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September 2014

The First

SPE Oslo magazine

FINANCE

Special issue

Financing E&P Companies and Projects on NCS

Oslo Section

OSLO BØRS

Panel discussion: What is the outlook for the Norwegian oil and gas industry? *p. 17*

Electronic version http://oslo.spe.org/home/RESOURSES/Magazine

Issue 3
September 2014

Inside this issue:

Chairman's Message

Dear SPE friends,

Welcome to a new SPE Oslo season and to the third edition of the SPE Oslo magazine The First!

This magazine is a special edition, summarizing some of the highlights from our SPE Oslo seminar on Financing E&P Companies and Projects held in June. The event was sponsored by Oslo Børs and PwC and with well over 80 participants from both the financial and technical segment of the petroleum business, it was a success.

During the 13/14 season, SPE Oslo hosted a total of eight technical dinner and lunch meetings and two Distinguished Lecturer (DL) meetings. We met for seafood at Re-vierhavnen Kro, "pinnekjøtt" and Christmas atmosphere at Hotel Continental and some late night discussions at Paddy's Pub.

The past season was also a very active one for both the SPE Oslo Young Professionals (YPs) and students. The YPs organized a huge kick-off event with around 100 participants and they hosted both quiz nights and technical presentations. The students also worked hard, continuing their tradition with the SPE Oslo student summer games and company presentations.

As a non-profit organization, SPE Oslo is dependent on sponsor funding and we are truly grateful for the support from all our sponsors. Further, SPE Oslo is a volunteer organization and none of our activities would be possible without the efforts of the volunteer SPE Oslo board. New sponsors and volunteers are always welcome - we look forward to working with you!

Looking ahead, the SPE Oslo section has no plans of slowing down. As I will be stepping down, Jafar Fathi will take on the responsibility as the new SPE Oslo Chairman, leading the section into this new and exciting season.

Aiming to be an arena for knowledge sharing and networking, SPE Oslo will continue to invite both members and non-members to technical events and social gatherings and we look forward to seeing you there!

Welcome!

Kristine Behné Ramsnes
WIS Delivery Manager at FMC Kongsberg Subsea / SPE Oslo Chairman 2012-2014

Vita Kalashnikova
Editor The First / SPE YP Oslo Chairman 2013-2015 / Geophysicist, PSS-GEO

Dear SPE Members and Friends,

The SPE Oslo magazine *The First* is a free magazine available for everyone to download from the SPE Norway web sites.

If you would like to receive hard copy of *The First*, or if you should have any question regarding sponsoring, articles or advertisements send your request to vita@pss-geo.com

Also, taking this opportunity, I would like to express my gratitude to Per Fossan-Waage, Director PwC Oslo for helping out in the making of this issue!

Financing E&P Companies and Projects on NCS, June 4 2014, PwC

The regulatory environment for E&P on the Norwegian Continental Shelf

by Gunnar Slettebø, Partner PwC Stavanger, and Per Fossan-Waage, Director PwC Oslo

Gunnar Slettebø
Partner PwC
Stavanger

Per Fossan-Waage
Director PwC
Oslo

Taxation – developments in the fiscal framework

The extensive welfare system in Norway is depending on a large tax base. The tax base is, however, under threat by other countries lowering the tax rates and an increased mobility of the tax basis. Countries like Finland, Sweden and Britain have reduced or plan to further reduce their corporate tax rate. The question is therefore how Norway – as a small open economy in a globalized world - should design its corporate tax income system to maintain its tax base and remain competitive, taking into account the reduced tax levels in other countries and the increased mobility of companies.

To address this important issue, the Stoltenberg government (which since has been replaced by the Solberg government) appointed a Norwegian Tax Commission on March 15, 2013.

The mandate of the commission – named the "Scheel tax commission" after Hans Henrik Scheel, the committee leader - is to consider implementation of measures to protect the domestic tax base as well as to attract business activities, investments and foster job creation.

The focus areas of the Commission are far reaching, and include (among others) a review of the corporate tax rate, measures against profit transfer, tax treatment of debt and equity, the exemption method for international share transactions and consideration of tax basis not subject to mobility.

In November 2013, the Solberg government also revised the mandate for the Scheel tax commission to include an assessment of depreciation rules and rates as well as considering recommendation that are leading to net reductions in tax proceeds.

A report including recommendations from the Scheel tax commission was originally due by October 15, 2014. Late August, the Ministry of Finance approved an application from the Commission that will delay the reporting until December 2, 2014.

Effective January 1, 2014, a new legislation came into force in Norway that will limit the deductibility of interest on related-party debt. This measure can be seen as part of the efforts to protect the Norwegian tax base and will limit tax deduction for interest costs for highly leveraged subsidiaries of foreign companies operating in Norway. The petroleum sector is currently temporarily exempted from this new piece of legislation.

Transfer pricing issues have been high on the agenda of tax authorities internationally for some time. It is expected that the report from the Scheel tax commission will contribute to this focus. The recommendations from the commission might also affect the petroleum industry in areas like withholding taxes and deductibility for bare-boat costs to mention a few.

On April 25, 2014 the Ministry of Finance changed the tax rules regarding uplift for Norwegian offshore investment in the Petroleum sector under the Petroleum tax act. The uplift in the petroleum tax system was reduced from 7.5 per cent to 5.5 per cent. The overall uplift is thereby reduced from 30 per cent to 22 per cent. The government at the same time reduced the ordinary business tax from 28 per cent to 27 per, while increasing the special tax (for petroleum companies) from 50 to 51 per cent. Hence, the total marginal tax rate in the petroleum sector was kept constant at 78 per cent.

Results from exploration drilling: Guidelines Norsk Olje og gass

Since 2005 a large number of smaller E&P companies have been listed on Oslo Børs or Oslo Axess. For such E & P companies the results from exploration drilling might often have a much larger impact on the share price than for bigger companies like Statoil. Thus, with all the small E&P companies entering Oslo Børs/Axess the focus on results from exploration drilling has increased dramatically.

Up to 2009 it was the Norwegian Petroleum Directorate (Oljedirektoratet) which released such results, prior to any release from the listed company. In 2009 Oslo Børs introduced a new practice for such information, and E&P companies could no longer wait for the NPDs release. The companies would have to make their own judgments regarding when to release a stock exchange notice to the market.

In 2012, the national authority for investigation and prosecution of economic and environmental crime (Økokrim) looked into the practice of the listed E&P companies. It turned out that the E&P sector had some characteristics that meant that the companies had to handle insider information differently than more "ordinary" companies.

The insider information (whether there is hydrocarbons in the reservoir that is being drilled into or not) is information that flows "bottom up". The drill crew will – at the time of drilling into the reservoir - very often know more about the result of the drilling (hydrocarbons or not) than the management of the company. (Compare this to an ordinary company where a Board is contemplating a merger with another corporation, in such a case the information is top-down and hence the company can more easily control the flow of information).

Based on Økokrims clampdown on the practice followed by the E & P companies, Norsk Olje og Gass (the Norwegian Trade association for the oil industry) prepared a set of guidelines.

The guidelines state that a listed company is bound legally to report the results from exploration drilling as soon as possible when facts have been established on whether hydrocarbons are present or not, and that such notice to the stock exchange should be coordinated with any other involved E&P companies to the extent possible. Alternatively the company could consider "delayed disclosure", but this would depend on fulfilling certain legal criteria which often might not be the case.

Any later assessment of the *commerciality of the discovery* (if this is the case) would be done by a group of engineers in the consortium. At this stage – with a limited number of people involved - it would be much easier to control the information, meaning that that the companies can more easily opt for "delayed disclosure" until the relevant conclusions are reached. Then a second (ideally speaking) stock exchange notice on the commerciality of the discovery will be reported to the markets. NPD would follow up with their own press release in due time.

Norsk olje og gass have prepared two examples (for discovery of hydrocarbons or a dry well) of the first stock exchange notice.

Finally, it should be noted that other non-listed companies involved in the exploration drilling should as well get familiarized with the guideline, as it is a legal requirement for all parties involved with insider information to handle such information with proper care (ref Norwegian Securities Trading Act sections 3-3 and 3-4).

This very brief summary does not cover all aspects of the new guidelines, and readers are encouraged to see more on the website www.norskoljeoggass.no, guideline number 139.

The Financial Supervisory Authority of Norway: Review of financial information

The FSA is routinely reviewing the financial reporting of listed companies. The E&P companies are covered as well. In 2013 the FSA had comments to various financial reporting issues related to Noreco's E&P activities. The FSA also reviewed the 2012 consolidated financial statements of Statoil. The review report was published in March 2014 and focused on key elements of Statoil's principles for impairment testing.

The review of Noreco can be found here; http://www.finanstilsynet.no/no/Artikkelarkiv/Aktuelt/2013/1_kvartal/Kontroll-av-finansiell-rapportering-/ and Statoil review here: http://www.finanstilsynet.no/en/Document-repository/Press-releases/2014/Q1/Control-of-financial-reporting--Statoil-ASA/

PwC
Oslo Norway

Lessons drawn from raising equity financing

by Ben Arabo, CEO Atlantic Petroleum

ATLANTIC PETROLEUM

Ben Arabo
CEO Atlantic Petroleum

In December 2013 Faroese independent E&P Company Atlantic Petroleum announced a successful IPO on Oslo Stock Exchange which raised gross proceeds of NOK 150MM to the Company. The main reason for the IPO was the Company's ambition to accelerate growth by pursuing current farm-in opportunities and other exploration opportunities, especially on the Norwegian Continental Shelf.

Bell Ceremony at Oslo Stock Exchange – Atlantic Petroleum listing December 2013. Bente A Landsnes, CEO of Oslo Stock Exchange, Ben Arabo, CEO Atlantic Petroleum, Jonny Hesthammer, MD Atlantic Petroleum Norge AS

ATLANTIC PETROLEUM

Atlantic Petroleum is a Faroese independent exploration and production (E&P) company headquartered in the Faroe Islands and with two highly experienced technical hubs in London and Bergen. The Company presently engages in activities ranging from exploration, through appraisal, to development and production and has partnerships with more than 20 international oil companies. Atlantic Petroleum is unique amongst its peer group of small cap companies in having a broad geographical spread of over 45 licences across UK, Norway, Ireland, Faroes and the Netherlands together with production from three UK fields currently yielding just under 2,000bopd.

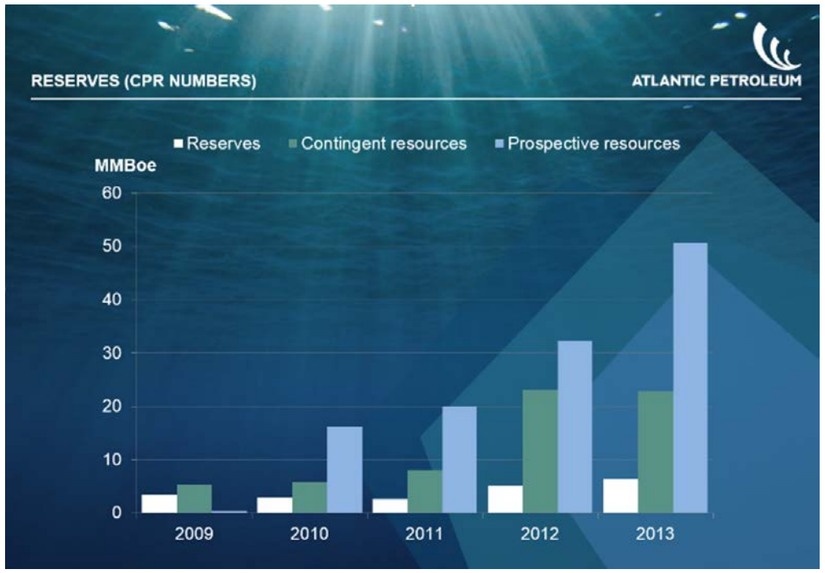
The Company currently has production from three fields in the UK sector of the North Sea and a pipeline of development projects coming to fruition in the next few years that will provide steady organic growth in production and cash flow. The portfolio consists of a wide variety of assets including high impact potential exploration assets.

