

Eclipse Petroleum Technology Oilbarrel Conference

www.eclipsepetrotech.com

Stuart Girling
July 09

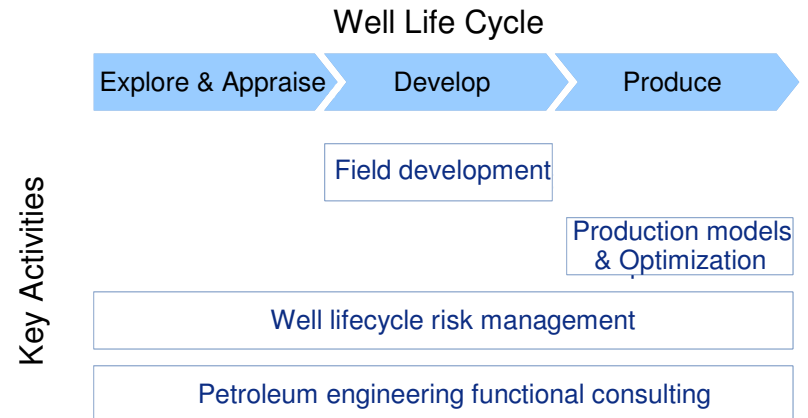
eclipse 

Agenda

- Who we are and what we do
- Conceptual field design
- Production enhancement

Who we are and what we do

- Specialist petroleum engineering consultancy - founded in 1999; 60 staff in London, Aberdeen and Houston
- Provide advice on maximising production and life cycle value
- Long-term clients include:
 - Shell, BP, BG, Hess, Tullow, ConocoPhillips, Talisman, BHPBilliton, Nexen, Fairfield, Lundin, CNR, Marathon, TAQA, Dubai Petroleum, Saudi Aramco, PDO, McKinsey
- Part of Petrofac Production Solutions since July 2008



Some key contacts



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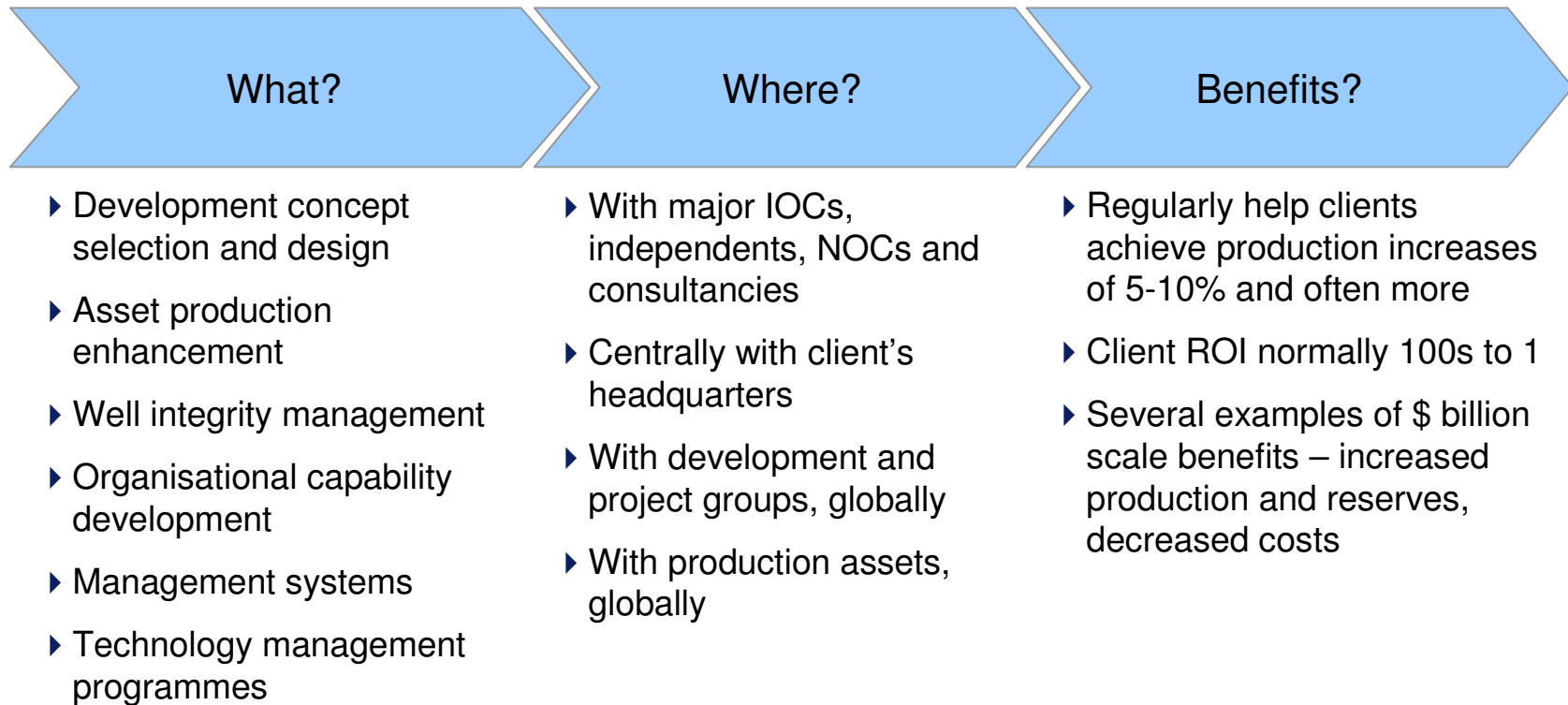


