adiL.
A Schlumberger Company

ACE.

Accelerate
Conce
Engineerin

Accelerated Conceptual Engineering

Oil and gas consultancy services

Accelerated Conceptual Engineering.

Accelerated conceptual engineering (ACE) is our process for quick, cost effective technical and economic evaluation to assist with upstream development decision making. It is an integrated engineering process, managed by experienced project and discipline engineers, supported by the use of specialist software tools.

The process delivers robust outcomes quickly, saving many hours or weeks compared with traditional methods. Data is presented in a clear and concise manner, supporting decisions to move to the next stage, recycle, cancel, defer or sell.

The facilities definition and cost estimates delivered as part of the process are engineering-based. This means that our clients move through the stage approval gates with fewer decisions outstanding and increased confidence in comparison to traditional assumption-based cost estimates.

We give clients confidence

We reduce uncertainty before moving into the next phase, meaning you move into detailed engineering phases with as few unanswered questions as possible.

We save clients time

We can deliver much more in a given timeframe – we delivered over 30 concepts in three months for a client.

How does ACE add value to our clients?

We deliver innovative solutions

We find different ways to develop fields, new ways to unlock value and make marginal fields viable.

We save clients money

We helped a client achieve $500m realised savings on one project.

What ACE is used for.

ACE applies to all stages of a field development from discovery to cessation of production and decommissioning. It is an ideal tool for operators, non-operator partners, investors and financiers in assessing the value and risk of development concepts and the selection criteria applied to them.

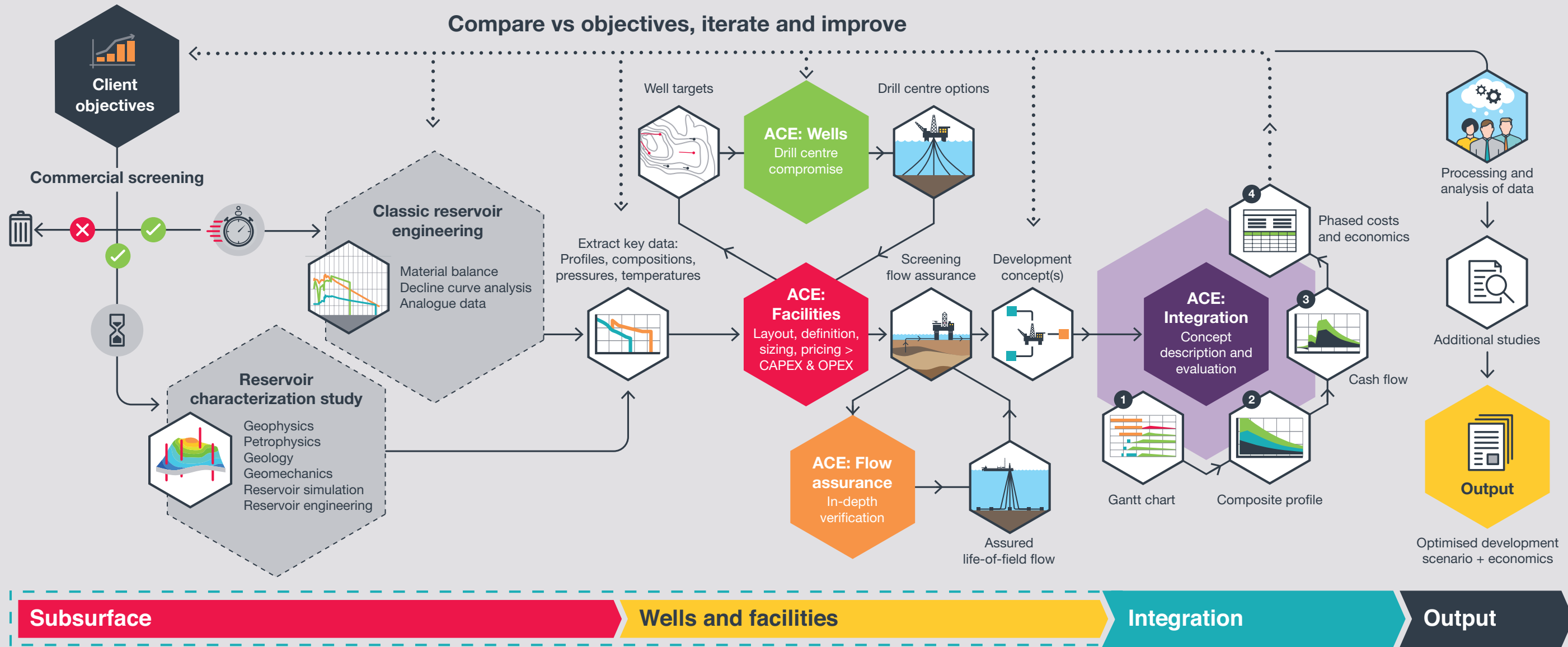| **OPERATOR**	
Prospect or discovery	▪ Assess economic viability ▪ Assist decision on exploration/appraisal well