Atlantic Petroleum is currently a small robust and sustainable company, but the ambition is to grow significantly over the next years. The Company has succeeded in growing the reserves base significantly in the recent years.

It was the ambition to accelerate growth by pursuing existing farm-in opportunities and other exploration opportunities that made Atlantic Petroleum set out to strengthen its financial position further and in 2013 decide to enter Norway and to have an IPO on the Oslo Stock Exchange.

DEBT VS. EQUITY FINANCING

By the end of 2013 Atlantic Petroleum was in a good cash position with a strong – but declining - production and lots of oil in the ground. The reserves base was the Company's largest ever. In addition to having a large portfolio of high impact exploration projects in the pipeline there were several farm-in and farm-out opportunities where the Company could get high impact exploration opportunities with a low downside exposure. To fully pursue the possibilities to grow Atlantic Petroleum needed a capital infusion. The decision to strengthen the financial position by equity financing rather than taking on debt at that stage was based on the long-term nature of the upcoming projects.



Source: Competent Person's Reports by Fugro Robertson (year 2009-2012) & GCA (year end 2013)

The decision was made to do an IPO on Oslo Børs and de-list from Nasdaq OMX Iceland whilst keeping the Nasdaq OMX listing in Copenhagen. The prime reason for the IPO was the Company's ambition to accelerate growth by pursuing farm-in opportunities and other exploration opportunities, especially on the Norwegian Continental Shelf. Atlantic Petroleum considered the Norwegian Continental Shelf to offer a number of quality high-impact exploration opportunities, and based on the Group's acquisition of Emergy Exploration (now Atlantic Petroleum Norge AS) in late 2012 and establishment of a skilled organisation in Norway, Atlantic Petroleum considered itself to be well-positioned for expanding its Norwegian footprint. Additionally, the net proceeds from the offering would increase the robustness of the Company's balance sheet.

Furthermore Oslo Stock Exchange has a strong E&P focus. Norwegian investors and analysts are more familiar with the E&P business, which should mean more attention for the Company and a possibility of increased liquidity in the stock.

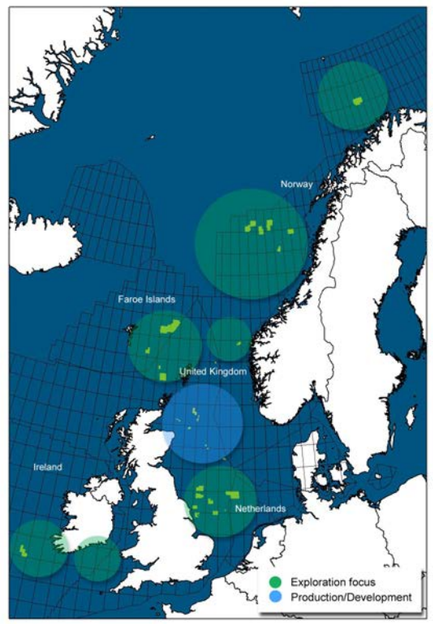
The listing has short term been a partial success. The financial position was strengthened and Atlantic Petroleum is gaining a firm footprint in Norway. The Company attracted a number of new institutional investors, and the number of analysts covering Atlantic Petroleum has increased. However, the liquidity in the stock has failed to increase in the short term. We do believe that the Oslo listing will be a benefit in the longer term, and that when we deliver the market will deliver.

THE WAY FORWARD

Our existing production comes from the Chestnut, Ettrick and Blackbird fields in the UK sector of the North Sea. These fields continue to provide investment opportunities to increase reserves and prolong the field life.

Atlantic Petroleum is involved in several development projects. The first of these is the Orlando field which consists of a subsea tie back to the Ninian Central Platform in the Northern North Sea. First oil is expected in late 2016 at initial net rates of over 2500bopd to Atlantic Petroleum. The second development will be the Kells field which like Orlando is planned to be a subsea tie back to the Ninian Central Platform. First oil is expected in 2017 at net initial rates of just under 2000bopd to Atlantic Petroleum. The third project we are involved with is the Perth field. This field is one of the largest undeveloped accumulations of oil in the UK sector of the North Sea. The exploitation of these reserves has been hampered by the challenging nature of the hydrocarbons and the amount of equipment required to process the fluids. The Perth joint venture group recently entered into a heads of agreement with the Lowlander group (a nearby discovery with similar fluids) to jointly develop the fields. By undertaking a unified approach economies of scale should be realised that will allow the efficient and economic development of these fields.

We are particularly excited by our exploration programme as we exit 2014 and enter 2015. Over the next eighteen months we expect to participate in up to 6 wells. In September of this year we plan to spud a well on the Ivory prospect in the Norwegian Sea. This well, if successful, has the potential to have a massive impact on Atlantic Petroleum. It is located close to the Aasta Hansteen gas condensate development which is due to come onstream in 2017. This development brings infra-structure connecting the Northern Norwegian Sea to the market for the first time (the Polarled pipeline project). Atlantic Petroleum believes there is potential for many more hydrocarbon discoveries in the area surrounding Aasta Hansteen. Over the last two years we have secured positions in 6 licences in the area. We have identified multiple pro-



Atlantic Petroleum portfolio

spects and leads; several of which are supported by DHI (direct hydrocarbon indicators) from the seismic data and positive anomalies on electromagnetic surveys (EM). Similar indications of hydrocarbons can also be seen across the Aasta Hansteen field. The Ivory well will test a prospect that has both a seismic Direct Hydrocarbon Indicator and EM anomaly. If Ivory proves to be successful it will significantly de-risk the other prospects in the area possibly leading to multiple discoveries in our acreage with multi TCF resources.

We also have a very active programme in the UK that is the result of several years' work of building and high grading our portfolio. The largest prospect is the Aurora gas prospect in the Southern North Sea. This is an intra- Carboniferous prospect immediately to the north of the Breagh field. The prospect was first identified on 2D seismic. A 3D seismic survey was acquired in 2013 to improve definition and de-risk the prospect. A prospect like this is very rare in the North Sea these days; it is very large, we estimate multi TCF potential and is located close to shore and export routes.

We are currently drilling the Pegasus West well, also in the Southern North Sea. This is a step out well from the Pegasus discovery made in 2011. It is a modest sized prospect once again located close to infra-structure – the Cavendish field. The well is being designed for later re-entry and early tie back if it is a discovery. Centrica (the operator) estimated gross resources in the Pegasus complex of just under 200 bcf.

The portfolio also includes three further opportunities ready for drilling including two oil prospects (one an appraisal of an oil discovery and the second an exploration well close to existing infra-structure supported by DHIs) and a gas prospect adjacent to a producing field.

Atlantic Petroleum has a sustainable and balanced approach to exploration and production where the near term production funds the short- to mid-term growth through developments and the long term growth opportunities through drilling 3 – 5 exploration wells a year.

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How does the E&P sector on and off the NCS utilize the Norwegian Bond Market?

by Per Gunnar Ølstad, Senior Listing Manager and responsible for the energy sector on Oslo Børs

Per Gunnar Ølstad
Senior Listing Manager and responsible for the energy sector on Oslo Børs

The Norwegian corporate bond market has experienced tremendous growth over the past years and has become a significant source of capital for financing of new companies and projects. An increasing number of international E&P companies have raised capital in the Norwegian bond market. Their bonds are listed on Oslo Børs or Nordic ABM and represent attractive credit risk exposure on new E&P companies for investors in the Norwegian capital market.

Background

Norway has long traditions for capital intensive industries e.g. shipping, offshore and oil & gas and our local investment banks have developed high level competency on the sectors and world class placing power among international investors. Together this combination of traditional industries and investment banking has become a solid foundation for the Norwegian corporate bond market, and today Oslo is considered among the world's leading high yield markets, together with London and New York.

New and strict capital requirements were imposed on the banking sector through the Basel III directive in 2010/2011, as a consequence from the collapse of Lehman Brothers in 2008. The aim is to strengthen the balance sheet of the banks and prevent distress and new bankruptcies. Therefore, access to traditional bank funding has diminished, and companies have been forced to other sources of debt capital e.g. the bond market. Simultaneously credit margins have tightened and the pricing of bonds have become increasingly competitive to bank funding. Companies also appreciate increased diversification in sources for debt capital.

On the supply side, investors have experienced relatively low yields from government bonds and volatile returns in the equity markets over the past few years, which have caused an intensified search for high yield in other asset classes e.g. high yield corporate bonds.

Characteristics of the Norwegian bond market

The level of required documentation when issuing a bond and subsequently listing it on Oslo Børs or Nordic ABM is reasonable compared to other markets. The term sheet, loan agreement and listing documentation are relatively standardized and only moderate legal costs are incurred when preparing documentation. This ensures efficient and speedy processes.

Also, all investment banks and corporate law firms in Norway are familiar with the listing requirements. This is advantageous and allows for the advisers and Oslo Børs to facilitate an efficient listing process to the benefit of the Company and their bond investors. The Genel bond issue, mentioned below, was listed on Nordic ABM within less than 2 weeks after issue, and bonds from existing issuers are normally listed even faster.

Nordic ABM is a listing venue for companies not reporting on IFRS or equivalent accounting standards. Neither does the EU prospectus directive apply. Continuing obligations for the companies, trading rules and market surveillance is similar to on a regulated market. Nordic ABM is

therefore a very good alternative for issuers of bonds reporting on national GAAP principles and wanting to avoid the burden of preparing a full EU prospectus. Nordic ABM has proven to be a great success since it was established in 2005, and currently more than 1000 bonds and a nominal volume of above NOK 400 bn is listed there.

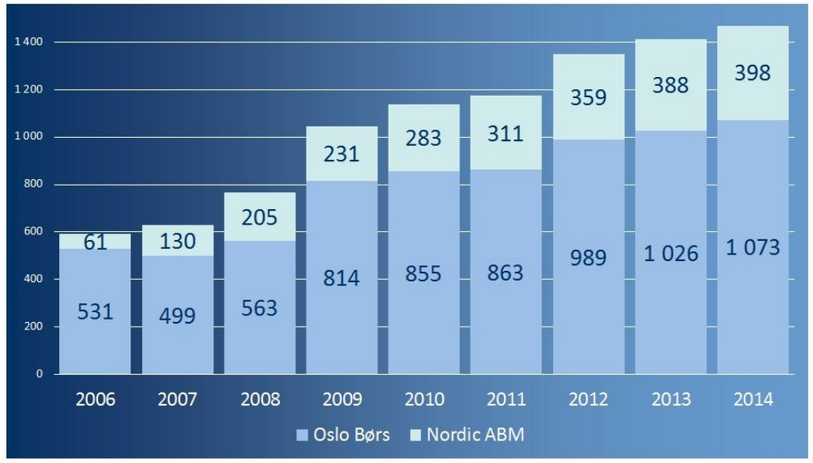
Furthermore, the absence of official rating requirements on high yield bonds, the lack of practice for due diligence and comfort letter from auditors together with limited disclosure of risk factors under Norwegian law also contributes to less documentation and saved costs relative to other markets.