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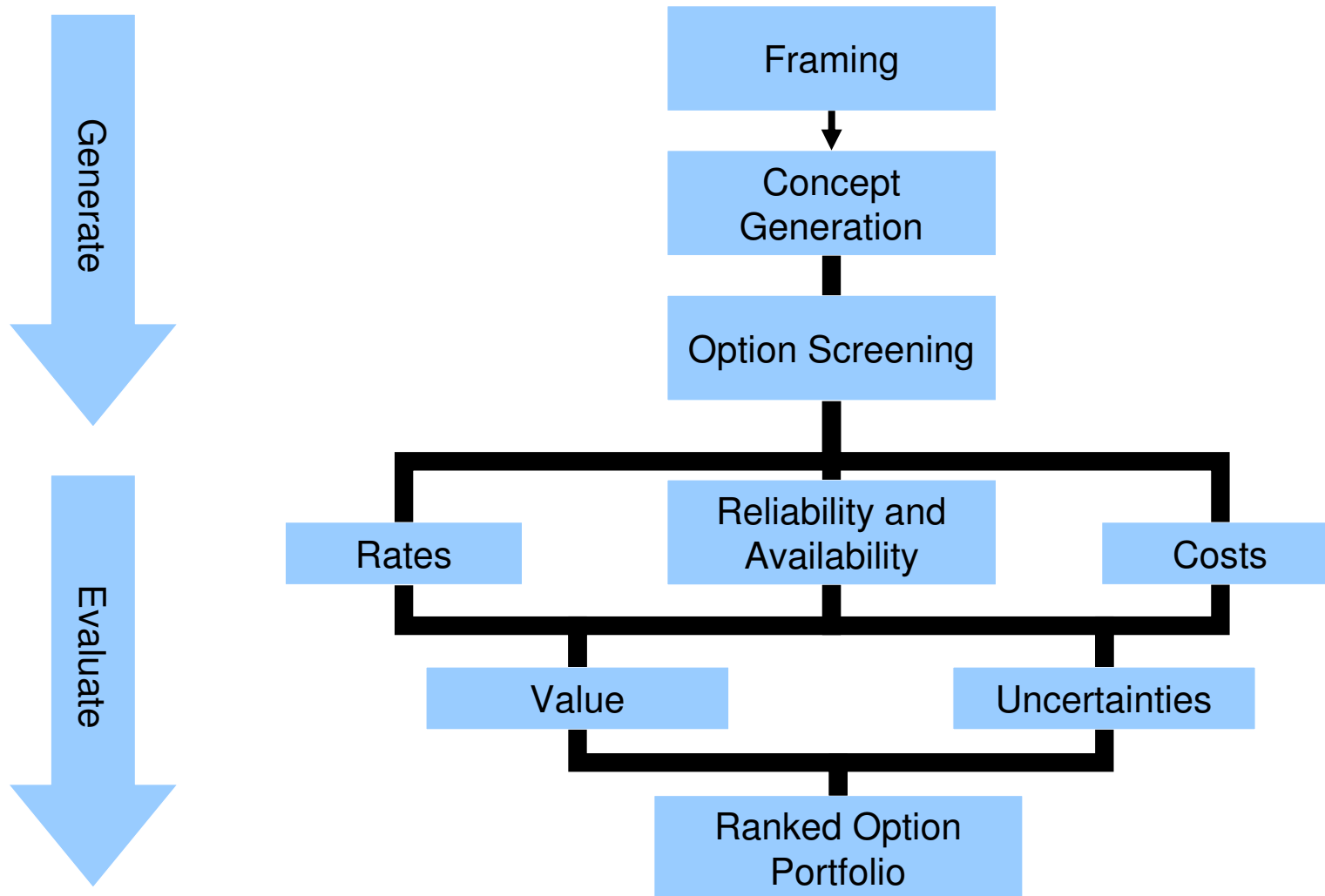
Eclipse works with clients on a wide range of projects...