Appraise	▪ Model, evaluate and compare alternative field development options
	  - Test technical feasibility
	  - Test economic viability

Select	▪ Improve technical definition of selected options ▪ Evaluate and compare sub-options
Area development evaluation and planning	
Brownfield modifications evaluations	

NON-OPERATOR	
Audit and benchmark	

INVESTMENT AND FINANCE	
Assess potential development value	

How it works

Our approach.

Key to the success of ACE is the use of an integrated approach - we work closely with all disciplines, bringing them together to produce the best results.

Compare vs objectives, iterate and improve

Client objectives

Commercial screening

Classic reservoir engineering

Material balance
Decline curve analysis
Analogue data

Reservoir characterization study

Geophysics
Petrophysics
Geology
Geomechanics
Reservoir simulation
Reservoir engineering

Extract key data:
Profiles, compositions, pressures, temperatures

Well targets

Drill centre options

ACE: Wells
Drill centre compromise

ACE: Facilities
Layout, definition, sizing, pricing >
CAPEX & OPEX

Screening flow assurance

Development concept(s)

ACE: Flow assurance
In-depth verification

Assured life-of-field flow

ACE: Integration
Concept description and evaluation

Phased costs and economics

Cash flow

Gantt chart

Composite profile

Processing and analysis of data

Additional studies

Output

Optimised development scenario + economics

Subsurface **Wells and facilities** **Integration** **Output**

How ACE works.

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There are three key components to ACE
– Process, People and Programs

Process
The process creates wells and facilities configurations and phasing for alternative development and export options, taking account of the forecast range of reserves outcomes, thus allowing for some optimisation.

It integrates subsurface, drilling, process, commercial and operations requirements to define all aspects of a development option through field life, delivering capital, operational and abandonment expenditure costs for the options in line with the project maturity.

People
The key to ACE is experienced people working to an integrated process with world class tools. Our project and discipline engineers have operator knowledge and experience covering a wide range of global projects.

Every ACE project is managed by these engineers and project managers, who utilise the ACE specialist software tools as appropriate.

Programs
We use up to four key software tools, depending upon the particular scope of work. These are:

ACE: Wells
A drill centre planning tool to help determine suitable locations, with realistic well plans that satisfy anti-collision constraints while minimising development costs and accessing targets.
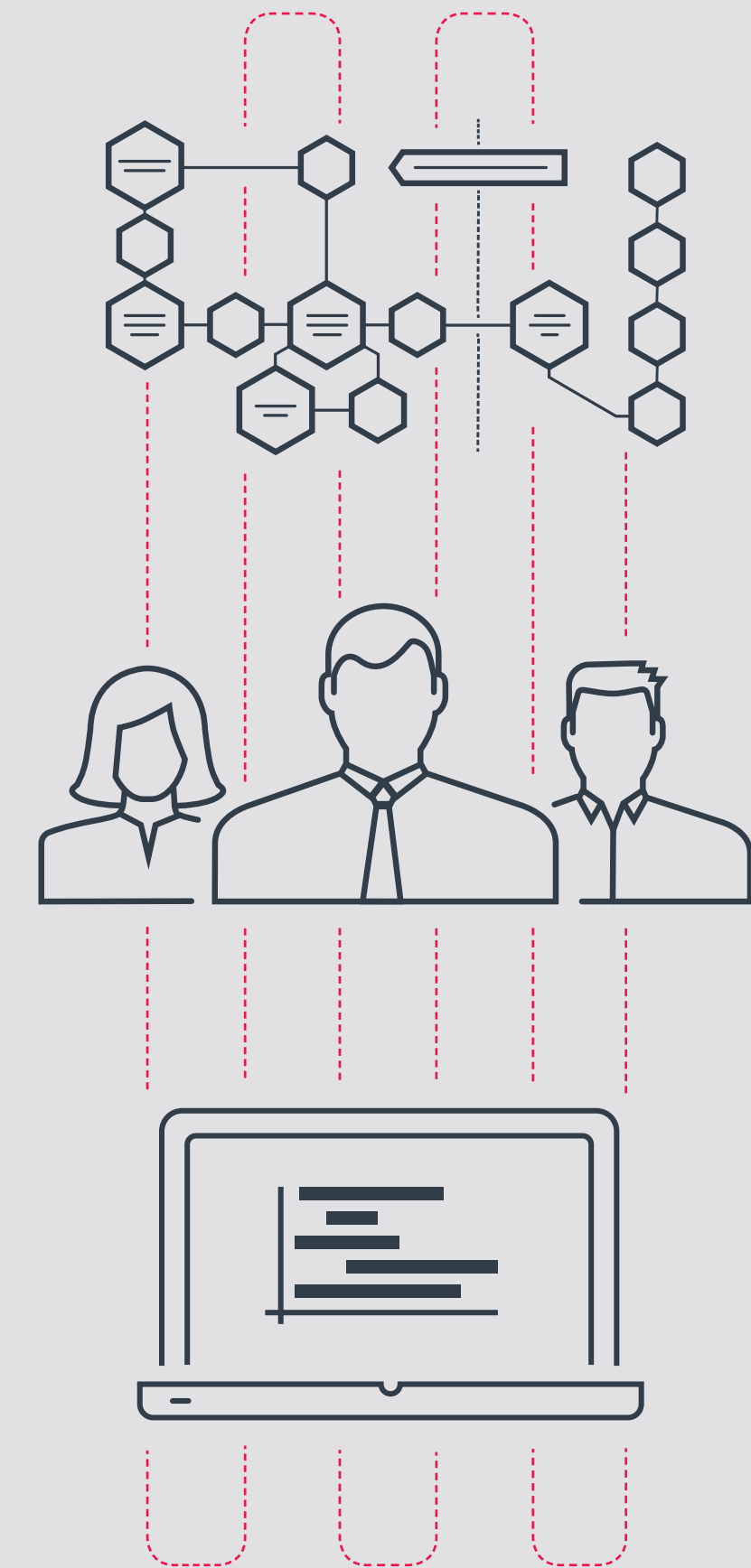
ACE: Facilities
An industry standard facilities design tool used to develop complete technical definition and capital cost estimates for oil and gas development projects.
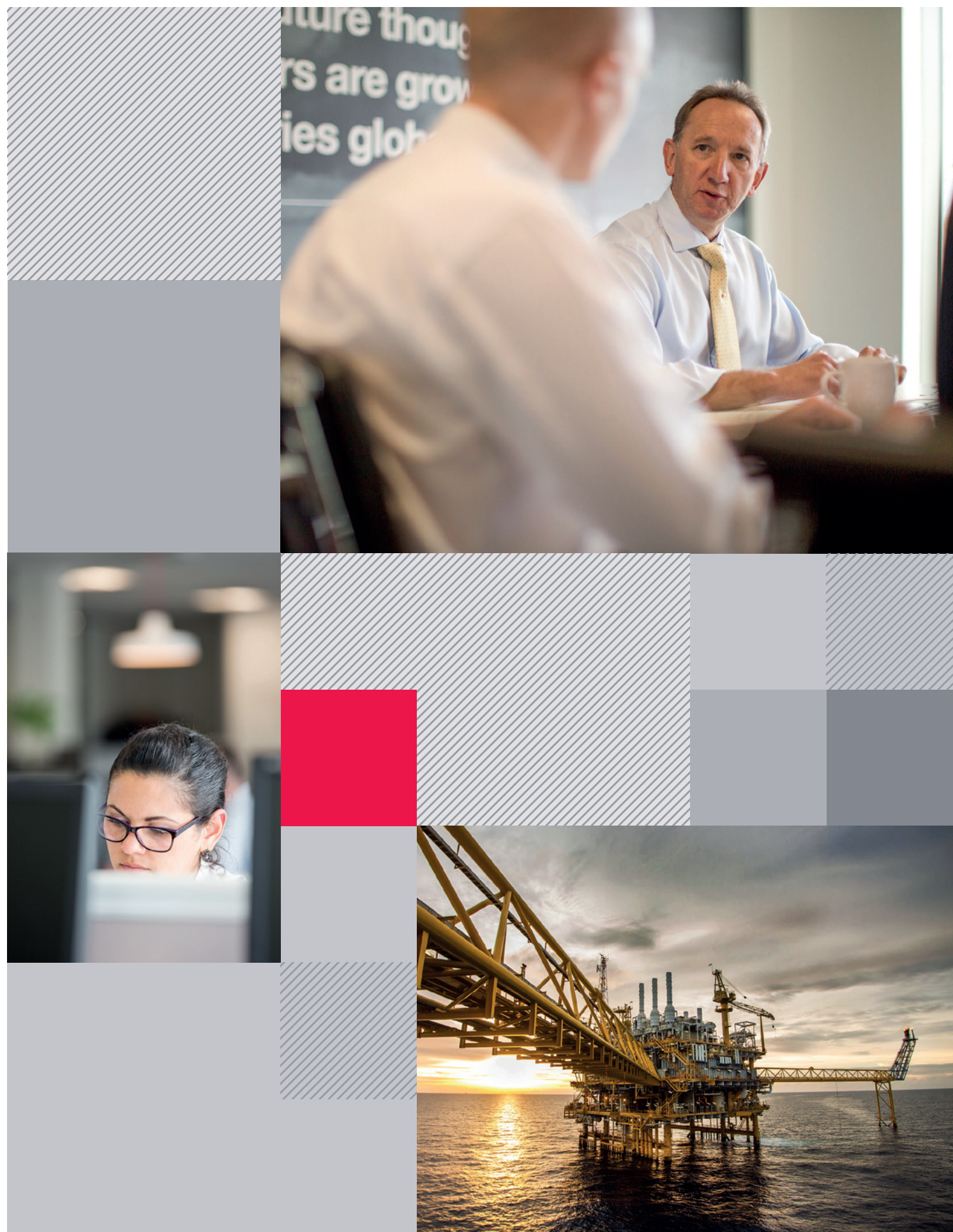
ACE: Integration
A sophisticated planning and economic modelling tool for field development and operations, identifying well phasing, rig utilisation and ullage constraints and tax implications.