Bonds may well be denominated in other currencies than NOK and this reduces currency risk and costs when entering into swap agreements. This is attractive for international issuers with cash flows in other currencies. Bonds denominated in EUR, USD, GBP, SEK and DKK are listed on Oslo Børs and Nordic ABM.

Finally, Nordic Trustee and their role as a representative for the bondholders has become internationally acknowledged.

Outstanding nominal volume, bonds and certificates

NOK bn



Pr.31.08.2014

Capital (bonds) raised and listed on annual basis

(Including new issues and taps, excluding government bonds)

Pr.31.08.2014

Facts and figures[1]

- Total size of market is approximately NOK 1900 bn.
- Around NOK 1500[2] bn (80%) listed on Oslo Børs or Nordic ABM.
- Corporate bonds represent NOK 400 bn.
- Offshore and oil and gas is close to NOK 120 bn which is nearly 30% of the corporate bonds segment. Above 60% of the offshore /oil & gas segment is listed in Oslo

The role of Oslo Børs in the Bond market

Oslo Børs organizes two markets for corporate bonds, the traditional regulated Oslo Børs market and Nordic ABM. Bonds issued by E&P companies are listed on both markets.

Investors emphasize whether a bond is listed or not. Investors value the company's duty to disclose notifiable information which they become subject to from the time of listing the bond. This ensures investors precise and reliable information from the company. Bonds on Oslo Børs and Nordic ABM are also subject to our market surveillance which secures transparent trading and follow ups on breaches of the company's continuing obligations towards the market participants. This is highly appreciated by the investor community.

Most investors in the bond market are professional, and many are UCITS funds or so called QIBs and their mandates request their bond investments to be listed, sometimes on a regulated market. Oslo Børs and Nordic ABM is line with any investment mandate requiring a bond to be listed, however only Oslo Børs is categorized as a regulated market.

[1]All figures as of September 2014. Sources: www.oslobors.no and www.stamdata.no
[2]Includes government bonds and certificates

International E&P bonds on Oslo Børs and Nordic ABM

The energy sector is the largest sector on Oslo Børs in terms of market cap and number of companies. Oslo Børs has a large E&P sector constituting of companies with assets on and off the Norwegian continental shelf. Since fall 2013 an increasing number of bonds issued by international E&P companies with no prior links to the Norwegian Continental Shelf (NCS) or the Norwegian capital market have been made available on Oslo Børs and Nordic ABM. The investment universe available on Oslo Børs for investors seeking exposure to the E&P sector has increased significantly over a short a short period of time.

Summary of the international E&P bond issues listed on Oslo Børs or Nordic ABM is shown on Table 1.

Norwegian E&P bonds on Oslo Børs and Nordic ABM

Summary of the Norwegian E&P bond issues listed on Oslo Børs or Nordic ABM is shown on Table 2.

Comparative analysis of terms

The key findings from the comparative analysis of the terms of the E&P bonds referred to above were:

·The volume of the international E&P bonds is larger than the Norwegian counterparts.

·The international E&P companies rely primarily on international investors in their bonds, while Norwegian E&P companies rely primarily on Norwegian/Nordic investors.

·International newcomers in the market experience extensive covenants, frequent use of guarantees and pledged assets, while the opposite is the case for Norwegian well known issuers.

·Pareto Securities is the dominant investment bank for international E&P companies

Norwegian E&P companies diversify use of investment banks.

Issuer	Location of assets	Bond volume	Coupon[3]	Market
Genel Energy PLC	Kurdistan Africa	USD 500 mill	7,50%	Oslo Børs
IGas Energy PLC	United Kingdom	USD 180 mill	10,00%	Oslo Børs Nordic ABM
Shamaran Petroleum	Kurdistan	USD 150 mill	11,50%	Oslo Børs
Salamander Energy	Thailand Indonesia	USD 150 mill	9,75%	Nordic ABM
Iona Energy Ltd	UK North Sea	USD 275 mill	9,50%	Nordic ABM
Sterling Resources	North Sea Europe	USD 225 mill	9,00%	Nordic ABM
Xcite Energy Ltd	UK North Sea	USD 135 mill	12,00%	Nordic ABM

Table 1. International E&P bonds on Oslo Børs and Nordic ABM

Issuer	Location of assets	Bond volume	Margin	Market
Det norske Oljeselskap	NCS	NOK 2,5 bn	5,42%[4]	Oslo Børs
Statoil	NCS and international	NOK 3 bn	4,17%[5]	Oslo Børs
DNO	Kurdistan Africa	NOK 1,4 bn	7,50%[6]	Oslo Børs
Noreco	NCS	NOK 3,1	6,00-7,00%[7]	Oslo Børs

Table 2. Norwegian E&P bonds on Oslo Børs and Nordic ABM

[3]All bonds are fixed rate.
[4]Volume weighted margin over 3 month NIBOR
[5]Volume weighted fixed rate
[6]Two bonds, 7,50% margin over 3 month NIBOR and 3 month US LIBOR
[7]Several bonds, different terms and structures.

Creating Value from Uncertainty and Flexibility

by Reidar B Bratvold, Professor of Petroleum Investment & Decision Analysis

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Department of Petroleum Engineering
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Background

One of the most important responsibilities of corporate managers in the petroleum business is to evaluate and choose among major investment projects. The role of analysis in this decision-making is to help identify the alternatives that managers should consider and to support high-quality conversations, using information from throughout the organization, that lead to the best choices possible.

Two concerns are often voiced in the context of these strategic investments. First, there is concern that the analyses and decision-making process frequently do not capture some of the flexibilities associated with projects. Commonly used decision models typically assume that management makes an initial investment decision, and then the project uncertainties are resolved and cash flows are determined. In reality, the firm makes a series of investment decisions as the uncertainties resolve over time. For example, when considering the development of a new oil field, if oil prices, production rates, or reserves exceed their expectations, or if production technology improves, the firm might be able to develop more aggressively or expand to nearby fields. Similarly, if prices, rates, or reserves are below expectations, the firm might be able to scale back planned investments and limit their downside exposure.

A second issue that has long concerned many decision makers and analysts in the petroleum industry is the way cash flows are discounted. Many investments have time horizons as long as 30 or 40 years, and the Net Present Values (NPV) for these investments are extremely sensitive to the discount rate used. Companies calculate NPVs for these projects using a discount rate that reflects their cost of capital and desired rate of return. This discount rate is well above the rate for risk-free borrowing and lending and hence can be viewed as a "risk-adjusted" discount rate. There is concern, particularly among decision-makers in the exploration and new ventures parts of the business, that the blanket use of such a risk-adjusted discount rate causes them to undervalue projects with long time horizons.

With these issues in mind, recent theoretical developments in how to value flexibilities, or options, should be considered. In this approach, one views projects as analogous to put or call options on a stock and values them using augmented versions of techniques like those developed by Black, Scholes, and Merton in 1973, to value put and call options on stocks. These methods explicitly model and value the decision maker's ability to make decisions (e.g., "exercise the option") after some uncertainties are resolved and do not require the use of a risk-adjusted discount rate. Thus, these new techniques appear to have the potential to address both of the concerns voiced above.

Modeling Flexibility

Some companies already routinely use a limited form of decision-tree analysis (DTA) to analyze a few select types of flexibility. Unfortunately, this type of DTA often has a focus on "making a decision now" which may lead decision-makers to overlook future options in the analysis. To incorporate options, we need to put them on the table in the early phases of the analysis in order to consider both current and future decisions. Being creative in thinking about and generating future options will, in most cases, increase value creation.

Consider the development decision for a large offshore project as an example. Assume that a significant amount of exploratory drilling has been conducted resulting in the identification of substantial reserves. However, there is still large uncertainty about the extent of the field and the total reserves. A common model for such a project is shown in a simple decision tree in Figure 1.

The only decision considered in this model is the current decision of whether to proceed with the project. Three uncertainties are included: reserves, prices, and costs. Each price scenario represents a sequence of annual oil prices, going out for approximately 30 years. Frequently in discounted cash-flow (DCF) valuations, "conservative" assumptions about the price variables are used to generate information about what "value" could look like if things proceed poorly. The resulting corporate planning price is sometimes

Figure 1: Decision tree for "Decide Now" decision

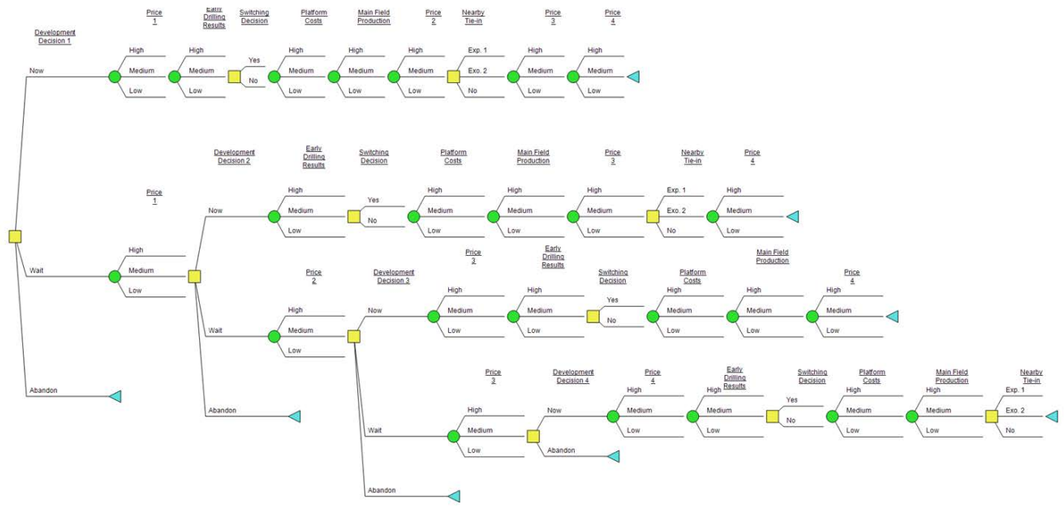


Figure 2: Decision tree with downstream decisions

called the "expected"[1] price, and the investment is also "valued" using a high and a low price.[2] This is sensitivity analysis or stress testing, not a means of incorporating price uncertainty into the valuation.

Similarly, the cost and reserve uncertainties represent a sequence of costs and production rates (and associated drilling expenditures) for each year, going out about 30 years. The distribution for reserves is usually calculated using a complex model that considered uncertainty about reserves in the as yet unexplored areas, the uncertainty in production rates, as well as many other factors. The values at the end of the tree represent NPVs of cash flows determined using an economic model that includes complex tax calculations. The result of the analysis in this example is a project with a positive expected NPV but a significant chance of having a negative NPV. The project is viewed as marginal because its expected NPV is small compared to the amount of capital required.