...helping clients realise many billion \$s of value

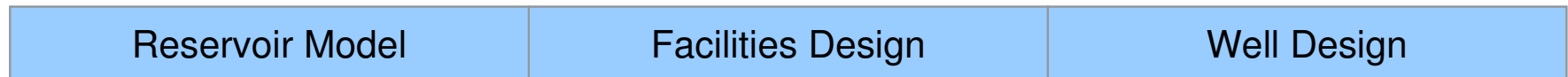
Decision framing and fast option analysis

Conceptual field design



Development concept identification and selection

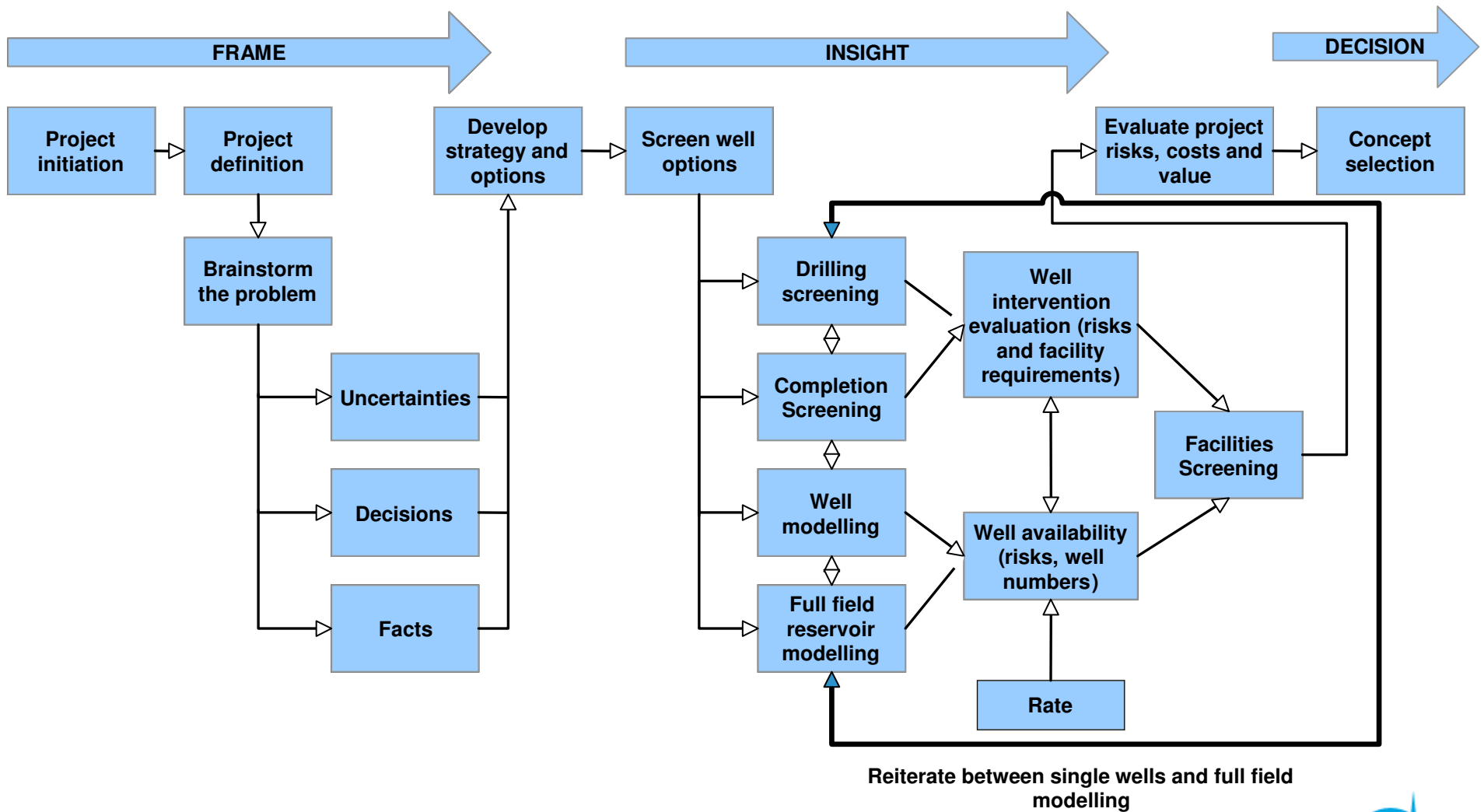
