SEKAL VALUE PROPOSITION – COST AND EMISSIONS REDUCTIONS

Official report, June 29, 2021

Rystad Energy has been hired by Sekal to assess Sekal's technology and value proposition by analyzing potential effects on costs and emissions, from implementation of Sekal's technology.

1. Executive summary

Sekal offers drilling support software, which aims to increase the performance of drilling operations. This has especially been proven relevant for complex, deep-water wells in high pressure and high temperature environments. However, the software has also been applied for less complex wells. Thus, the global well universe is relevant for Sekal's offerings.

Two clear initiatives have been identified for Sekal, both expected to decrease drilling expenditures and reduce drilling emissions from ultimately reducing the total rig demand and length of rig contracts. The first initiative is directed at the reduction of technical sidetracks and the second is decreasing drilling time through automatization of the drilling operations.

Full global adoption of Sekal's DrillExpect and DrillScene software has the potentials of reducing CO2 emission by 2.1 million tons and cost by 13 billion USD annually. If the automation software DrillTronics is fully adopted in addition the CO2 emission reduction increase to 2.9 million tons, and costs can be reduced by 17 billion per annum.

2. Efficiency improvements

Sekal's technology can reduce total rig demand by increasing drilling speed and reducing non-productive time. The software has a track record for offshore drilling operations for wells ranging from high to low complexity. Well complexity increases in cases of depleted oil reservoirs, HPHT reservoirs, horizontal segments etc. In complex wells, it is particularly important to reduce drilling challenges that can lead to technical sidetracks, while improved drilling speed is the main benefit for less complex wells.

NPD data from the period 2013 to 2016 shows that 31% of all wells drilled on the Norwegian Continental Shelf (NCS) required at least one technical sidetrack. Data received from Sekal for wells drilled on the NCS from 2012 to 2020 using DrillScene shows a reduction of technical sidetracks to 12.7%. Clients that implemented all three Sekal products, resulting in full automation, reported a reduction of technical sidetracks to 6.5% (down from 31%). These results show that Sekal's technology can significantly reduce the risk of needing to drill a technical sidetrack, thus reducing total drilling time. In addition, a reduction in the number of technical sidetracks will reduce the need for well commodities and services such as drilling fluids, casing, personnel on rigs, rig rent, etc.

The average drilling speed on the NCS was 76 meters per day in 2018 and 2019, according to NPD data. Rig drilling speed ranges from 34-178 m/day, dependent on well complexity, weather, degree of automation, technology adoption, etc. The big variance in drilling speed points to different geological conditions, but it also shows a significant improvement potential in drilling speed, from improving drilling of wells in the lower part of the range. Adoption of automated drilling will enable an increase in drilling speed within the technical limits, assuring safe operations. Increased drilling speed will reduce total drilling time, in addition to reducing drilling fluids and personnel on rigs due to automation. Clients of Sekal have stated an average reduction in drilling time of 15%. However, with fully automated drilling control, the average reduction in drilling time can potentially reach levels up to 20%.

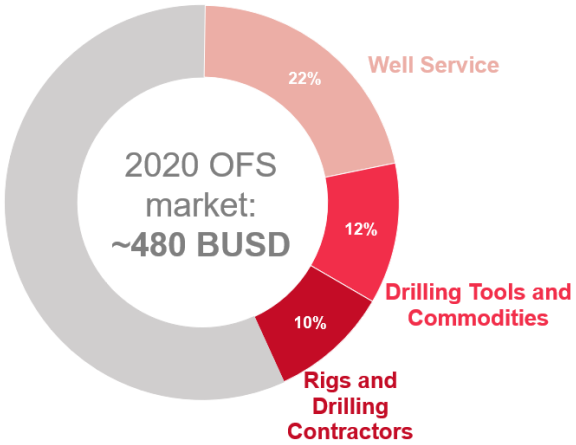

Figure 1: Total expenditure in the OFS market (2020). Well service, drilling tools & commodities, and rigs & drilling contractors represented 44% of the total market.

3. Emission reductions

The reduction of total drilling time, both through fewer technical sidetracks and increased drilling speed, will lead to lower emissions from rigs. Assuming full market adoption of the three Sekal softwares by 2025, to achieve fully automated drilling control and thereby reducing the chance of technical sidetracks to 6.5% per well, total rig emissions can be reduced by 0.9 Mt of CO_2 per year. Reducing drilling time by 20% through increased drilling speed as a function of adopting DrillTronics has the potential to reduce total rig emissions by 2 Mt of CO_2 per year, assuming full market adoption is reached by 2025. This results in a total reduction potential of 2.9 Mt of CO_2 per year, corresponding to 17% of total annual emissions from drilling operations. Assuming at least DrillExpect and DrillScene are fully adopted, the total reduction potential is 2.1 Mt of CO_2 per year. The analysis is based on key parameters like regional drilling complexity, regional drilling time and regional historical data of sidetracking probability.

4. Cost reductions

The reduction of total drilling time will also lead to cost savings. Costs related to well service, drilling tools & commodities, and rigs & drilling contractors represented 44% of the global OFS market in 2020, which speaks to the vast potential for cost savings related to wells and drilling.

Complex wells are proven to cost about 57% more than the average well, based on data from the UK Continental Shelf. One technical sidetrack is estimated to equate to 10-15% of the total well cost, based on data from Norway. A client of Sekal has stated that an average sidetrack in their operations costs approximately US$7 million. Other examples show that a technical sidetrack results in an increased well length of about 15-20%.