In such investment opportunities there are significant flexibilities that are not captured in the original analysis. Because the project in our example is marginal and its value is very sensitive to oil prices, it can be viewed as being like a call option: Although the project is marginal at current prices, it could have considerable value if prices were to rise at some point in the future. There are also several expansion options in that one can use the platform and facilities constructed for this project to develop (or "tie in") other nearby fields when production at the main field declines. There are also gas reserves in the reservoir that provides an option to switch from oil to gas production when the cashflows from the oil production become marginal. Finally, there is an abandonment option in that the field could be abandoned at any time if continued production appears to be uneconomic. The "decide now" decision tree shown in Figure 1 is typical in its lack of delayed (or "downstream") decisions.

The first step in analyzing the options associated with the project is to construct a new decision tree (Figure 2) for the project that incorporates these previously unmodeled options as well as the key uncertainties in our model. The result is a decision tree that is significantly "richer" than the "decide now" tree depicted in Figure 1. This tree has more than 50,000 endpoints and includes a rich spreadsheet-based cashflow model. This tree includes significantly more uncertainties and decisions than a typical tree. Even so, the model takes only a few minutes to run on a PC.

An alternative approach to evaluating these flexible decision models is to use dynamic programming techniques such as Least-Squares Monte Carlo (LSM). In this approach for valuing options, we build a Monte Carlo simulation model that takes into account all of the uncertainties in the problem, which can then be used to calculate expected NPVs for any given exercise policy. To calculate an optimal exercise policy, at each decision point, we need to examine the expected future NPV for each alternative, conditioned on the resolution of all uncertainties up to that time. The optimal policy is found by selecting the alternative which maximizes the future NPV in a given information state. Using the LSM approach, the max future NPV is obtained by comparing the exercise values with the continuation value. The continuation values are estimated using least squares regression.

The LSM method is very general. However, although the complexity of the procedure is relatively insensitive to the number of uncertainties in the problem, its complexity grows with the number of decisions and alternatives in the problem in the same way as decision trees. In general, we need to perform regression analysis to estimate conditional expectations for each alternative of each decision in the model, working backwards from the last decision towards the first.

Benefits of Modeling Flexibilities

To create value from uncertainty and flexibility, we must assess and solve more complex decision models. Incorporating flexibilities can only increase the project values because one could always choose the base case alternative assumed in the model without flexibilities. In practice, project managers do respond to the resolution of uncertainties over time and make decisions accordingly. In general, these kinds of options are difficult to value intuitively. Without explicitly modeling the uncertainties we cannot put a value on the flexibilities and without being able to put a

[1]For most firms, the price curves used are not actually expected prices; rather, companies decide to control expenditures by using "conservative" prices. In fact, many companies have boasted of their conservativeness in this regard. The expressed logic is that by using conservative price forecasts, they can be sure the projects are robust and that only the best projects will be funded. This second reason requires an assumption that the company is capital constrained to be even internally consistent, much less to be correct. The fact that the price curves are not expected prices but are risked is critical to valuation, both to the absolute valuation and the relative valuation of the alternatives. Thus, firms mix expected costs with risked revenues to generate a set of cashflows that are neither explicitly risked nor expected.

[2]Companies often refer to the low and high price values as the P10 and P90 value, respectively, although, clearly, they are not P10 and P90 values drawn from the underlying distribution.

value on the flexibilities, we tend not to worry about them.

A second and more important benefit is that in modeling flexibilities we often identify new options and strategies. While some options might be discovered in due course (in which case the benefit of identifying them now is through the improved measurement of the value of the project), some of them might be lost if they are not identified up front and steps are taken to preserve the flexibilities.

A final benefit from modeling flexibilities is the set of optimal policies generated by the analysis. While the traditional analysis (the "decide now" focus) generates an initial decision and value, the models that incorporate these downstream decisions generate an optimal policy that specifies, for example, when the project should be developed, when production should be shifted to nearby fields and when the production should be switched from oil to gas. Such a policy might say, for example, "Initiate the development when oil prices reach $115 per barrel" or "If oil prices are below $80 per barrel, gas prices are above $3.80 per million BTU and oil production is below 1,000 barrels a day, then switch to gas production." These kinds of results provide decision-makers with "signposts" that suggest changes to (or at least a re-evaluation of) their operating procedures under certain conditions.

Valuing Risky Cash Flows

In the classical discounted cash flow (DCF) approach to valuation, the net present value (NPV) of a project is calculated by discounting the future expected values using a discount rate that reflects the cost of capital and desired rate of return. This discount rate is markedly higher than the prevailing risk-free interest rate and hence can be viewed as a risk-adjusted discount rate. Furthermore, most corporations use a single discount rate in the analysis of all projects or, at best, establish different discount rates for only a few large classes (e.g., political, pipeline installation vs. new field development) of investment decisions. This one-size-fits-all approach to dealing with projects mimics the risks of the overall firm, but it fails to reflect the variety of projects that feature different types and levels of uncertainty. Furthermore, using risk- adjusted discount rates often leads to an undervaluation of oil and gas projects with long-time horizons.

While the classical DCF approach may, in some sense, be right "on average" for the company, it can lead to trouble when applied to projects that are significantly different from the firm as a whole. If we want to use risk-adjusted discount rates, we should use different discount rates for different projects, evaluating each on the basis of their own cost of capital. To do this, we need to somehow estimate the correlation between the project returns and the market as a whole, either by identifying betas for firms that are "similar in risk" to the project or by making a difficult, subjective estimate of the beta.[3] Given a flexible project, we might need to go one step further and use different discount rates for different time periods and different scenarios as the risks of a project may change over time, depending on how uncertainties unfold and decision-makers react. For our project example, the risks associated with the later cash flows are very different in the case where we choose to expand development as compared to the cases where we abandon the project after the main field declines. While, in principle, we could use time- and state-varying discount rates to value flexible projects, it becomes very difficult to determine the appropriate discount rates to be used in this framework.

Rather than risk-adjusting discount rates to capture risk premiums, the market-based approach use a fully risk-neutral approach where we construct a single, coherent risk-neutral model and use it to estimate the value of the project. In this approach, we would risk-adjust the probabilities or processes associated with the uncertainties or stochastic factors in the model (e.g., oil prices and the production) and calculate the value of any investment by determining its expected NPV using these risk-neutral probabilities or processes and discounting at the risk-free rate. Due to space limitations, we will not get into further details of why this makes sense other than to say that using the fully risk-neutral approach in situations where the project cannot be perfectly replicated by trading securities can be justified in two different ways: by (1) using an equilibrium model of asset prices and (2) using a decision-analytic valuation procedure.

In the market-based approach, the probabilities or processes associated with the uncertainties or stochastic factors in the model (e.g., oil prices or production) are risk-adjusted. The value of the investment is then calculated by determining its expected NPV using the risk-adjusted probabilities or processes for market risks and subject-matter-experts[4] (SME) probabilities for private risks—all discounted at the risk-free rate. Risks that fall somewhere between market and private (e.g., rig-rate risks) are assessed as SME probabilities conditional on the concurrent market state.

To value general options, we need to use models that consider the evolution of the underlying uncertainties directly. In our example, such a direct model would consider uncertainty in both oil & gas prices and production over time.[5] For market based uncertainties the value of each security should be equal to its expected future value, where expectations are calculated using risk-adjusted probabilities and discounting is done at the risk-free rate. For example, if we use a mean-reverting price model for the oil price, we select the parameters to minimize the squared errors in futures and options prices, where the errors are the differences between the discounted expected values calculated by the model and the prices listed on the relevant stock exchange. In this approach, the futures prices should be equal to the expected (risk-adjusted) oil price. In Figure 3 we see that the expected values of the mean-reverting process provide a very good fit to the futures prices. The option prices provide information about the uncertainty in these risk-adjusted price forecasts. To place the option prices back on the same scale as the futures prices, we use the listed options prices to estimate confidence bands (10th and 90th percentiles) for the risk-adjusted distribution for oil prices in the month of expiration, using the current price for options expiring in that month. Comparing these implied confidence bands to those from the mean-reverting model, we see that the estimated put and call prices generated by the mean-reverting model are very close to their true prices.

One challenge in using the futures and options markets to generate the risk-adjusted oil price forecasts is that the maturities of the exchange-traded futures and options contracts are much shorter than the time horizons of the projects we are interested in evaluating. While the projects may last 30 or 40 years, the futures contracts go out about 8 years and the options contracts only a few months.[6] Thus, we need to somehow extrapolate from these shorter term risk-adjusted forecasts. In performing this extrapolation, it is important to remember that we are not attempting to forecast what oil prices will be in the future. Instead, we are asking what an oil futures or option contract maturing in say, 2020, would trade for today: it is not the firm's projections of future oil prices that matters, so much as the current market assessment. Here, we extrapolate using our mean-reverting price model, estimating its parameters with the near-term market data and assuming these estimates hold going forward.

The market-based approach is used without questions when valuing derivative securities. It has, however, been tough to sell in corporate contexts. Its use can make a big difference in values and strategies particularly for projects with long time horizons and significant uncertainties and flexibilities. The approach has broad applicability is logically correct and no more difficult to implement than the conventional risk-adjusted discount rate approach. It provides the benefit of highlighting the interaction between market and private risks. Using market-based valuation requires a shift away from the risk-adjusted discount rate mindset. An obvious benefit of this shift is the lack of need to choose, sometimes seemingly arbitrary, a risk-adjusted discount rate.

[3] "Beta" comes from the Capital Asset Pricing Model (CAPM) and is a measure of the risk arising from exposure to general market movements as opposed to idiosyncratic factors.
[4] The firm's geoscientists, engineers, economists, lawyers, etc.
[5] Note that the goal is not to try to predict the actual future price or production. Trying to predict the actual future values is an exercise in futility and, luckily, we don't need them for valuation and decision-making. The goal is to describe the possible price and production levels and their probabilities; i.e., the uncertainty in these values.
[6] Longer maturity futures and options are currently traded over-the-counter, though prices for such contracts are not readily available to those not active in those markets.

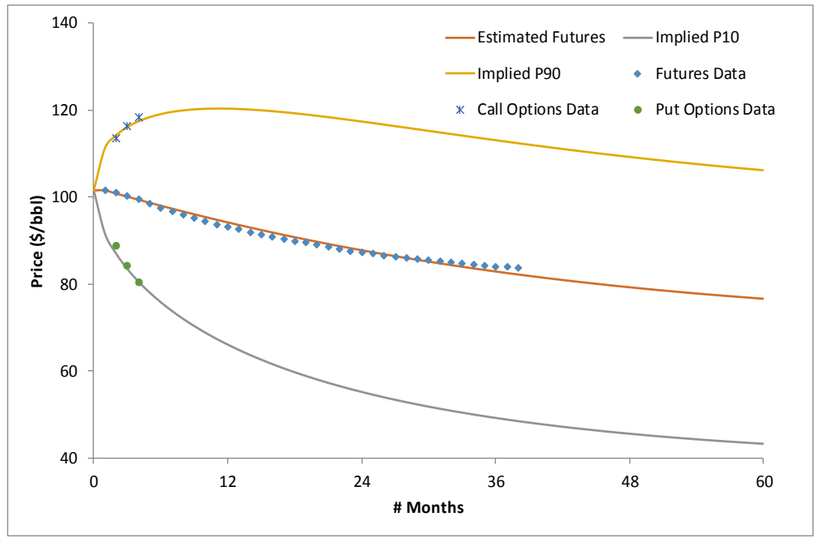


Figure 3: Price-process calibrated to futures and options

Summary

Despite the ubiquity of options in business and everyday life, in practice we find that embedded options are often overlooked in the formulation and evaluation of decision problems, even when uncertainties are explicitly modeled. One possible reason for this is the difficulty of evaluating decision problems that include many downstream decisions. To properly evaluate these downstream decisions, we must model not only the downstream decisions, but also the information available at the time these decisions are made. While decision analysts have developed techniques for assessing probabilities for simple random variables, with flexible decision models, we need to consider some complex conditional probability or stochastic process assessments representing key uncertainties. As shown in Figure 4, significant value can be created by including downstream options in the early analysis.