ACE: Flow assurance
A compositional thermal hydraulic steady state flow assurance tool that models multi-well systems and pipeline networks from reservoir to process plant. This provides quick visibility of the impact of phasing the development on the project economics.

A new approach to conceptual engineering.

Conceptual engineering is not something that the oil and gas industry traditionally does well. The traditional 'waterfall approach' where tasks are undertaken sequentially does not allow for iteration and is not easily adapted.

The industry also sees different disciplines working in silos, with poor interaction and integration with each other. This leads to an elongated conceptual engineering phase resulting in moving into subsequent design phases with conceptual engineering incomplete leading to cost and schedule overruns.

We understand the challenges this brings; our ACE process provides a solution. We work with clients to understand their drivers and test concepts against those in a comprehensive manner against client objectives.

Our ACE track record.

We have a strong track record of delivering for clients using our ACE process. This has been built over a number of years and includes onshore and offshore assets around the world.

Realised savings of

$500m

Unrealised savings of

$700m

Project example

Start date	2013
End date	2014
Location	EAF
Client	Confidential

Overview
Agreed by the partners that a review should be undertaken to define ways to reduce CAPEX.

Our approach
ADIL supported the client to align all the stakeholders (subsurface, D&C, commercial, facilities and subsea) and integrate these functions to ensure the overall development remained viable.

Deliverables
Identification that test and gas separation systems were over specified.

Detailed flow assurance identified some wells would not flow / not flow for long.

Our locations

Our international experience and expertise extends across the world. We have undertaken work with clients in a number of international locations.

Aberdeen

London

Mexico City

Bogota

Rio de Janeiro

Dubai

Kuala Lumpur

● ADIL hubs ● Onshore projects ● Offshore projects

> ADIL delivered a number of concept scenarios in a short timeframe.

ADIL client

> Using the ACE process, ADIL identified considerable cost savings for the project.

ADIL client