Assuming adoption of automated drilling control with DrillTronics, reducing the chance of technical sidetracks to 6.5%, the potential cost savings could reach US$9 billion per year. The analysis is based on regional well cost and well complexity levels, and assuming full market adoption. A 20% reduction in total drilling time enabled by more efficient drilling operations results in a cost savings potential of US$8 billion per year. In total, this represents a total cost savings potential of US$17 billion annually, which corresponds to 25% of total rig activity expenditures. Assuming that at least DrillExpect and DrillScene are fully adopted, the total cost savings potential is US$13 billion annually.

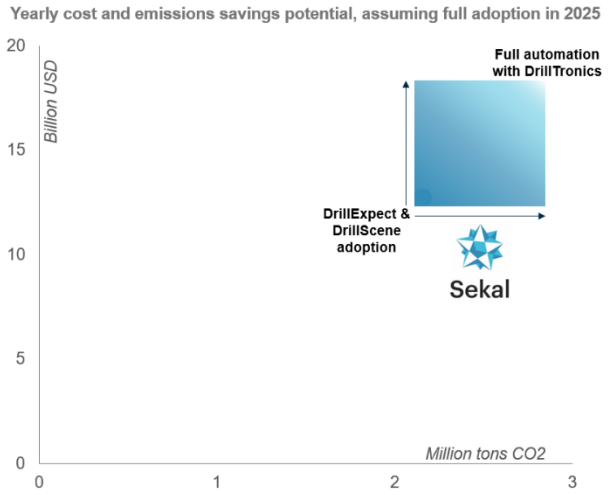

Figure 2: Cost and emission reduction potential, assuming full market adoption by 2025. The range represents the case approach dependent to which degree all three products are adopted.

5. Appendix 1: Emissions from drilling operations

The oil and gas industry contributes to almost 55% of global CO_2 emissions. The upstream sector accounts for only 5% of total oil and gas emissions, corresponding to 1 Gt of CO_2 per year, as the lion's share comes from combustion (89%). In the offshore upstream industry, production stands for a majority of lifecycle emissions, as the volumes emitted through gas turbines are the key emissions points. On an average North Sea field, rig activity stands for about 5% of total lifecycle emissions. On a global level, the share is lower as flaring regulations in the North Sea push flaring levels down to a minimum, which means total emission levels per barrel produced are generally lower than in other regions. However, as shown in Figure , total rig emissions still represent about 17 Mt of CO_2 annually, where 80% come from development drilling and 20% from exploration drilling. These emissions can be reduced by utilizing Sekal's technology.

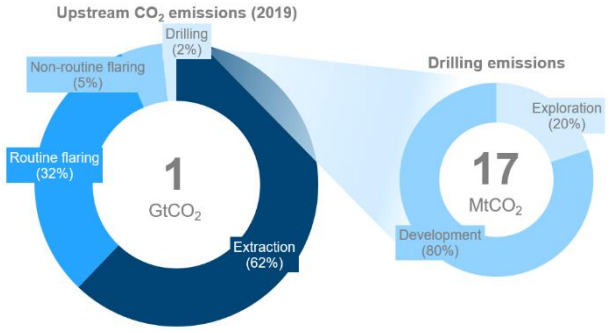

Figure 3: Upstream CO2 emissions from 2019 by source, where drilling represents 2%.

6. Appendix 2: Sekal's solution

Sekal's software seeks to drive decisions based on facts, reducing operational risk by pushing the potential technical limits while staying within acceptable risk and increasing drilling performance. Performance improvements are achieved by increased drilling speed and reduced non-productive time. The software is tailormade to proactively and responsively identify – and thus avoid – potential drilling challenges. This makes it possible to reduce drilling emissions and costs.

Another part of the value proposition lies in reducing safety risks through automation, thereby facilitating the relocation of personnel from the rig to off-site offices. This allows companies to proactively and more efficiently apply their expertise to resolve potential problems at the rig sites, instead of responding to problems as they occur at the site.

The software tools have proven to be particularly valuable for complex, deep-water wells in high pressure and high temperature (HPHT) environments. Nevertheless, the software has in recent years also been applied on less complex wells and DrillTronics is permanently installed on several offshore rigs operating in the North Sea. In the global well market, both onshore and offshore, is relevant for Sekal's offerings.

Sekal offers three software and real-time monitoring support by its dedicated operation team who owns professional drilling expertise. DrillExpect aims to reduce risk and invisible lost time (ILT). The software includes advanced modelling methods that can verify and tune drilling parameters to improve drilling plans, eliminate lost time on critical operations and improve control of well costs. The tool is used pre-operation, using well simulations to improve preparation of the drilling operation.

DrillScene includes a real-time monitoring tool and trend analysis to be used during drilling operations. This makes it possible to identify deviations between modelled and actual data to monitor wellbore conditions. The software is operated by the drilling operations team, making it possible to accelerate and simplify decision-making real-time, identify performance improvements to drive drilling efficiency and reveal reasons for non-productive time.

DrillTronics facilitates automation of the drilling process. The software enables drillers to optimize and enhance the safety of drilling operations through control system integration. DrillTronics applies the same advanced modelling capabilities as DrillScene to help maintain wellbore stability and consequently reduce non-productive time and increase drilling speed. This especially improves efficiency during the drilling of complex wells. DrillTronics can ensure that all drilling operations are conducted within safety limits, while also optimizing and enhancing performance. Implementation of all three products lead to fully automated drilling control.