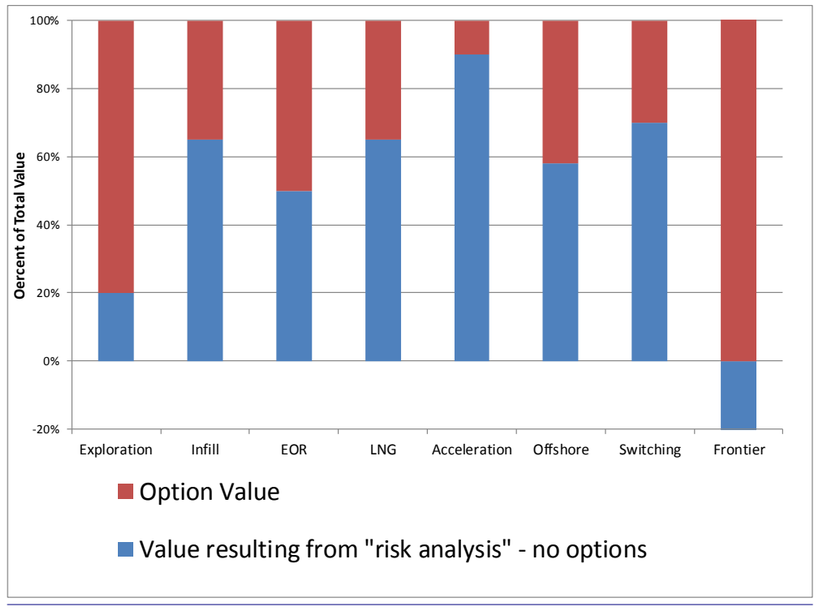


Figure 4: Option values

The real options approach recognizes the value-creation potential resulting from decision-makers' active management of their investments over time. My goal has been to help the readers better understand methods for modeling and creating value from uncertainty and flexibility. Although some of the methods discussed here—risk-neutral valuation and Monte Carlo methods for dynamic programming—may be unfamiliar to many of the readers, these tools can be quite useful for modeling project dynamics and options. The tools that many oil & gas professionals know well—including decision trees and probability assessment methods—are also quite helpful for modeling project dynamics and options.

Acknowledgement

In writing this article, I have borrowed liberally from the writings of several of the leading researchers and practitioners in real option valuation including Jim Smith, Luiz Brandao, Jim Dyer, Joe Hahn and David Laughton.

Transactions in the NSC License Market

by Olav Hasaas, Partner / Head of Energy Group, Kluge Advokatfirma AS

Olav Hasaas
Partner
/ Head of Energy Group
at
Kluge Advokatfirma AS

The NCS has seen a record amount of license transactions over the recent years. A key driver seems to be that some companies are looking at divestments as a tool to raise cash and reduce future investment commitments while other companies are using acquisitions to grow their business.

This shift in market dynamics has given rise to a number of large transactions, often exceeding USD 1 billion in value. The most prominent examples have been Statoil's sale of interests in large producing fields to buyers including Centrica, Wintershall and OMV.

With the introduction of annual Awards in Predefined Areas (APA) in 2003, and a favourable tax refund system for exploration costs, a number of smaller exploration focused companies have entered the NCS. These companies often rely on "cashing out" on their exploration successes rather than participating in a field development project where investment costs are high and no tax refund regime available. As an alternative to selling the discoveries, these companies may buy producing assets in order to be able to take advantage of the tax depreciations generated by the investment project. Det norske's acquisition of Marathon's NCS portfolio is an example of the latter approach.

It is generally recognised that the NCS has a stable and efficient regulatory framework for sale and purchase of license interests. This is important as it gives both parties predictability for its investments and limits the risks associated with the transaction. There are however several key risk factors that need to be properly managed by seller and buyer through the transaction process. These risk factors should be identified and managed through the due diligence process and ultimately addressed in the sale and purchase agreement (SPA) between the parties.

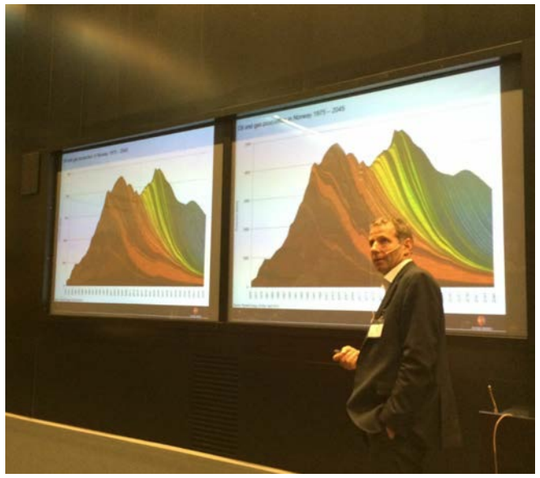
The NCS is now generally recognized as a mature oil province. This means that a number of the transactions involve fields that are approaching the tail-end phase. In these transactions, the decommissioning liability will often be a challenging issue. The Petroleum Act stipulates that a seller of an interest in a producing facility will remain liable for the abandonment cost if it turns out that the buyer is unable to cover these costs when the relevant facilities are being closed down.

Most sellers will therefore require that the buyer provides some form of security for this potential future exposure. Usually, the parties will negotiate a Decommissioning Security Agreement (DSA) separate from the SPA, which normally are financially backed by a parent company or bank guarantee. The SPA/DSA could also include a repurchase opinion for seller should its liability enter into effect.

This illustrates that NCS companies looking to grow their business through acquiring producing fields must focus on risk management in the transaction process. Despite these challenges, we are confident that we will see a continued high level of transaction actively on the NCS in the years to come.

In 2013 Statoil sold a share in the Gudrun field to OMV
Photo Harald Pettersen, Statoil

Panel discussion: What is the outlook for the Norwegian oil and gas industry?



Picture 1. Jarand Rystad (Rystad Energy) presenting "Oil price outlook and costs in NCS: Activity driven versus price-driven"

Prior to the panel debate Jarand Rystad from Rystad Energy introduced the subject by presenting facts and graphs on the activity on the Norwegian Continental Shelf (NCS), in his presentation "Oil price outlook and costs on NCS: Activity driven versus price driven" (see picture 1).

Speakers on the panel discussion were Henrik Zetlitz Nessler, Partner, PwC; John Olaisen, Analyst, ABG Sundal Collier; Arild Dybvig, VP, Strategy and Business Development, Statoil; Jarand Rystad, Managing Partner, Rystad Energy; Terje Skogen, Regional Sales Manager NCS & Denmark, FMC Technologies; Moderator - Teodor Sveen Nilsen, Analyst, Swedbank (see picture 2).

Some brief excerpts of the Panel Debate can be found on the SPE web site /Resources.

Picture 2. Panel discussion

"SPEs agenda represented a varied and highly relevant agenda from an E&P industry perspective.

Direct participation and interaction by industry players always put an extra edge to the program.

This years' panel debate was no exception. The issues of the debate comprised highly representative of challenges of today, and triggered open and honest views from both from the participants.

As always, Jarands (Rystad) industry analysis and trends acted as an excellent play up to the views from the upstream, (Statoil) supplier (FMC) and "investor" (ABG, PWC, SWEDBANK) perspective. The vibrant activity level and prospective outlook on the NCS must be balanced with the need and efforts to break the industry's non-sustainable cost escalation and efficiency losses. This can only happen in full and constructive collaboration between the operators and suppliers. There appears to be a common view that the approach to date is quite different, more constructive and systematic compared to previous cost cutting exercises. As a Statoil representative, I am very pleased to receive such feedback and look forward continue working towards higher industry and NCS competitiveness.

The debate was well orchestrated by Teodor, the views and participation from the panel members well balanced.

I'd like to thank the program committee for the session, repeat it at the next occasion, and do leave even more time and space for the audience to contribute with challenging questions and views."

- Arild Dybvig, VP Strategy and Business Development, Statoil

Upstream project values

by Arvid Elvsborg, Managing Director IPRES and Lars Rustad, Senior Consultant IPRISK

Arvid Elvsborg
Managing Director
IPRES

IPRES Norway AS is a software development company providing advanced tools to the upstream petroleum industry. We focus on integrated decision support with full stochastic uncertainty/risk handling for major asset investment projects and resource management which is important parts of Enterprise Risk and Enterprise Performance Management systems.

At the SPE finance seminar 4th June we presented some highlights from the use of IPRISK to show how a systematic stochastic approach to decision support secure optimised results compared to the more traditional deterministic methods. This means an integrated and consistent approach to asset valuation along the upstream value chain (Fig. 1) and represent a wide range of projects and decision processes.

Lars Rustad
Senior Consultant
IPRISK

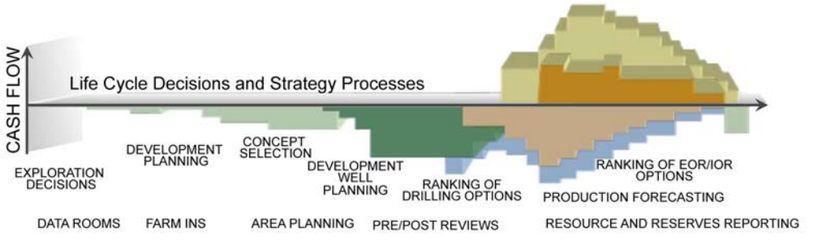


Fig. 1 Upstream value chain and Decision processes covered by IPRES tools

The main challenge in the upstream oil industry is the complexity of the projects regarding types and amount of data and the large uncertainties in the most important parameters. Fig. 2 illustrates some of the typical challenges in an offshore development project where only one discovery and a possible undrilled prospect are considered. In most cases it is even more complex with several discoveries, prospects and already producing fields evaluated in an area asset development. This is also an excellent way to create the integrated teamwork necessary between all the key speciality disciplines involved. As part of the team work high level simulation models of some options can easily be built to investigate if they are models of interest to carry forward towards the final decision.

