determine the price that would be paid by a willing buyer of assets in an open market transaction.

Since the value of the SDFI portfolio is calculated on a pre-tax basis, the valuation is not intended to reflect the price that could be achieved in the marketplace, as any buyers would be subject to Norwegian upstream taxation. The values we have calculated in this report are simply those which are arrived at using a mechanistic approach based upon field data provided by Petoro and economic assumptions provided by the MPE and Wood Mackenzie.

Commercial Fields, Pipelines and Onshore Assets

The SDFI portfolio contains interests in a number of 'commercial fields' – defined by Wood Mackenzie as being those in production, under development or where a future development is reasonably firm within longer term corporate plans. It also has an interest in a number of offshore pipelines which transport produced oil and gas to the market and in several onshore industrial projects directly related to its upstream activities.

The principal methodology used by Wood Mackenzie to value the commercial fields, pipelines and onshore projects within the SDFI portfolio has been to construct a cash flow analysis for each field, pipeline and onshore project.

The cash flows have been run on the oil (and gas) price scenario relevant at the start or end dataset and discounted using a 7% discount rate in real terms to derive a net present value ('NPV') for each asset.

Valuation Prices

The valuation of the assets has been undertaken using the price assumptions documented in the appendix.

Data Sources

Petoro has provided all the field data and the 2010 and 2011 cash flow items that we have used to form our conclusions on the valuation of the assets included in this report. The data consists of, inter alia, production, sales volumes and cost profiles for individual fields and infrastructure projects.

The information is based on Revised National Budget 2012 data as reported in autumn 2011 by the field operators. Petoro has also provided access to its personnel to discuss matters arising from our examination of the data.