

Royal Norwegian Ministry of Petroleum and Energy

Valuation of State DFI, 2003

June 2004

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Role of Wood Mackenzie

Wood Mackenzie Limited (Wood Mackenzie) has been appointed by the Ministry of Petroleum and Energy to undertake a valuation of the SDFI portfolio of oil and gas assets and to review the valuation of the portfolio carried out by Petoro.

The principal aim is to quantify the change in value over the course of 2003. 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 start year position was evaluated in the report prepared for the Ministry of Petroleum and Energy by Wood Mackenzie in June 2003 and this has been the source of the opening value used in this report. The data for this valuation was based on the Revised National Budget 2003 (generated in late 2002). The end year data is based on the Revised National Budget 2004 (generated in late 2003).

In both cases the Revised National Budget data is based on data provided by field operators, but Petoro has adjusted production and/or cost profiles on some projects due to a different perception. Changes to the data between start and end 2003 may be based upon differences in the operators' expectations from one year to the next, or changes to the field development plan.

A more detailed breakdown of the differences between the modelling of the individual assets in the portfolio between the two datasets is given in an Appendix to this report.

The data has been run using the assumptions 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 end of 2003 and calculated the change in value over the course of 2003. As 2003 was the first full year during which Petoro had a complete organisation and fully developed strategy, it represents a better benchmark for what it might be expected to achieve in future years.

In order to calculate the change in value of the SDFI portfolio over 2003 we have run valuations using the start and end year datasets, as supplied by Petoro. From this analysis the value of the SDFI portfolio has increased by NOK 26 billion during the course of 2003, but would only have increased by NOK 14 billion had price assumptions remained unchanged between the datasets.

A number of different factors impact the value, with the most important ones relating to changes to development plans by the operators and changes in production, reserves or cost assumptions for individual assets by both Petoro and the operator. On an individual field asset basis the key drivers for the increase in value of the SDFI portfolio are Troll, Gullfaks, and Ormen Lange; whilst Visund, Tune, Grane, showed substantial decreases in value.

We also reviewed the valuation of the SDFI portfolio carried out by Petoro and taking into account the inherent differences in the valuation methodology and price assumptions used, we don't believe there are any major differences with our valuation.

We believe that a repeat of this study in subsequent years will form a valuable part of the assessment of what Petoro is able to achieve.

Valuations

Summary - Value Change Comparisons

In undertaking our valuation we have initially valued the datasets to show the value of the start 2003 dataset at 1 January 2003 and the end 2003 dataset at 1 January 2004. The opening value for the start year position is sourced from the equivalent report prepared for the Ministry of Petroleum and Energy in June 2003.

To ensure comparability of the value of the datasets, we have made the following adjustments as described below. The following table summarises the start and end year valuations of commercial assets as calculated and the reconciliation between the two figures. For a breakdown of the valuations by individual asset refer to Appendix 2 and for the valuation of technical reserves and acreage refer to Appendix 3.

- 1 Restated the start 2003 dataset value of NOK 410.8 bn, which was in 2002 terms, to start 2003 terms by inflating the dataset to convert it into start 2003 terms and then discounting from the start of 2003. This gives a value of NOK 445.3 bn.
- 2 Adjusted this figure upwards by NOK 4.5 bn to reflect the updated methodology used in this year's valuation (see Methodology and Assumptions section). This gives a value of NOK 449.8 bn.
- 3 Deducted the cash flows arising during 2003 from the start 2003 dataset. These cash flows have been discounted to reflect the value of NOK 67.7 bn in start 2003 terms. The value arising is NOK 384.3 bn.
- 4 Restated the end 2003 dataset value of NOK 438.3 bn to start 2003 terms by deflating the dataset to convert it into start 2003 terms and then discounting from the start of 2003. This gives a value of NOK 410.5 bn.