IPRES has structured the input

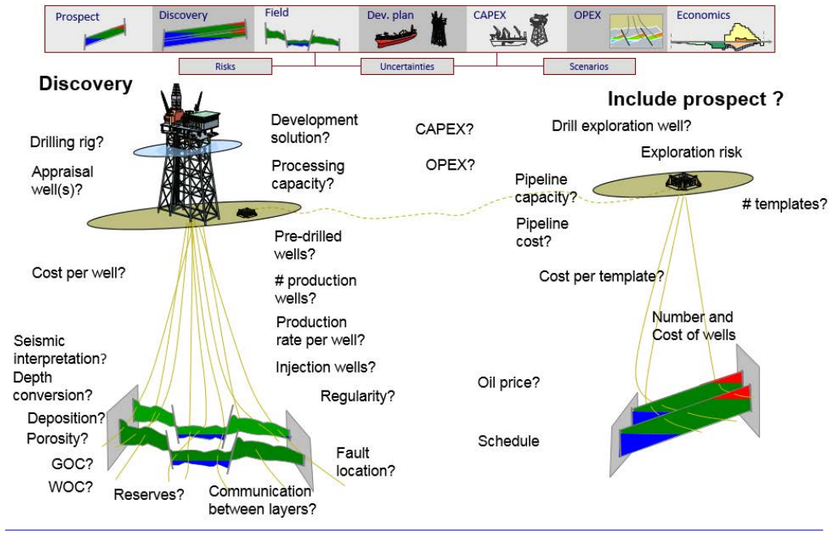


Fig. 2 IPRISK – Development Project Uncertainties (offshore example)

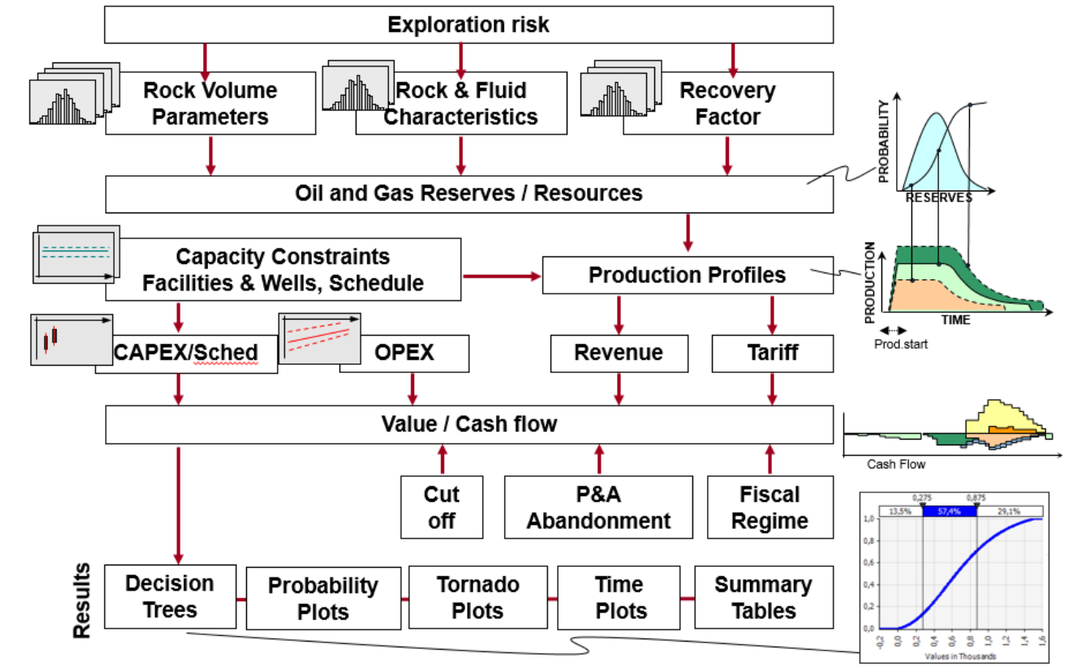


Fig. 3 Integrated Development Assessment

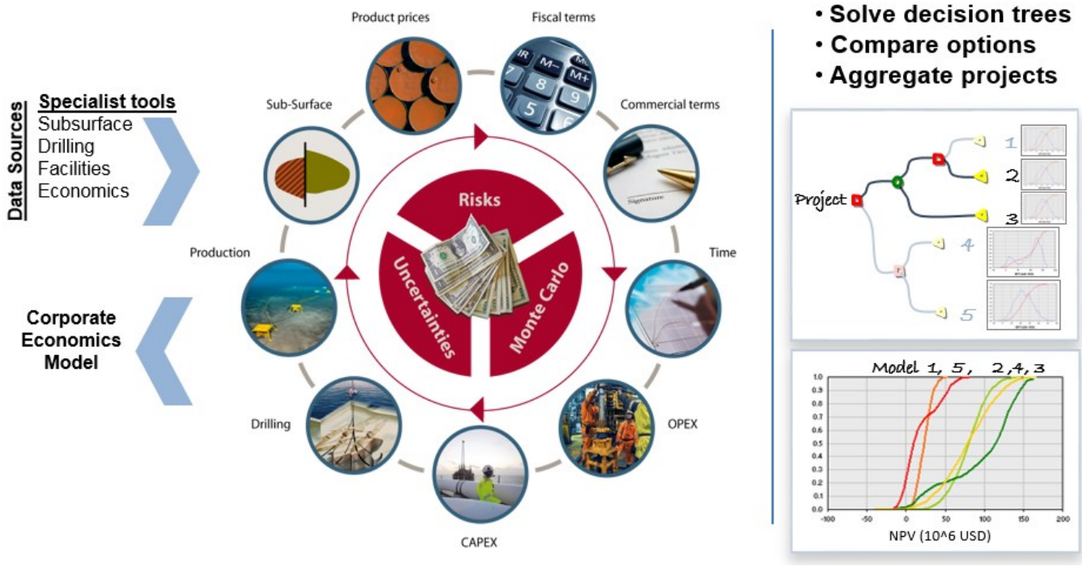


Fig. 4 IPRISK® Value Simulation Model – An Integration Platform The next generation solution

from all specialist disciplines necessary as shown in Fig. 3 including stochastic uncertainty on all parameters. The alternative development options are simulated with a Monte Carlo engine, Fig. 4, making it possible to evaluate the full range of value both for each option and also screen and compare in detail all options.

The integrated and consistent approach to asset valuation along the upstream value chain with full uncertainty handling makes it also easy to compare the risks involved using Tornado diagrams, Fig. 5, to analyse the effect of all main parameters within the most important disciplines: subsurface (reserves, production), drilling (DRILLEX, time, events), facilities (CAPEX, capacities, time, events), economics product prices, inflation, discount rate, fiscal regimes, time).

Scheduling/timing of all parts of the project is usually one of the biggest uncertainties and

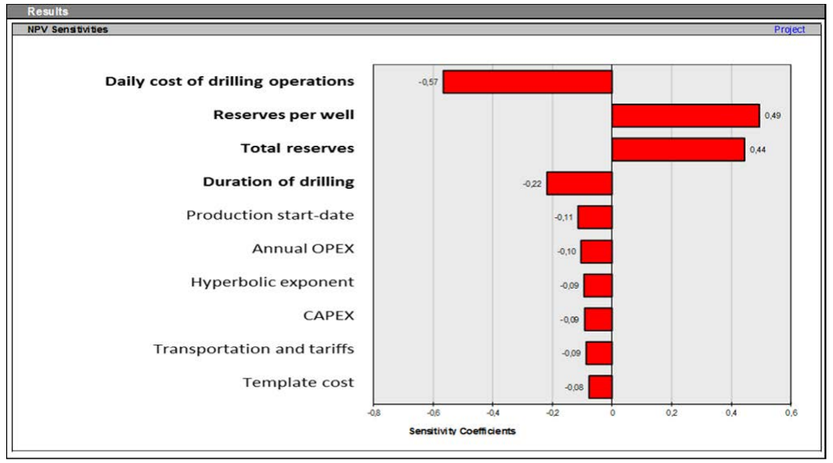


Fig. 5 Tornado diagram showing some key parameters effect on NPV

risks since so many parameters are time dependent and influencing on economic value. Controlling the timing of all parts of the project is much easier in such a consistent fully integrated simulation model compared to most other solutions available. This makes it easy to update all scheduling options in a project quickly saving time to analyse and improve results rather than spending time on input and calculations.

Through empirical studies it has been documented that Oil and Gas companies in general are risk averse in a non-systematic way. The industry in itself are subject to significant systematic (product prices, market changes, etc.) and unsystematic risk (volumes, technical solutions, etc.). To maximise company and shareholder value it should be logical to accept and treat the risks of the industry consistently by using a combination of decision trees and stochastic modelling on single assets and portfolio's illustrated in Fig. 6.

The expected financial exposure of a company's oil and gas portfolio should of course be dependent on the size and financial strength of the company.

How will such a decision methodology affect company value over time?

To illustrate this we have made the following simplified, schematic example:

- An E&P company has limited managerial and financial capacity.
- Develops one new asset per 5 year within a 20 year period
- Several assets available for development
- Example simplified to 2 asset types
- Discovery 1: Oil discovery, limited volumetric upside, subsea tie in to third party for processing
- Discovery 2: Oil discovery, high volumetric upside, higher CAPEX due to own processing (FPSO)
- Decision methodology: Stochastic or Deterministic

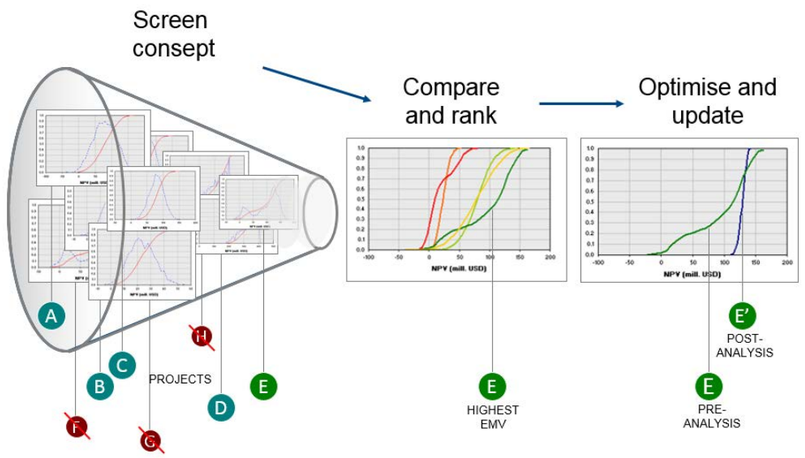


Fig. 6 IPRISK Field Workflow

In the plot, Fig. 7 below we have compared NPV for the 2 asset types, shown both with stochastic and deterministic evaluation.

A company which only uses a pure deterministic approach will choose Discovery 1, due to highest "Base case" value.

A company which uses a stochastic approach will choose Discovery 2, due to the highest Expected (Mean) value.

The cumulative value of a company portfolio represented by repeated investments in one new asset every five years, a total of four times, is illustrated in Fig. 8.

The difference in portfolio value in this example is 80 % higher (NPV after tax) if each decision is based on stochastic methods rather than a deterministic method.

The methodology with full stochastic uncertainty handling has proved that decisions are optimised, often as much as 30-40%, compared to the traditional deterministic way both on single projects and even more on a portfolio or group of portfolios of asset development projects as shown here with an example of 80% added value.

It is documented that the financial benefits is increased shareholder value by this consistent approach to uncertainty and risk evaluation of each asset and portfolios by

- Reduction in suboptimal asset/field development decisions
- Reduction in suboptimal well prioritisations
- Efficient integration of the entire, integrated value chain with uncertainty
- Time saved when performing analysis iterations and updates
- Time and costs saved by standardisation
- Reduced probability of errors

And now with the increased focus on better revenue on each project and at corporate level, it is expected that more effective integrated work processes will get a lot of attention in all companies globally, Fig. 9. The increasingly technically and commercially complex projects with challenging margins will lead to more focus to develop integrated teams for decision support using advanced methodology and tools for effective and more optimal decisions on all asset development projects.

