

A Comparison between the DONG Energy Reserves/ Resource Classification System and the UNFC-2009 System

UNFC, London, 7th February 2011

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Prepared by J. Christensen & J. Refstrup, DONG Energy



- **Introduction – DONG Energy**
- **Classification Systems/Procedures**
- **Example**
- **Close out**

Exploration & Production

Exploration & Production explores for and produces oil and gas. The activities are focused in the waters around Denmark, Norway, the UK (West of Shetland area), the Faroe Islands and Greenland

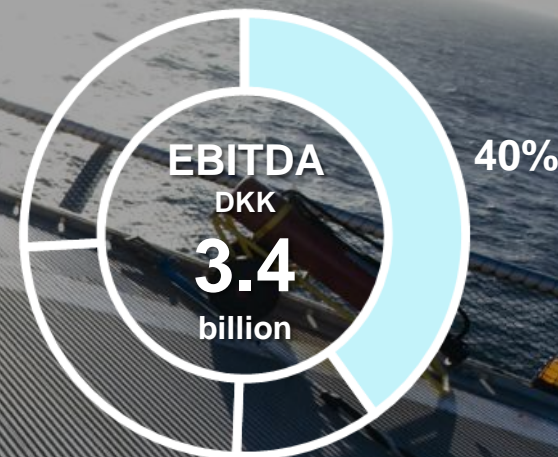
End 2009

OIL AND GAS PRODUCTION

24 mio. boe

OIL AND GAS RESERVES (2P)

364 mio. boe



Generation

Generation produces power and heat from efficient, flexible power stations and renewable energy sources

Generation is a market leader in the construction and operation of offshore wind farms and clean coal technology

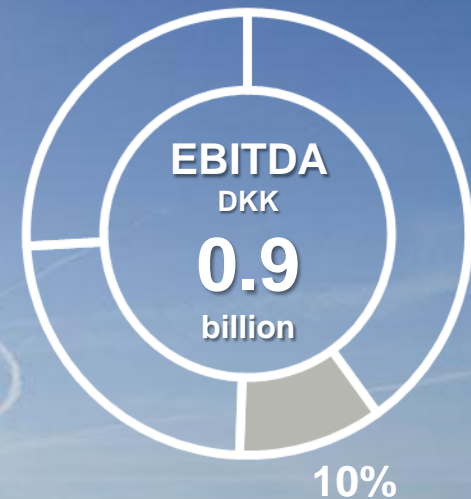
End 2009

POWER GENERATION

18,074_{GWh}

HEAT GENERATION

46,686_{TJ}



Energy Markets

Energy Markets optimises DONG Energy's energy portfolio, forming the link between the Group's procurement and sale of energy. Energy Markets sells gas and power to wholesale customers and trades on energy exchanges

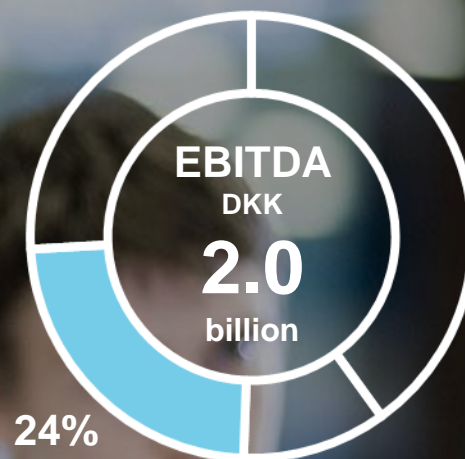
End 2009

GAS SALES

102,436_{GWh}

POWER SALES

10,723_{GWh}



Sales & Distribution

Sales & Distribution sells gas, power and related products to private customers, companies and public institutions in Denmark, Sweden and the Netherlands. Sales & Distribution operates the gas distribution network and power grids, gas storage facility and oil pipeline owned by DONG Energy in Denmark.