The impact of these adjustments is such that if the 2003 actual cash flows and future expectations at the start of 2004 were those predicted at the start of 2003, there would be no change in value. A higher value for the end year dataset than the start year dataset plus 2003 cash flows, 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 some NOK 26.2 bn has been calculated.

Reconciliation Between the Start and End Year Valuations of Commercial Assets

Value Component	Value (NOK Billion)*	Value (NOK Billion)*	
Start 2003 in start 2002 terms from previous study	410.8		
Start 2003 restated to start 2003 terms from previous study	445.3		
Start 2003 restated to start 2003 terms adjusted to reflect updated methodology**		449.8	(A)
Cash Flow 2003	67.7		
Discounted value of 2003 Cash Flow		65.5	(B)
Start 2003 value less 2003 discounted Cash Flow (A-B)		384.3	(C)
End 2003 in start 2004 terms	438.3		
Restated to start 2003 terms		410.5	(D)
Value Creation (D-C)		26.2	

* Discounted at 7% in real terms. For a detailed breakdown of the various items refer to Appendices 2 and 3. Totals may not add due to rounding.

** See Methodology and Assumptions section. The restating of the value in 2003 terms is not an adjustment simply based on the discount rate used. The cost and revenue data need to be adjusted for inflation and also the formulae used by Petoro to account for differences in crude quality do not move fully in line with inflation.

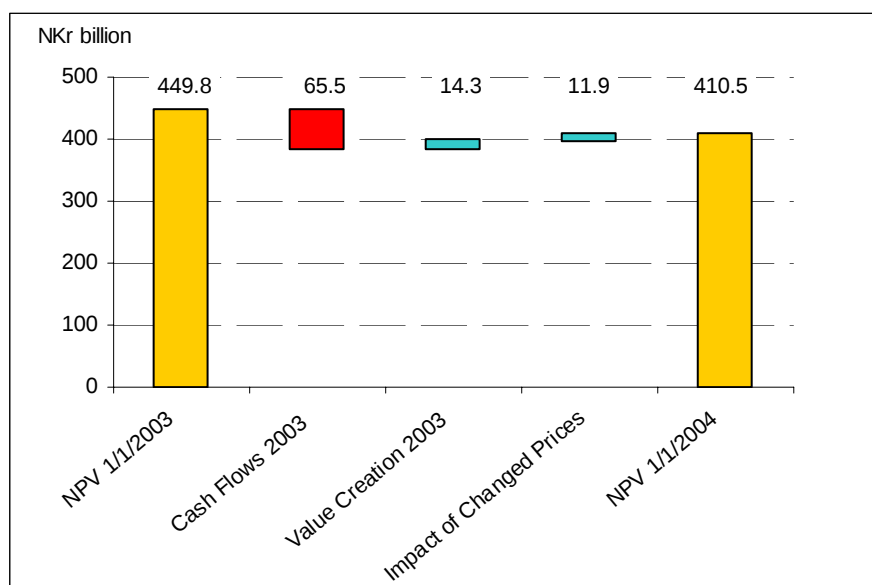
In addition to determining the overall value change, we have calculated the extent to which changes in oil and gas price assumptions have impacted on the value change. We have therefore run the end 2003 dataset using start 2003 oil and gas price assumptions, to isolate the impact of changes arising from different oil and gas price assumptions. Refer to the table on page 28 for the impact on individual assets.

The following table summarises the analysis we have undertaken. Using start 2003 assumptions, the value of the end 2003 dataset falls from NOK 410.5 bn to NOK 398.6 bn. By changing the assumptions during the year, the value of the portfolio has therefore risen by NOK 11.9 bn. Thus the value increase of the underlying asset base excluding the impact of changes to the assumptions is NOK 14.3 bn.