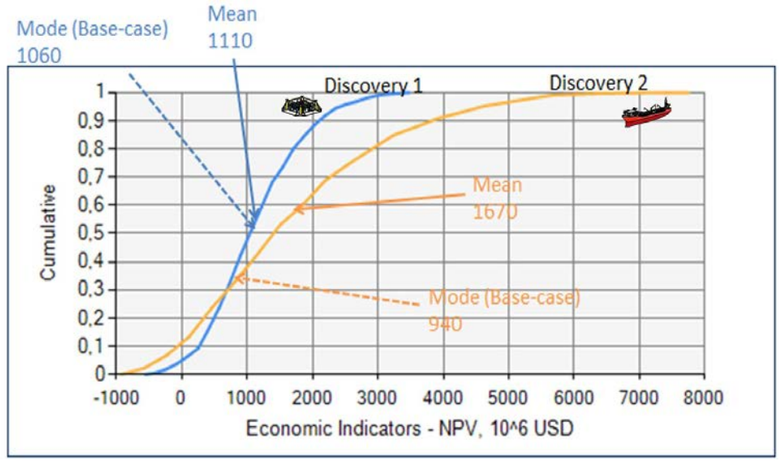


Fig. 7 Investment example: Comparison of Deterministic and Stochastic approach

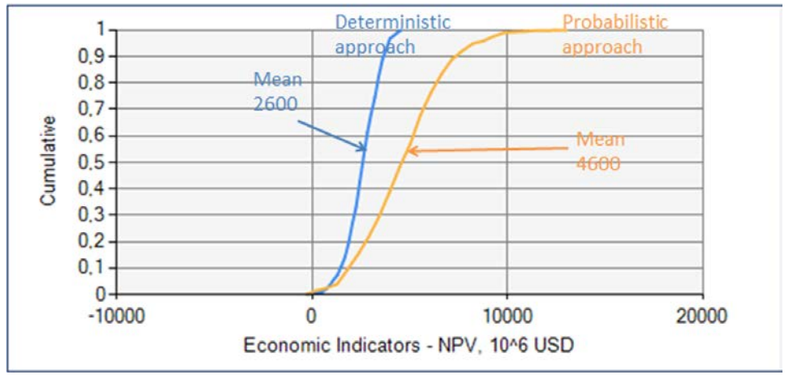


Fig. 8 Value of portfolio. Stochastic vs. Deterministic decision making

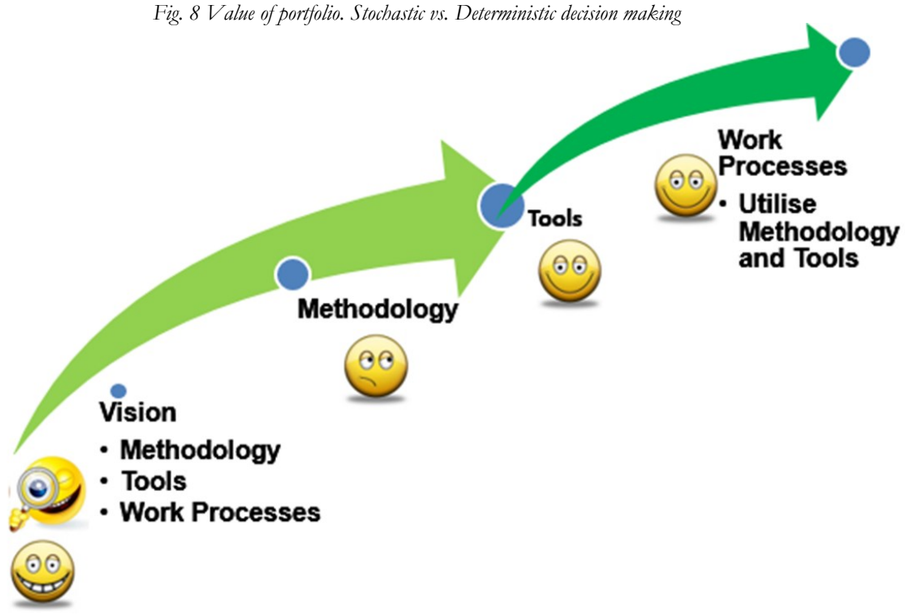


Fig. 9 Stochastic Approach the New level of Decision Analysis

Financial considerations: How to avoid financial failure

Swedbank

Overview

Teodor Sveen Nilsen
Analyst, Swedbank

Teodor Sveen Nilsen is a highly reputable analyst, covering the E&P companies listed on Oslo Børs and Oslo Axess. His presentation "E&P – How to avoid financial failure" on the Seminar **Financing E&P Companies and Projects on NCS** June 4, 2014 focused on the fact that while E&P companies are able to raise financing, many of them end up in financial problems. He presented a list of various companies and their story of success or failure, and provided a "lessons learned" from each of them.

In this overview you will find case studies for several companies, and lessons learned from a financial prospective.

He suggested the following steps to avoid financial failure:

•Raise capital when the market is open

-Successful companies have raised money when the market was open.

•Know when and where to get cash

-Shareholders with deep pockets are valuable.

•Know how to utilize bond market

-When issued at the right time and in the right amount, bonds are a great supplement to bank debt and may be used to fund production or close to producing assets

•Deliver on operational strategy

-A credible financial strategy cannot replace operational results.

His presentation represents the view of Swedbank's E&P research team.

The full presentation of Teodor Sveen Nilsen can be found on the SPE Oslo web site /Resources

Case 1: Noreco – 2013 was a challenging year

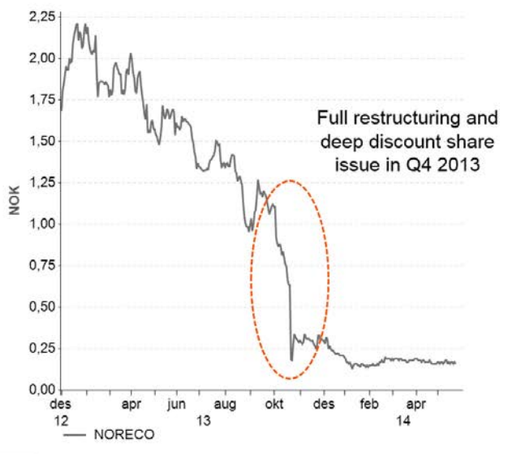
Substantial restructuring

- Situation much worse than expected
- Proposed debt structure probably the only option
- Deep discount share issue

Current situation

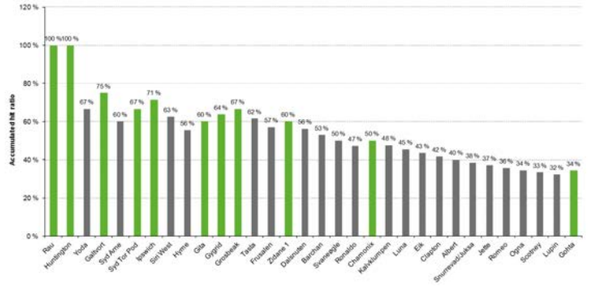
- Still uncertainty in Denmark
- Huntington delivers strong production on the best days
- Reversed share split could be on the horizon

Noreco's share price



Gohta: Noreco's first commercial discovery since October 2010 (Zidane)

Accumulated hit ratio (grey = dry wells, green = geological or commercial discoveries)



Lessons learned

1. Financial + operational gearing is a risky combination
2. Print equity when the market is open
3. Avoid too much (and expensive) debt

Case 2: Rocksource – Pil has changed the company

A bumpy ride

- Promising EM positive prospects announced in 2011
- Equity raised on attractive terms in 2011
- A number of dry wells in 2011, lower activity in 2012-13
- Pil discovery in March 2014 looks promising

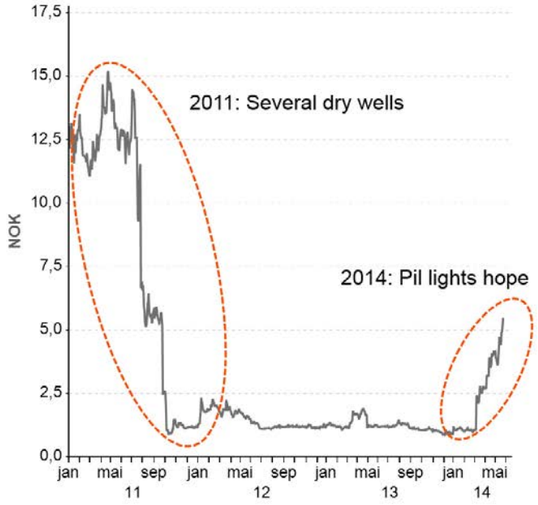
Current situation

- Runs out of cash in 2014e unless more funding is obtained
- Rights issue proposed (ongoing process)
- Pil needs to be divested

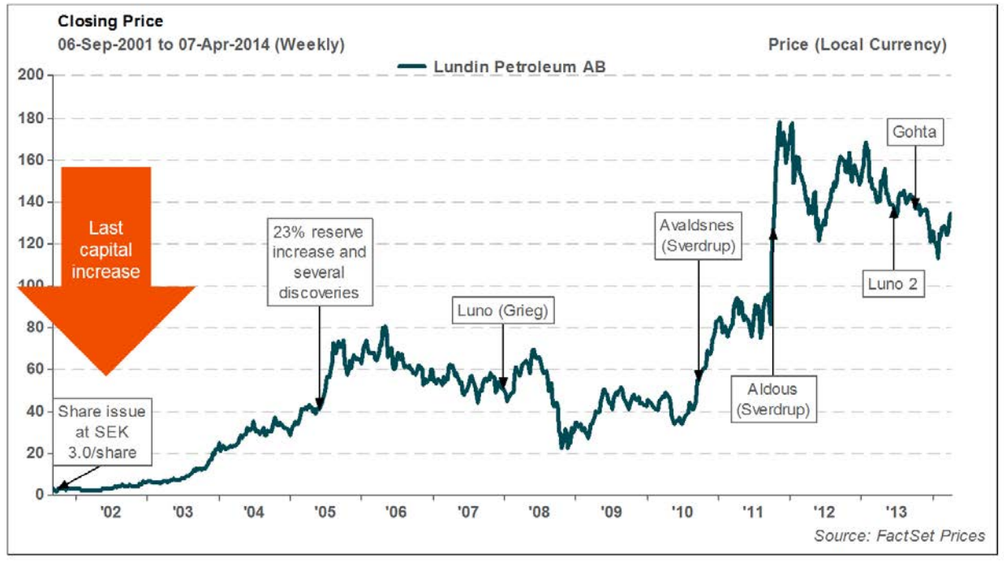
Lessons learned

1. Print equity when the market is open (as in 2011)
2. Extremely hard to issue public equity with a mixed track record

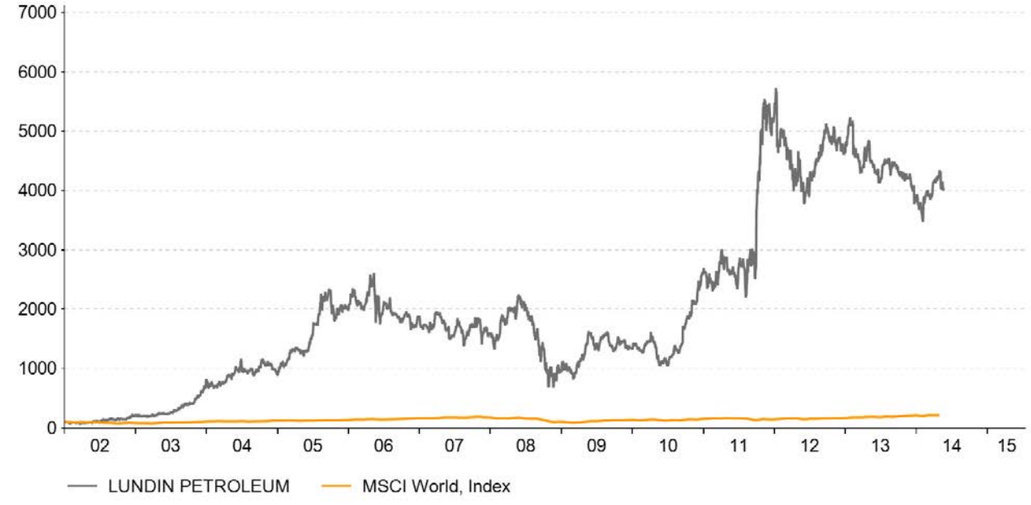
Rocksource's share price (adjusted for rev. split)