Conventional Approach



Multiple Option Approach



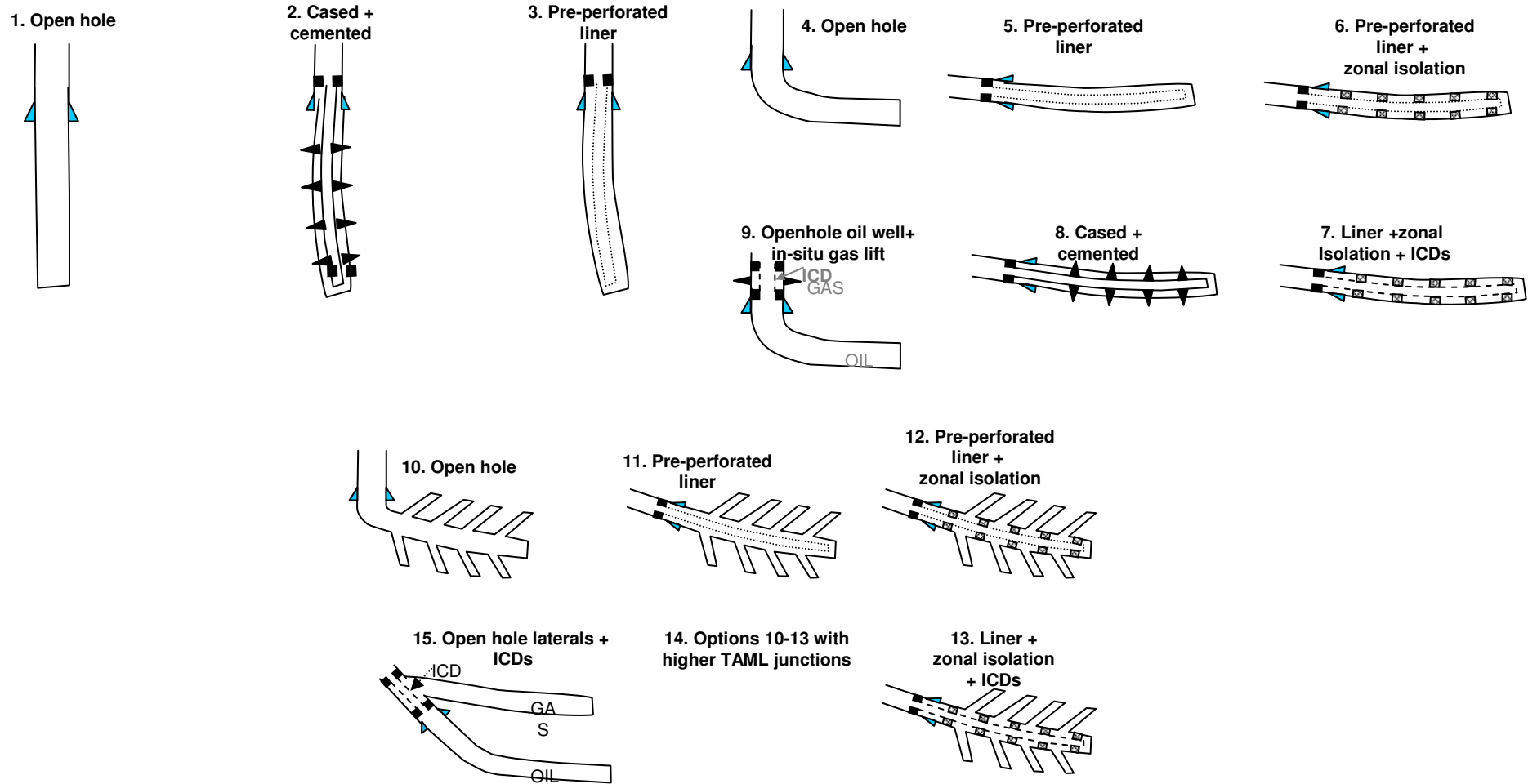
Concept selection workflow example



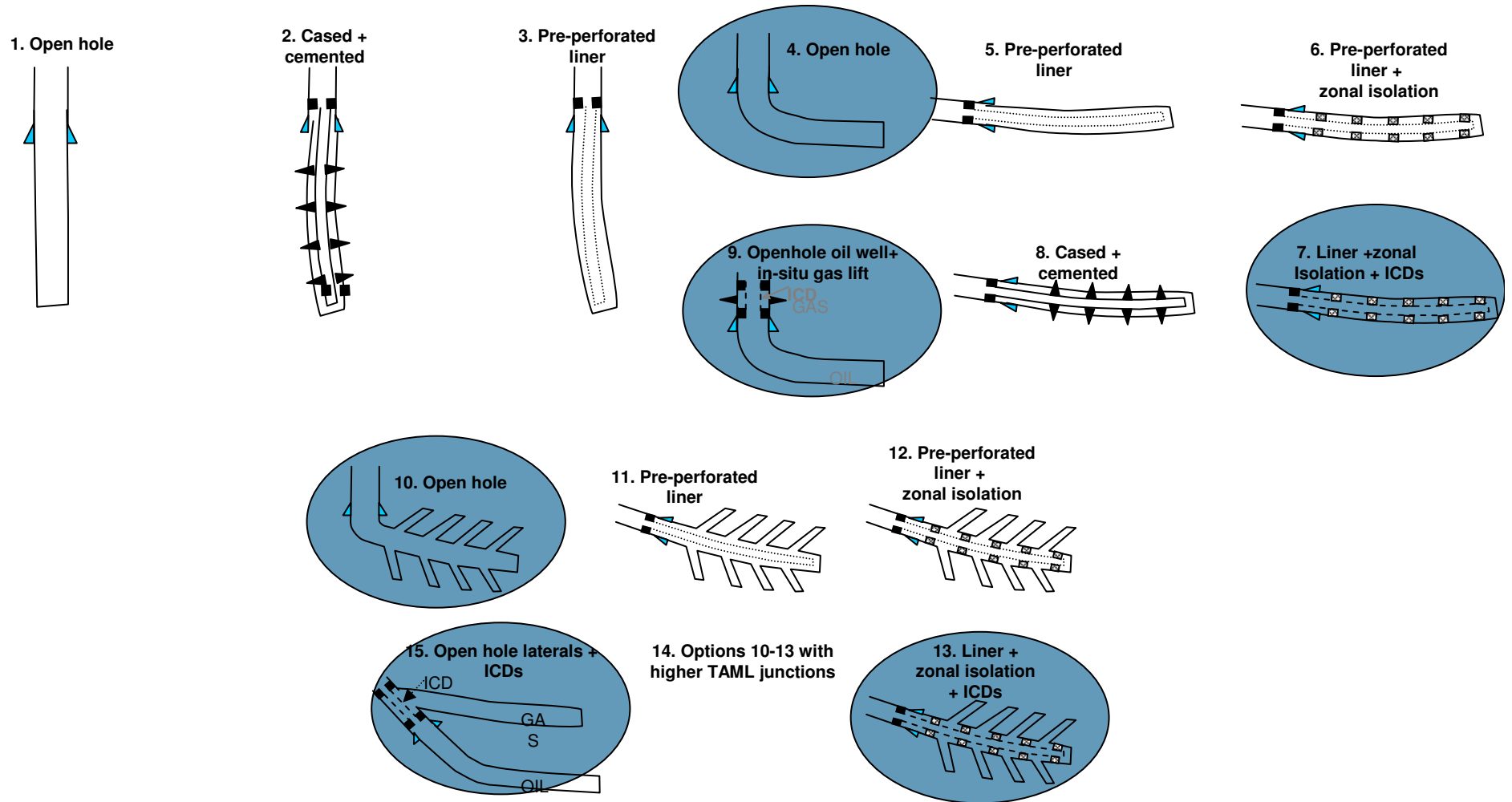
Option strategy table example

Producer	Well Type	Completion Complexity	Casing	Artificial Lift	Stimulate
Oil Producer	Deviated	High	Open hole	None	Yes
Gas Producer	Horizontal	Low	Pre-perforated	Surface delivered	No
	Multi-lateral		Pre-perforated with zonal isolation	In-situ	
	Vertical		Liner + cemented + DHC		
			Off bottom liner		