Impact of Oil Price Assumptions

Value Component	Value (NOK Billion)
End 2003 restated to start 2003 terms	410.5
End 2003 as above using start 2003 prices	398.6
Value Increase due to revised prices	11.9
Total Value Increase from previous table	26.2
Value Increase based on constant price assumptions	14.3

Value Increase During 2003



Key Value Change Drivers

On a field asset basis the key drivers for the increase in value of the SDFI portfolio are, in order of decreasing importance, Troll, Gullfaks, Ormen Lange, Draugen, Tordis and Oseberg. The main field assets which show a decrease in value, again in decreasing importance, are Visund, Tune, Grane, Heidrun and Snøhvit.

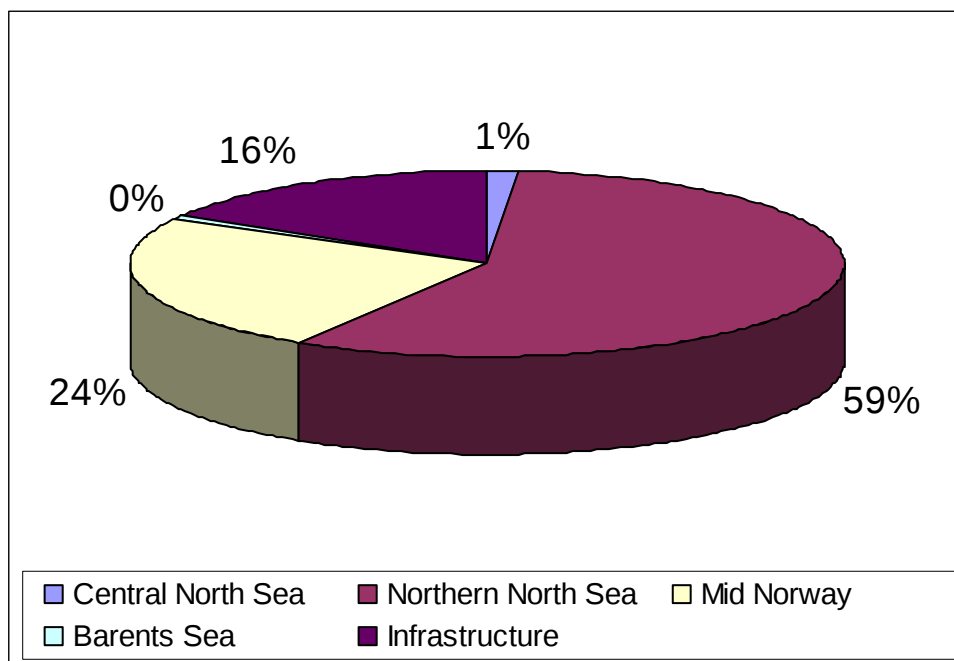
Assets with a higher value compared to last year show a total increase in value of NOK 52.8 bn and those with a lower value show a total decrease of NOK 22.1. The net increase in value is NOK 30.7 bn, of which NOK 11.9 is attributable to changes in the price assumptions used this year.