End 2009

GAS SALES

21,756 GWh

POWER SALES

8,529 GWh

GAS DISTRIBUTION

9,966 GWh

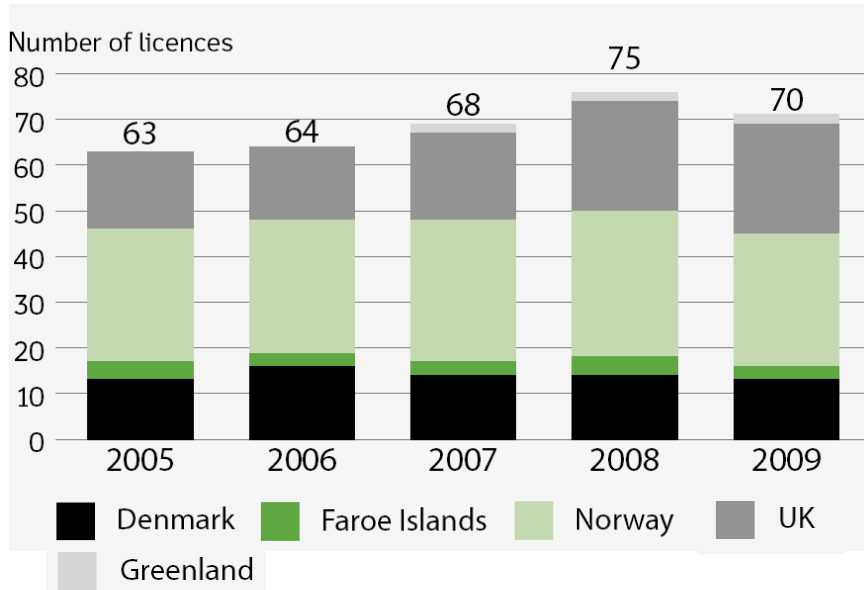
POWER DISTRIBUTION

9,156 GWh

26%

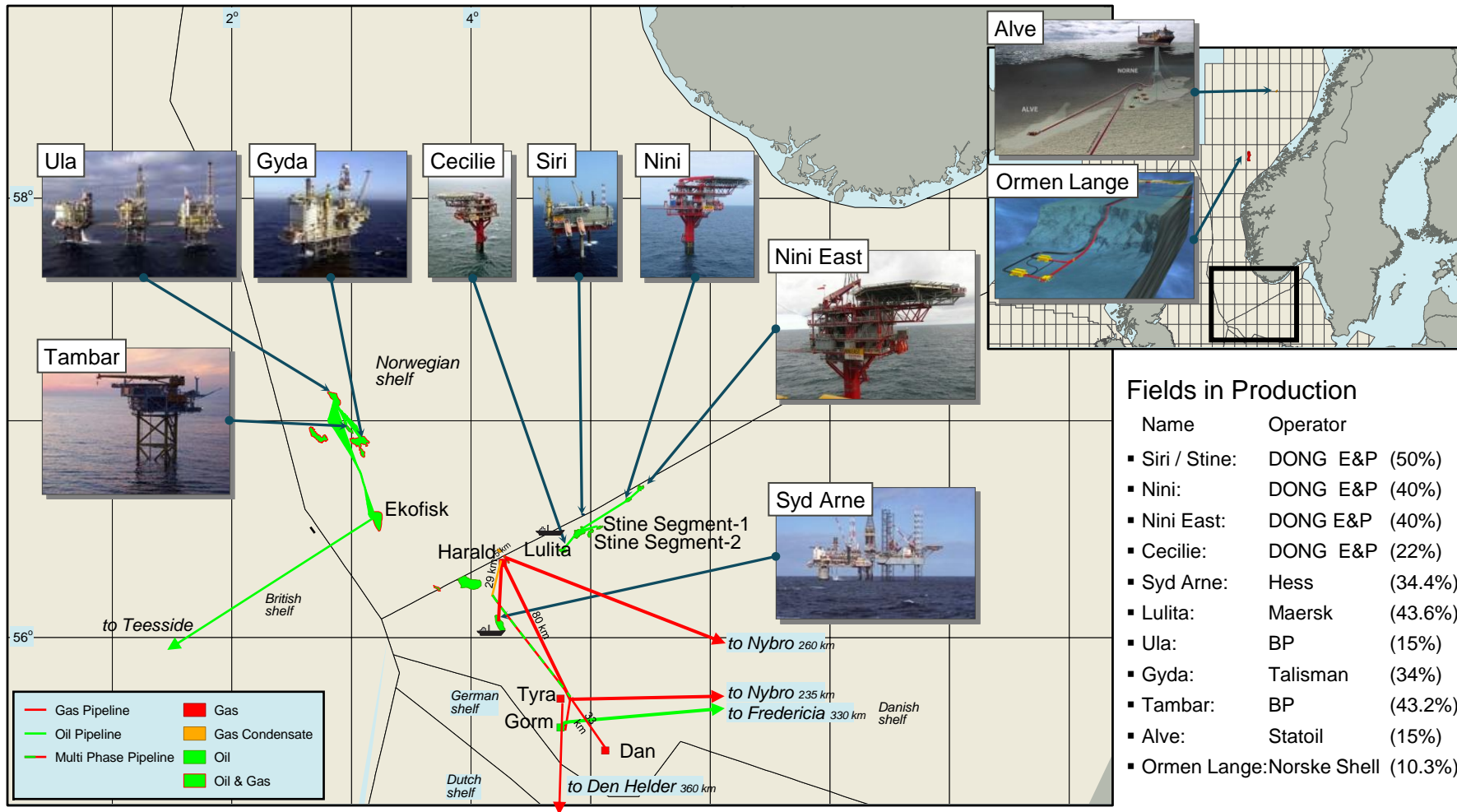
EBITDA
DKK
2.2
billion

Exploration & Production – Facts



- The activities of this business area focus on oil and gas exploration and extraction in Denmark, Norway, the UK (West of Shetland area), the Faroe Islands and Greenland
- This business area includes a stake in Gassled, which comprises the entire gas pipeline network from the Norwegian fields to continental Europe and the UK