Case 3: Lundin – Among the world's best E&P companies

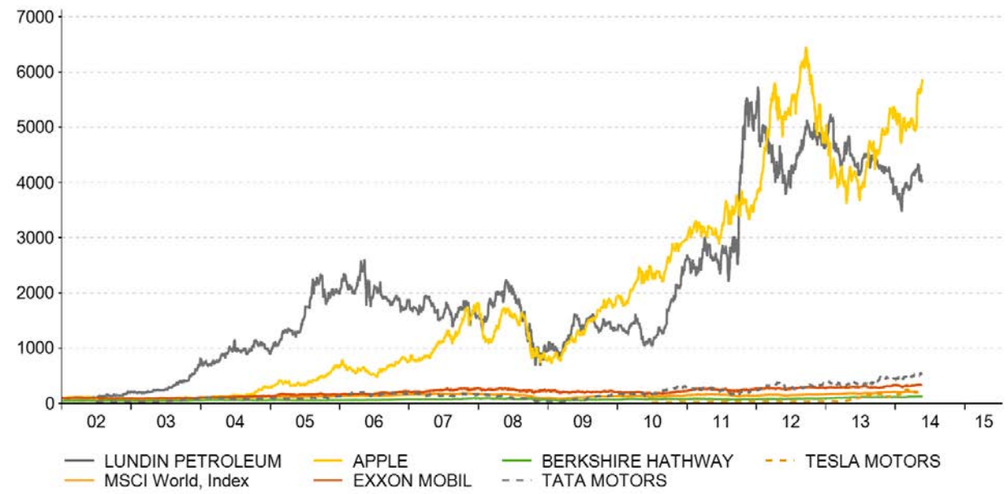


LUPE versus global equity markets (indexed to 100 in primo 2002)



...even when compared to other great companies

LUPE versus global equity markets (indexed to 100 in primo 2002)

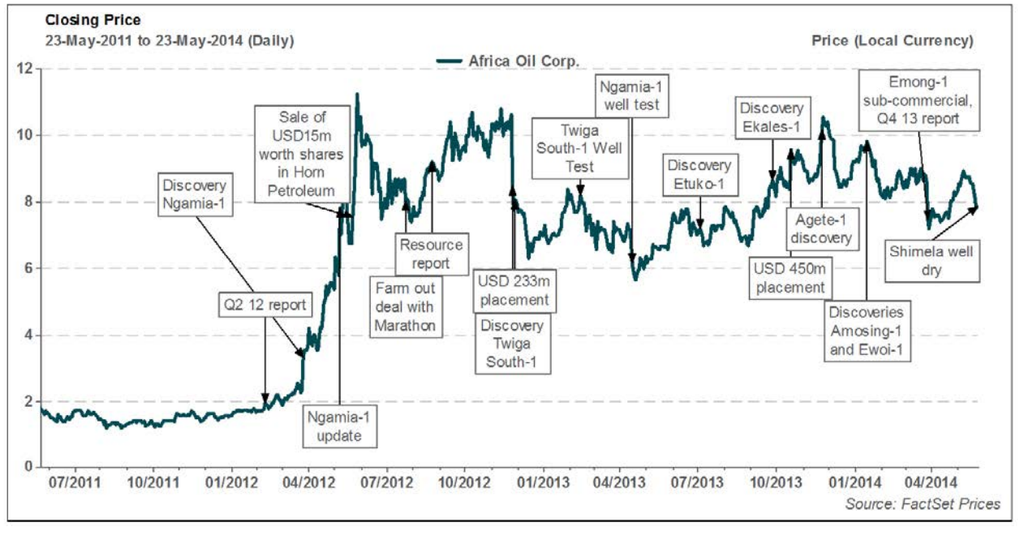


Lundin – lessons learned

1. Raise money when the market is open
2. Top-quality management creates value
3. Top-quality shareholders (no doubt about that cash will be available if needed)
4. Strong operational results
5. Disciplined capital spending – spend as you earn
6. No or little use of debt before operational cash flow is strong
7. Do not fall in love with assets – divest assets (or spin off)

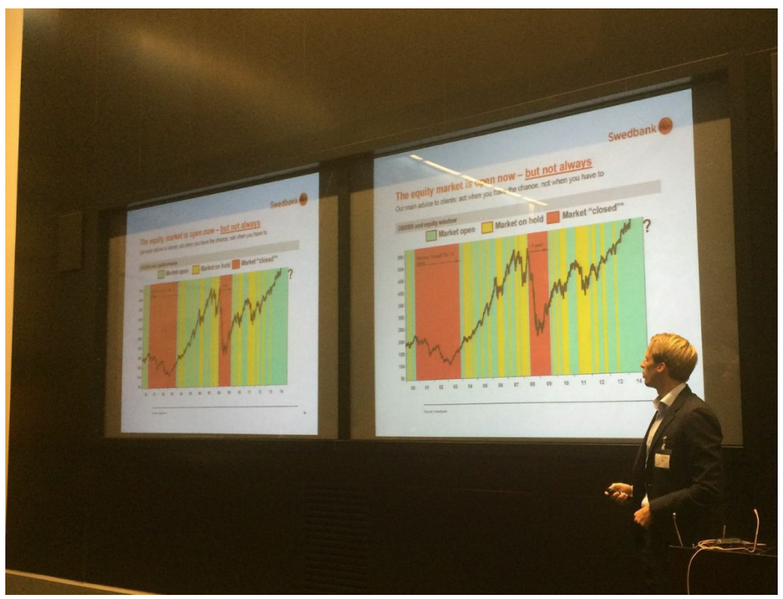
Case 4: Africa Oil – Frontier drilling with a credible strategy

Share price (USD) and important news



Africa Oil – lessons learned

1. Raise capital when the market is open
2. Top-quality management creates value
3. Top-quality shareholders (no doubt about that cash will be available if needed)
4. Strong operational results (highly commercial discoveries in seven of nine wells)
5. No use of debt before operational cash flow is strong (Africa Oil is a pure exploration company)



Teodor Sveen Nilsen presenting at the Financing E&P Companies and Projects on NCS, June 4 2014

Events SPE Oslo 2014-2015 season

17:30 **16 September 2014**	**Meeting and Technical event: kickoff season 2014-2015** Knut Åm,"The conditions for IOR/EOR in the future". *Mr Åm has over 40 years of experience in the international oil and gas industry, including senior management and executive positions with ConocoPhillips and Statoil.* *Ekebergrestauranten AS, Kongsveien, Oslo*
11:30 **14 October**	Lunch meeting Norwegian Patent Registration Office: Lunch Meeting The Intellectual Property Rights Advisory Board invites SPE Oslo members to a lunch meeting, to present and educate SPE Oslo's member companies on usage and protection of Intellectual Property Rights. *Patentstyret, Sandakerveien 64 ,Oslo 0484*
17:30 **16 October 2014**	YP**:** Join event: SPE, DNV LG, and Kongsberg Oil&Gas Technology *Scandic Solli, Parkveien 68, 0202 Oslo*
11:30 **6 November 2014**	**Distinguished Lecturer-i: Lunch meeting at AGR** Mohsen Achou "The Science and Engineering of Internal Corrosion Control in the Upstream Petroleum Industry " *Mohsen Achour is currently leading the Corrosion, Inspection and Materials group within Global Production Excellence division of ConocoPhillips. Mohsen holds a PhD in Chemical Engineering and Materials from Oklahoma State University (USA) and Adjunct Professor honorary position from Ohio University Institute of Corrosion and Multiphase Technology. He held an Associate Professor of Chemical/Process Engineering position at the University of Carthage in Tunisia for 11 years before joining ConocoPhillips. He has published more than 70 papers and patents in transport phenomena and corrosion and supervised more than 20 MS and PhD students. He is a member of SPE and NACE International and has been extensively active chairing multiple technical committees, sessions and symposiums in regional and international conferences for both organizations.*
17:30 **26 November 2014**	YP: Oil and Gas Quiz 3 Olivia Aker Brygge *Stranden 3, 0250 Oslo*
9 December 2014	Meeting and Technical event: (**Christmas Dinner**)
18:00 **20 January 2015**	**Distinguished Lecturer-ii: Dinner** Arild Saasen "Drilling Fluid Influenced Magnetic Shielding of Directional Measurement Tools: Causes and Consequences" *Arild Saasen has been a technology adviser at Det norske oljeselskap in Oslo, Norway, since January 2009. He is also an adjunct professor in drilling and well fluids at the department of petroleum engineering at the University of Stavanger. Saasen holds an MS degree from the University of Oslo and a PhD degree from the Technical University of Denmark, Lyngby. In 2012, he was awarded the Carl Clason Nordic rheology prize.* *Hotel Continental, Stortingsgata 24-26, 0117 Oslo*

17:30 **28 January 2015**	YP**:** Oil and Gas Quiz 4 Olivia Aker Brygge *Stranden 3, 0250 Oslo*
10 February 2015	Big Data in Oil and Gas Industry (Full day event + dinner)
18:00 **10 March 2015**	**Distinguished Lecturer-iii: Dinner** James Hemingway "Comparing Formation Evaluation Measurements Made Through Casing With Openhole Logging Measurements" *James Hemingway started at Schlumberger in 1980 and has held various petrophysics and engineering positions since 1982. He moved to Paris in 2001 as a new technology adviser and has been based in Houston since 2010 as a petrophysics adviser focusing on unconventional resources. Hemingway has been heavily involved in reservoir monitoring of enhanced oil recovery operations using techniques designed for use in cased wellbores. He holds degrees in chemistry and chemical engineering.* *Hotel Continental, Stortingsgata 24-26, 0117 Oslo*
18:00 **7 April 2015**	YP: Drilling (presentation and dinner)
21 April 2015 or June **(Planned date)**	Annual SPE Oslo event with Oslo Børs/PwC: Full day Seminar
18:00 **19 May 2015**	**Distinguished Lecturer-iv Dinner** Klaus Potsch "Understanding and Checking the Validity of PVT Reports" Klaus Potsch is a retired senior expert from OMV and a consultant for fluid studies. For the past 4 years, he has been a guest lecturer in reservoir fluids and their modeling at the Mining University of Leoben, Austria.Potsch holds BS and MS degrees in physics and a PhD degree in mechanical engineering from the Technical University of Vienna. *Hotel Continental, Stortingsgata 24-26, 0117 Oslo*

****The meeting time, place or topic can be changed, please follow information on http://oslo.spe.org/ Events*

Thank you!

*electronic version might have slight difference from the printed issue