Regional Analysis

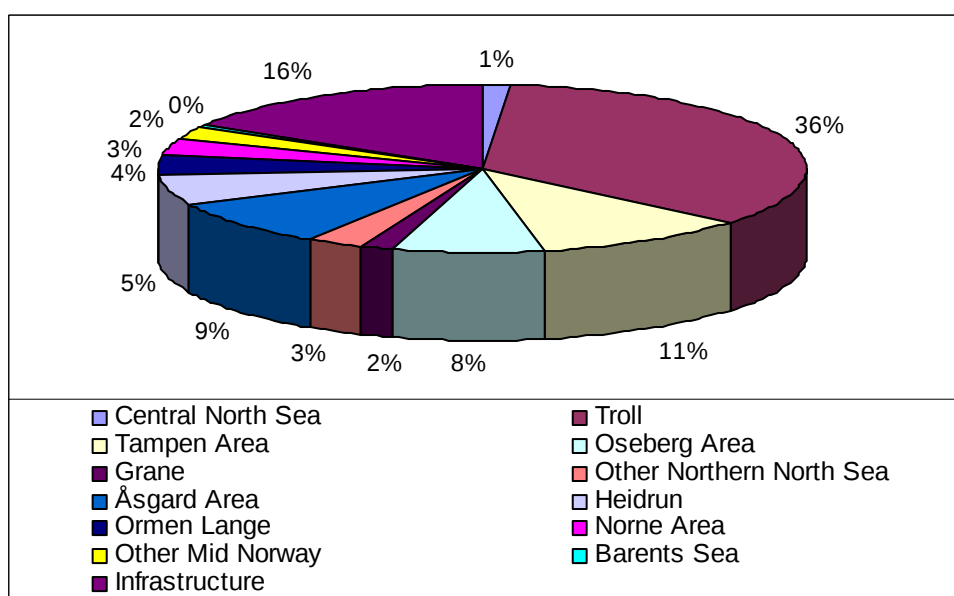
In the following charts the value distribution of the SDFI portfolio by location on the Norwegian Continental Shelf is portrayed. The first chart shows the split by region, whilst the second shows the split by core asset area.

The most significant change is the increase in relative value of assets in Mid Norway (up from 22 to 24%). Most of the main assets in the area, in particular Heidrun and Ormen Lange increased in value compared to last year. This was matched by the fall in value of infrastructure assets (down from 18 to 16%).

Value Distribution by Region



Value Distribution by Core Area



Benchmark Parameters

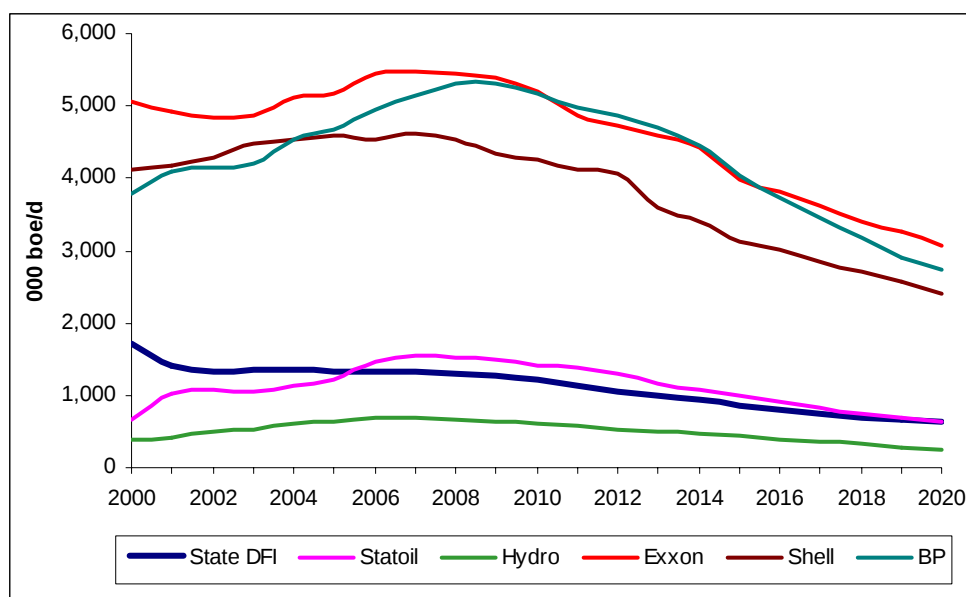
In the following charts we benchmark aspects of the production profile for the SDFI portfolio against a peer group consisting of the main Norwegian players Statoil and Norsk Hydro and the major international players ExxonMobil, Shell and BP.