Concept generation example – creating alternatives



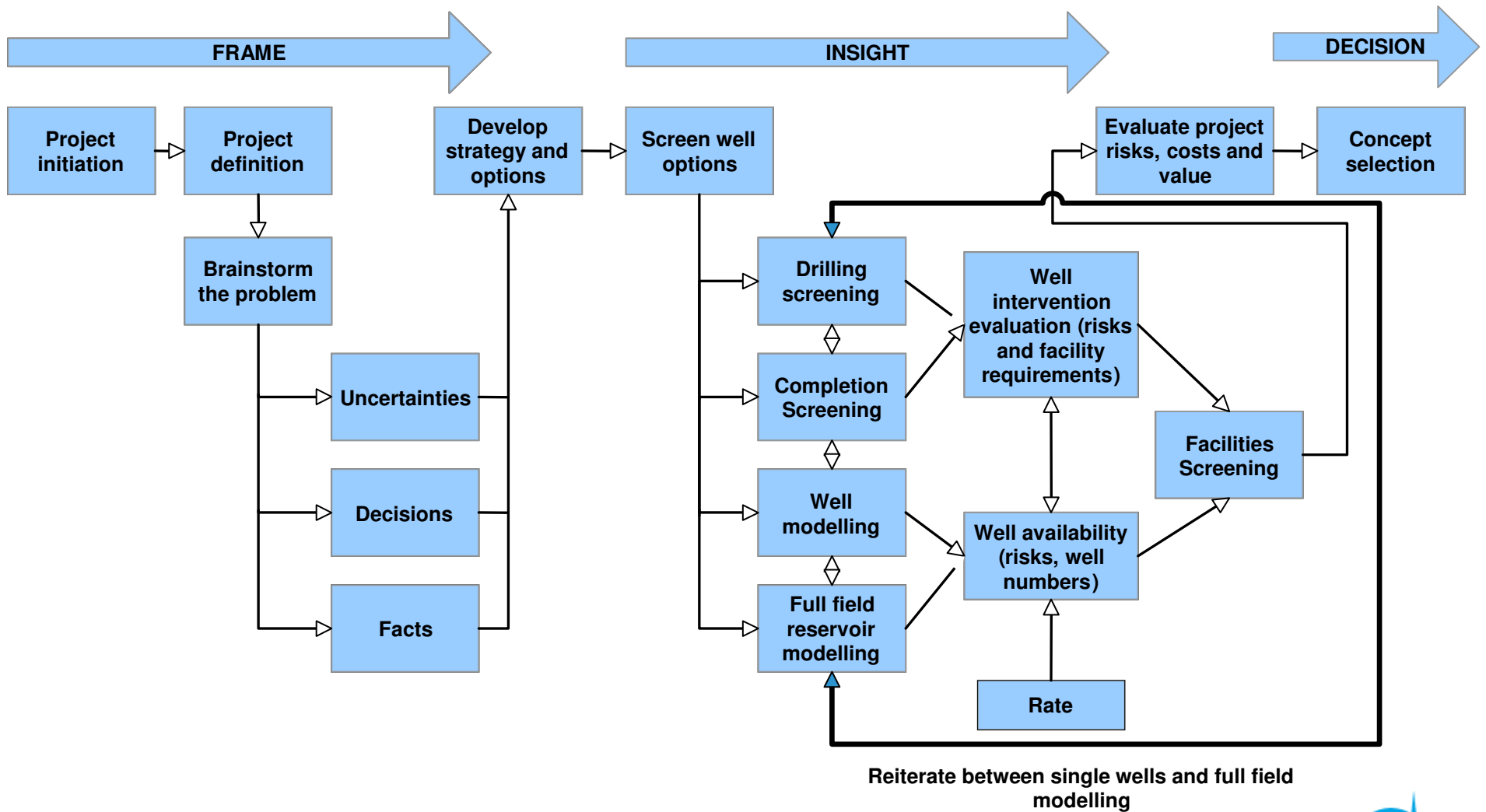
Concept generation example – creating alternatives



Concept generation example – creating alternatives

- Options coarse screened to reduce modeling time
- Options covering full range of appropriate technologies and sensitivities:
 - 4 - Open hole, horizontal – oil and gas
 - 10- Open hole, multi-lateral – oil and gas
 - 7 - Liner, horizontal, zonal isolation, ICDs – oil
 - 13- Liner, multi-lateral, zonal isolation, ICDs – oil
 - 9 - Open hole, auto gaslift – combined
 - 15- Open hole, bi-lateral, auto gaslift - combined

