INNHOLD

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Production, processing, and transport

Remaining contingent resources on NCS as presented in Figure 2, are almost equally distributed between contingent resources existing fields and contingent resources in the NCS discovery portfolio. Average size of discoveries is decreasing, but most discoveries are within tie-back distance to existing fields, as shown in Figure 29.

The NCS is characterized by very efficient infrastructure which is the main reason behind favorable operational costs and break even prices presented in Figure 32 and Figure 33. However, as production declines from existing fields, costs per barrel increas unless more resources are produced.

Cost-efficient continued development of the NCS is therefore dependent upon two success factors in particular:

- Efficient utilization of the existing infrastructure to realize contingent resources in the areas.
- Realization of discoveries through tie-backs to existing infrastructure.

Making a step-change in cost effectiveness for subsea solutions will enhance tie-in economy and hence provide a great impact on the ability to lift additional volumes from near-field discoveries and prospects. With the high number of potential tie-in projects going forward, there is a great advantage to standardize on new subsea technologies to enable wide implementation with reduc unit costs.

Safe lifetime extension of existing installations is contingent on cost-effective documentation of present state with adequate quality. In this context, efficient development and implementation of sensors and tools, both physical and software, is important across NCS. Robotics with increased level of autonomy and advanced analytics including Artificial Intelligence can prove vital tools for documentation of condition, but also safe and efficient production while in operation.

Value of data is realized when used to update a risk picture, integrate into optimization schemes, or inform decisions to be made Further, efficient data-collection will bring most value when systemized and coupled with domain knowledge on e.g. degradation mechanisms and prediction of future load and response. Such knowledge on both capacity and load side of offshore structures important. Technologies improving management of information across all project development interfaces (research communities contractors, suppliers, service providers, partners, manufacturers, integrator) is needed to improve efficiency in engineering, construction, operation/maintenance. This calls for standardized digital twin solutions.

Extent of modification scope needed on existing infrastructure to accommodate tie-backs is important for viability of new tie-in prospects. Swift modification and hook-up are important also for production efficiency of the existing production. Ability to choose subsea processing technology may ease topside modification scope, reduce cost and project execution time and there enhance overall economy of such projects. Several subsea processing technologies matured to project ready level is hence needed to capitalize on these opportunities.

For long tie-back distances, multiphase flow technology development competes with subsea processing and unmanned installations to provide the best development solution for a given prospect. Use of unmanned installations, floating or fixed, will increase the ability to process well stream to transport quality. Using existing infrastructure onshore as well as offshore for furth processing can prove cost efficient. Further development of unmanned systems needed to improve brownfield as well as open greenfield opportunities is essential to harvest the full potential and define the NCS petroleum future.

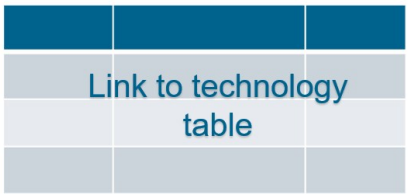
The prioritized technology and knowledge areas for TG4 are closely linked to the success factors. The TG4 priorities are:

- Material condition detection and degradation mechanisms.
- Digital sensory and technologies for facilities.

- Data management for facilities.
- Digital tools for improved monitoring and better understanding.
- Unmanned facilities and subsea processing.
- Standardized subsea templates.

CASE - TG4

All-electric subsea - A game-changing technology going forward



Production, processing and transport - table prioritized technologies

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