Future Production Profile

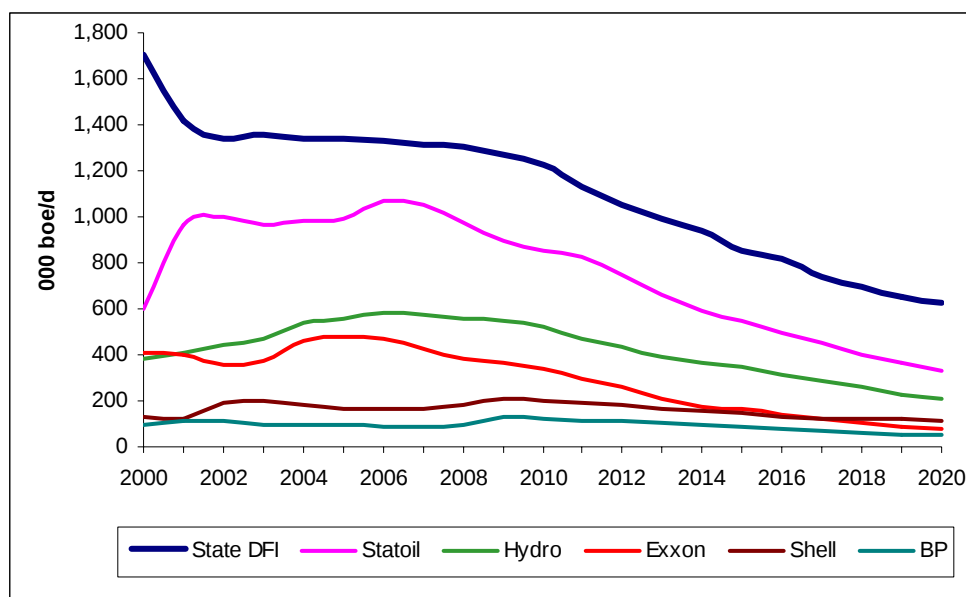
The benchmarking of the SDFI's future production profile is shown in terms of both the companies' global positions as well as their portfolios in Norway and is illustrated respectively in the following two charts.

In terms of global production the SDFI's future profile shows a similar trend in the longer term to that for the Norwegian companies Statoil and Norsk Hydro, although Statoil's profile shows a significant rise over the short term due to increased output from its West African assets. This general similarity reflects the heavy weighting of Norway within Statoil and Norsk Hydro's portfolios. However, the State DFI's future production profile, which shows a slow and steady decline, is in marked contrast with those for the international majors, which exhibit near term increases followed by relatively sharp declines.