Concept selection workflow example



Option screening example – well performance modelling

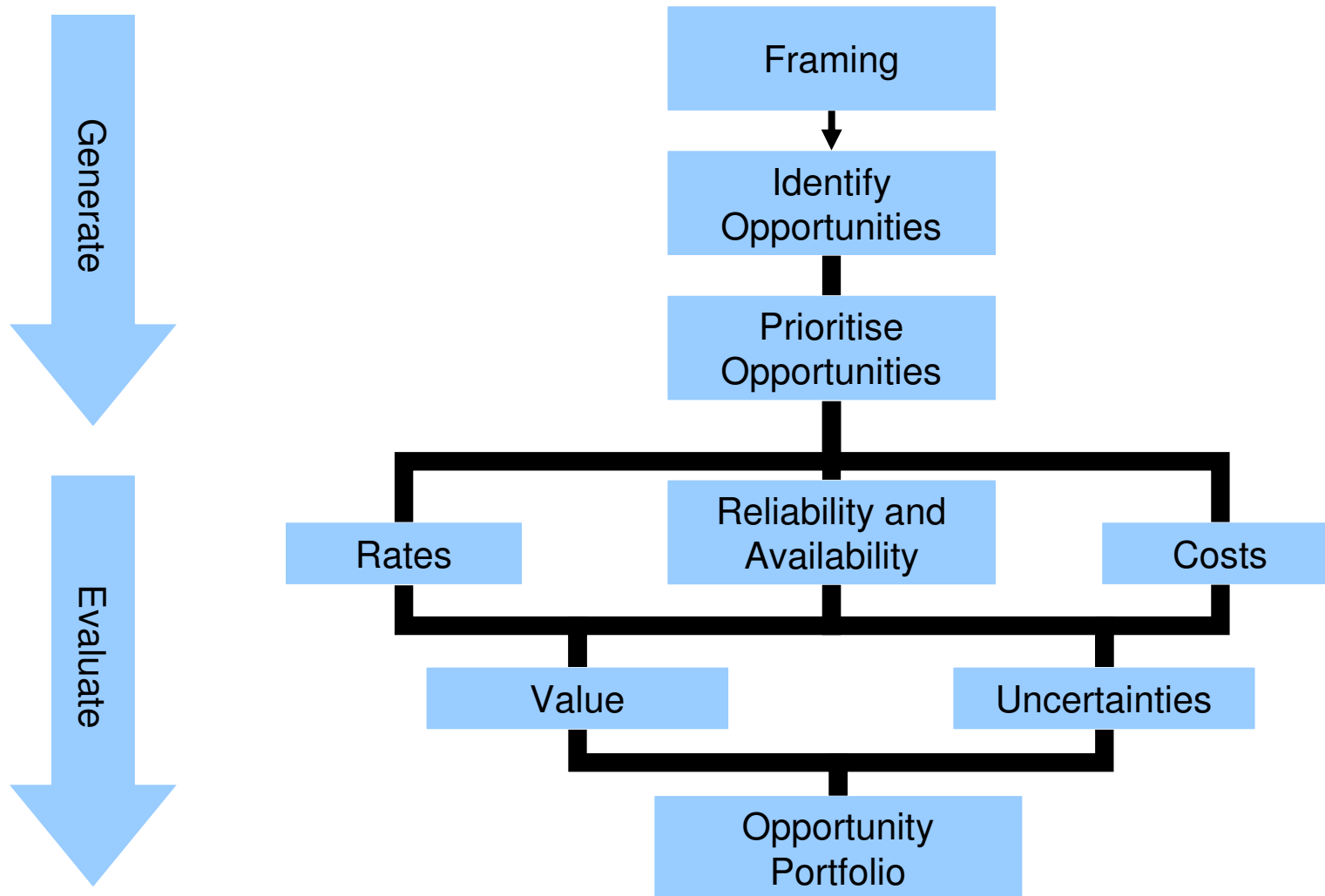
- Evaluate sensitivity of decisions and uncertainties on performance:
 - Well position
 - Well length
 - Hole size
 - Permeability
 - Reservoir fluid saturations
 - Formation damage (skin)
 - Artificial lift (yes, no)
 - Stimulation (yes, no)

Conceptual design examples and their outcomes

- Oilfield offshore India – reduced development from 12 wells to 7 (multi- laterals, well sizing)
- Oilfield offshore Trinidad – deferred 5 well redevelopment plan, replaced with a single workover (optimised drawdown management and availability)
- Gas condensate development onshore Kazakhstan – reduced development plan from 120 wells to 80 (big bore wells)
- Gas fields offshore Tunisia and Denmark– redesigned sub-economic fields as successful developments (simplified well designs, changed facilities)
- Deep water oilfield GoM –reducing development capex from \$4 to \$3.5 billion (sand control, stimulation, artificial lift, facilities concept)
- Oilfield offshore UK – added 1 million barrels of reserves - redefined field development concept to manage water (smart wells)
- Oilfield offshore Norway – increased ultimate recovery by 10% (smart wells)

Decision framing and fast option analysis

Production enhancement



Asset reviews very often throw up same themed technical opportunities

- Well operating envelopes and drawdown management
 - Field modelling and production optimisation processes
 - Artificial lift optimisation
 - Water management
 - Sand and erosion management
 - Stimulation
- Can often address without capex
- Capex usually required

Production enhancement review - all key steps

Project Steps

Eclipse brings

1- Appoint steering group	Process, focused direction
2- Identify priority fields or wells	Objective view, external experience
3- Framing workshop to identify opportunities	Technical insight, challenge accepted norms (across disciplines)
4- Evaluate and prioritise opportunities	Fresh perspective, benchmarking
5- Detailed engineering work	Expert resource, momentum
6- Implement decisions made	Support, challenge

Examples of production enhancement projects and their outcomes ...

