Maersk Oil has for decades designed and developed integrated concepts and solutions for optimal and fit-for-purpose development of challenging oil and gas fields in the North Sea and Middle East.

The integrated field development planning process explores options and targets the optimal development plan for the individual fields. The spine in the process is the specialist teams who navigate, manage and integrate the subsurface and topside complexities, uncertainties and opportunities into a single development plan, maximising the overall field recovery and asset value.

The Field Development Plans created by integrated project teams in Maersk Oil are matured through a combination of:

- Strong technical capabilities, especially within subsurface characterisation and modeling, horizontal drilling/completion/stimulation, innovative facility solutions and contracting strategy and execution – delivering highest recovery within cost and schedule.

- Technology and a ‘can-do’ mind-set – that has driven innovation in complex and challenging reservoirs and areas and unlocked significant recovery otherwise lost.

- Robust Project Maturation Process which consists of a staged delivery process covering the full maturation cycle of a project in six mandatory phases from the identification of a business opportunity, through Feasibility and Concept Select Stages, to Define (Front End Engineering Design) and Execute and, finally, the post-implementation phase.

The integrated Field Development Planning is matured during the Assess to Define stage with focus on optimal technical and economical Concept selection and maturation with appropriate Front End Loading and Decision Quality to deliver the highest value and recovery for the project.
## Technology and ‘can-do’ mindset

While Maersk Oil as a mid-size oil company historically has maximised value and recovery through optimising proven technologies, coupled with strong cost discipline, the company has had a long tradition of investing in development and adaptation of new cutting edge technology in a simple and efficient way.

Examples of these winning technologies include long horizontal wells in line drive patterns developed for off-shore thin reservoirs (< 5 feet targets), efficient and cost effective stimulation techniques (CAJ liner), and various Early Production Systems and phased developments to de-risk challenging and complex reservoirs.

This focus has meet the specific challenges of the North Sea and Middle East carbonates and unlocked stranded discoveries - and has historically done so with great success.

### Strong technical capabilities

Maersk Oil has core capabilities within a range of technical disciplines. Most capabilities have been developed for the challenging North Sea and Middle East carbonates in shallow offshore environment.

#### The core capabilities include:
- Subsurface Reservoir Modeling: Cross-disciplinary subsurface reservoir modelling and simulation work-streams (from advanced reservoir characterisation to cutting-edge fluid flow simulation). This includes complex reservoir fluid dynamics, including non-equilibrium hydrocarbon columns which are common in low permeability reservoirs and geophysical reservoir characterisation and imaging.
Example: Halfdan Field

The Halfdan field in the Danish North Sea is an excellent example of successful Integrated Field Development Planning utilising Maersk Oil core capabilities.

The Halfdan field delivered first oil less than one year after completion of the exploration well by applying 30 years of the knowledge and experience gained from other similar carbonate fields in the Danish North Sea and Qatar – especially the neighboring Dan field (see figures below).

Immediately after discovery of the field an integrated Field Development Planning team was established to capture learnings from previous developments, model optimal development options for the Halfdan field and make new innovations were required. Every stage of development for this project from discovery to first oil delivered the planned production on time and on budget.

The development included the use of Maersk Oil’s capabilities within world-record long horizontal wells and new innovation with unique drilling and completion methods to achieve a perfect line drive pattern. The success of the development has been confirmed through cutting edge 4D seismic imaging.

- Horizontal wells: Designing, Planning, Drilling/Steering, completion and stimulation of long horizontal wells tailored for specific reservoir characteristics.
- Advanced water flooding: Understanding the criticality of efficient water flooding in most oil reservoirs with basis in advanced reservoir models and WRFM (Well, Reservoir and Facilities Management) experience and control the flooding with horizontal wells has been designed to deliver optimal water injection at lowest cost (e.g. FAST - Fracture Aligned Sweep Technology).
- Facilities/Contracting: Designing and executing optimal fixed platforms for phased development within schedule and budget.
Recovery
Factor (%)

Link between technology development/strategies and recovery factor in the tight carbonate Dan field - neighbour to Halfdan.

Dan and Halfdan Oil production vs year from start of production
Barrels of oil per day

Dan production  Halfdan production
**Master Development Plans**

A Master Development Plan is an Integrated Development Planning tool that is scalable to various field sizes and types.

In order to create highest life-cycle value for a field or cluster of fields and optimise the field for all stages, a Master Development Plan is created within Maersk Oil that defines the life of field strategy and provides a clear and robust framework for all Field Development Plans.

All strategic decisions required throughout the lifetime of the asset are mapped and evaluated with focus on understanding short versus long-term tradeoffs, managing the portfolio of opportunities and early maturation of the relevant technologies.

The workflow within Maersk Oil include a ‘plan for every barrel’ systematically defining all opportunities. The workflow brings consistency and transparency to enable effective decision making and decision quality and drive the project prioritisation processes.

The final MDP delivery includes an MDP reference case that defines the agreed forward plan for the field or cluster of fields. Potential alternative cases are identified depending on key uncertainties, upcoming strategic decisions and risks and opportunities.

**Who is involved?**

Integrated Field Development Planning takes place for all of our projects around the world.

Integrated Field Development Plans are matured across Maersk Oil business units worldwide often in collaboration with the Global Production Development team based in Copenhagen.

The integrated approach ensure highest value and recovery for the projects and mitigation of risks and uncertainties while allowing each discipline to focus on their areas of expertise and utilise the knowledge and experience of Maersk Oil globally.