Future Production – Comparison with Companies' Global Profiles



Future Production – Comparison with Companies' Norwegian Profiles



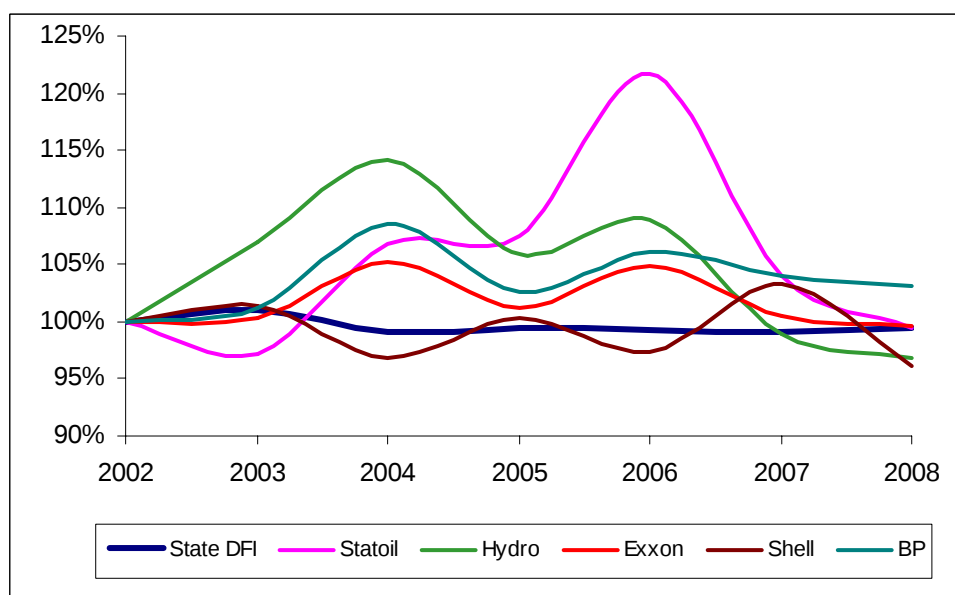
Production Growth

As before, the benchmarking of the SDFI's picture of production growth from 2002 is carried out in terms of both the companies' global positions as well as their portfolios in Norway. The normalised results are illustrated in the following two charts respectively.

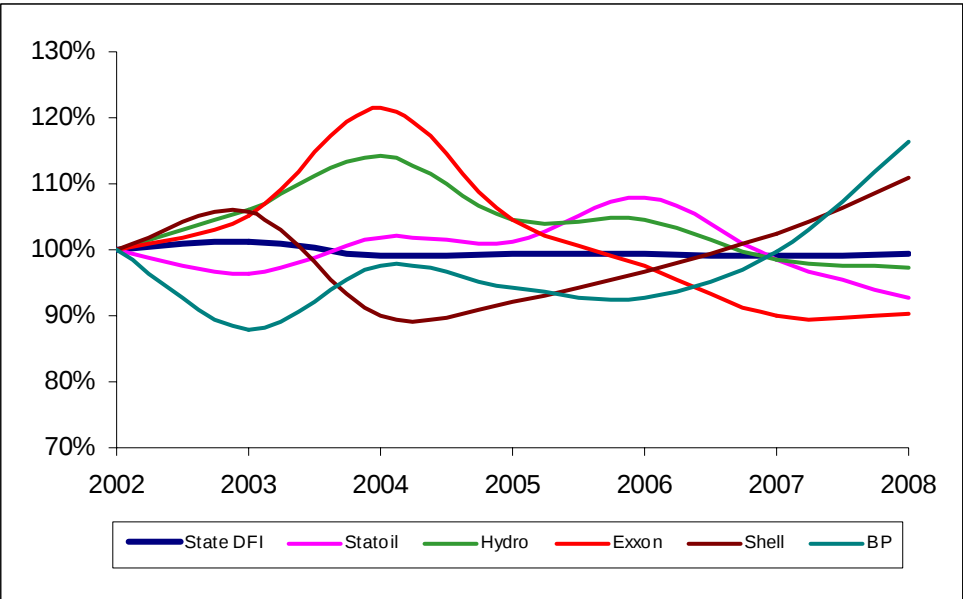
The stability of the State DFI's production profile is striking when compared to that for the global portfolios of the companies. It is also clear that over the short to medium term, the companies will enjoy a period of significant production growth, with the exception of Shell.

However, when the comparison is made with the companies' production growth within their Norwegian portfolios, the position of the State DFI shows a middle ranking. This reflects the wide breadth of the State DFI's portfolio of assets across the Norwegian shelf, which means its pattern of production falls close to the overall average. The companies have significantly different outlooks for production in Norway with both ExxonMobil and Norsk Hydro having strong production growth over the short term but a weaker medium term picture and both BP and Shell showing near term declines before a healthier picture emerges in the medium term due to output from the Ormen Lange development.

Production Growth - Comparison with Companies' Global Profiles*



Production Growth - Comparison with Companies' Norwegian Profiles*



* Source Wood Mackenzie CAT product

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. The valuations are not derived from a solely mechanistic valuation, but are adjusted to reflect market conditions at the time of the valuation.

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 are therefore those which are arrived at using a mechanistic approach based upon field data provided by Petoro and economic assumptions provided by the MPE.

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 government consent for the development is likely within the next 2-3 years. 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 pertaining to the relevant start or end year position and discounted using a 7% discount rate in real terms to derive a net present value ("NPV") for each asset.