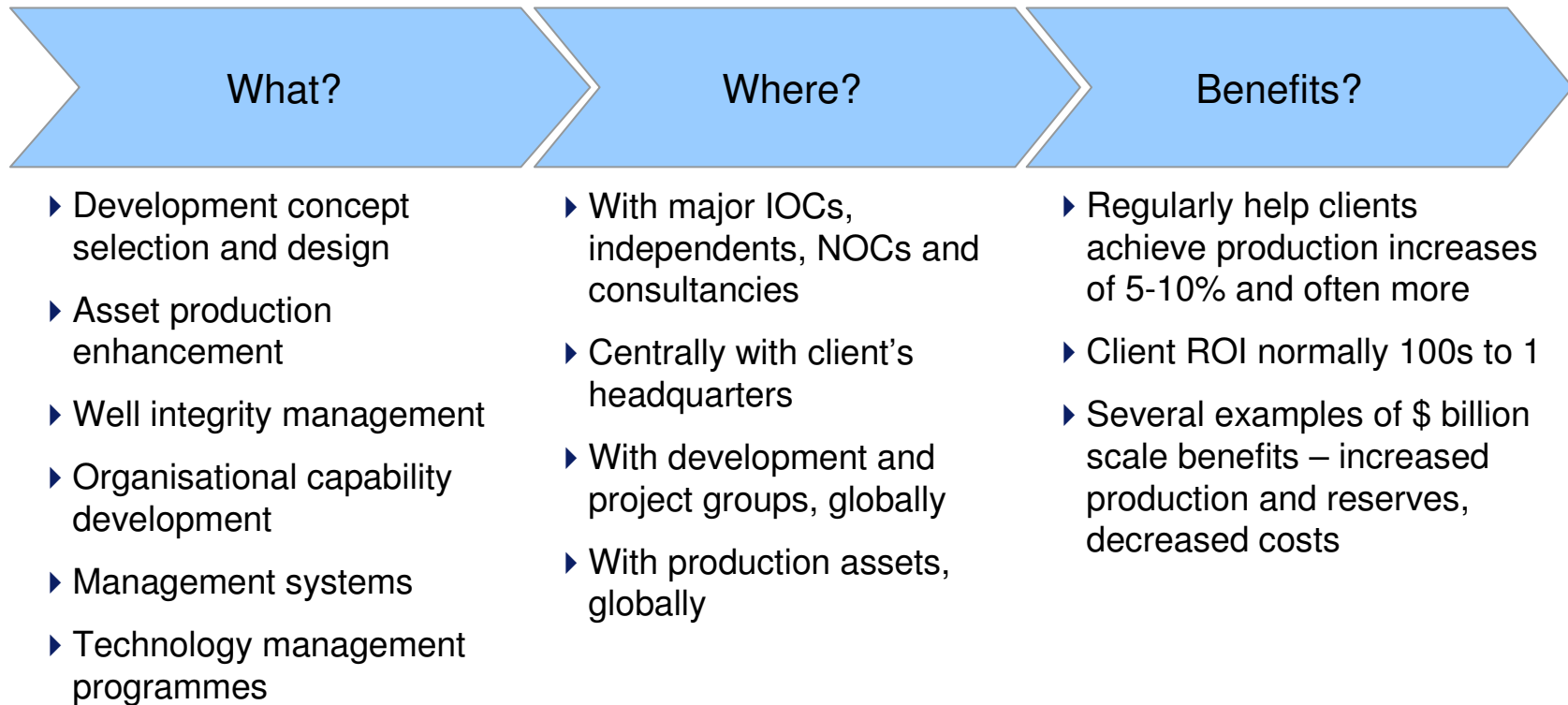
- UKCS - added 3,000 bopd (optimisation initiatives following well production performance benchmarking reviews)
- Offshore West Africa – increased field production 30% (operating envelope review and drawdown optimisation)
- Onshore Indonesia – increased well production 100% (perforation practices)

...without incremental capex

Review process provides...

- Focus on issues that maximise production (in design and enhancement)
- Objective forum for communication, eliminating discipline overlap
- Fresh perspective – with a new look at accepted norms and practices
- Clear decision audit trail, including why options not pursued
- Fast process that allows all appropriate well technologies and enhancement opportunities to be screened
- More creative than conventional approach – encouraging out-of-the-box thinking
- Momentum

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