Valuation Price Scenarios

The valuation of the assets has been undertaken on two different oil price scenarios (as supplied by the MPE):

- ❑ one case, which is that used in the 2003 National Budget submission (autumn 2002) and which is relevant to the valuation of the SDFI portfolio as at 1 January 2003;
- ❑ a second case, which is that used in the 2004 National Budget submission (autumn 2003) and which is relevant to the valuation of the SDFI portfolio as at 1 January 2004;

These scenarios are outlined in more detail on the following page.

Data Sources

Petoro has provided all the data that we have used to form our conclusions on the valuation of the assets included in this report, with the exception of several minor cost items where Wood Mackenzie assumptions have been utilised (see Appendix 1, Asset Assumptions). The data consists of, inter alia, production, sales volumes and cost profiles for individual fields and infrastructure projects.

The information has either been produced internally by Petoro for budgeting and planning purposes or has been supplied by other companies that operate the particular assets concerned. Petoro has also provided access to its personnel to discuss matters arising from our examination of the data.

Updated Methodology for End 2003 Valuation

In order to improve the comparability of Petoro's start and end year datasets and the valuation of the SDFI portfolio on a going forward basis, several adjustments have been made which impact on the start year value which is used in this report. These adjustments relate to a better understanding of how to model the costs and revenues for the gas infrastructure system and also to changes in the data submitted by operators for two specific assets which are relevant to their start year valuation. The adjustments that have been made are described below.

As a method to better reflect the actual running costs of the gas infrastructure system (Gassled), a forward assumption of the 'Operating Element' of the tariff charges for the use of the system has now been included in the end year dataset. So that an equivalent view can be made from the start year position, an adjustment of a NOK 11.0 bn decrease in value (in 2003 terms) needs to be applied to the value of the start year dataset. The inclusion of a more representative operating costs profile for the Varg asset and the removal of any assumed gas sales for the Vigdis asset, results in further decreases in the start year value of some NOK 0.8 bn and NOK 1.6 bn respectively.

Acting in the opposite direction, the inclusion of an assumption for tariff revenues for the gas infrastructure system from the likely development of Resource Class 3 and 4 reserves (under the utilised NPD definition) requires an equivalent adjustment of a NOK 17.9 bn increase in value to be applied to the value of the start year dataset.

Therefore, the appropriate net adjustment to the value of the start year dataset is an increase of some NOK 4.5 bn.

Upstream - Key Assumptions

Oil, NGL and Gas Prices

We have valued Petoro's oil and gas assets in this report using two sets of oil/NGL/gas price assumptions (as supplied by the MPE) which are those used in the 2003 and 2004 National Budget submissions respectively. The key oil price assumptions are set out in the following table:

Oil Price Assumptions in real (2004) Terms

Scenario	2003 Budget	2004 Budget
	Oil Price NOK/bbl	Oil Price NOK/bbl
2003	182.0	202.2
2004	151.7	171.9
2005	146.6	151.7
2006	141.5	141.5
2007*	141.5	141.5

*All prices are essentially flat in real terms thereafter

Differentials to the Brent price (as supplied by Petoro) have been applied to specific fields in order to reflect crude quality/price differences beyond that of the portfolio average.

Inflation

All the data has been compiled and run in real terms.

Exchange Rate

All the data has supplied and run in NOK terms.

Discount Date

Future cash flows have been discounted to 1 January 2003 or 1 January 2004 as appropriate.

❑ **Discount Rate**

The discount rate used for valuing all the assets is 7% per annum in real terms.

❑ **Corporate Overheads**

A forward estimate of corporate overheads (as provided by the MPE) over and above those applicable to specific assets has been modelled as a separate 'asset' within the SDFI portfolio. These take the form of three items: Petoro's Budget from the MPE, insurance provisions and costs related to Statoil's marketing of oil and gas.