- At the end of 2008, DONG Energy was participating in 62 exploration and appraisal licences and 13 production licences
- The growth strategy for this business area is based on continuous oil and gas exploration. DONG Energy therefore participates actively in licensing rounds within this area of activity

DONG Energy fields in production – Denmark and Norway



Fields in Production

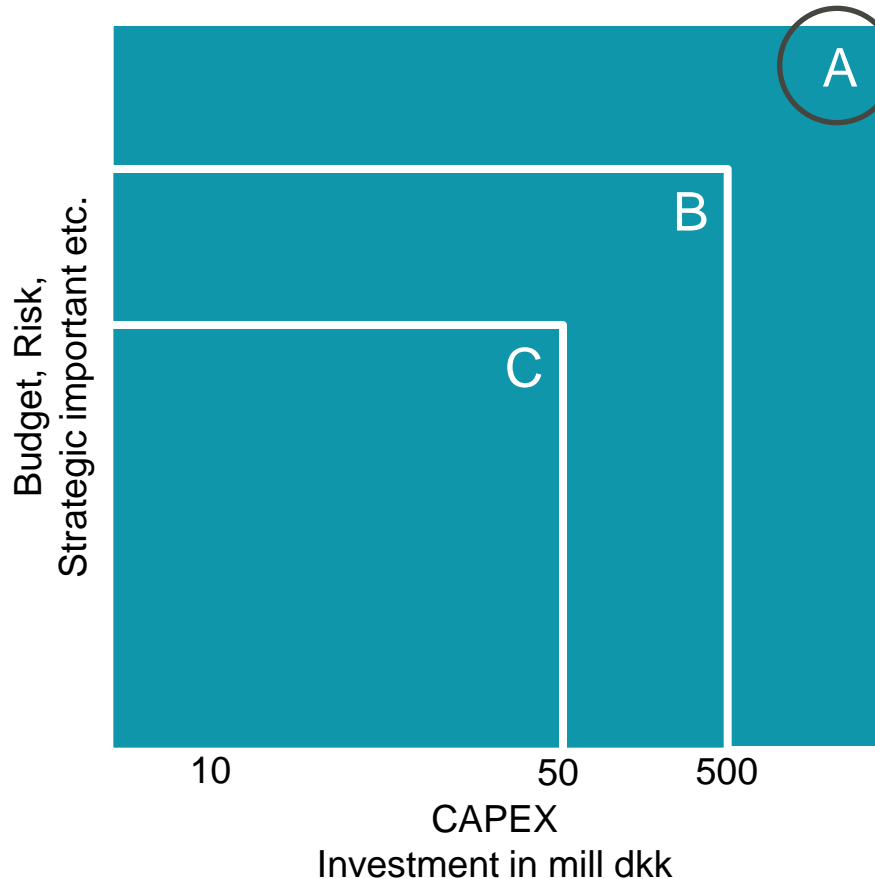
Name	Operator
▪ Siri / Stine:	DONG E&P (50%)
▪ Nini:	DONG E&P (40%)
▪ Nini East:	DONG E&P (40%)
▪ Cecilie:	DONG E&P (22%)
▪ Syd Arne:	Hess (34.4%)
▪ Lulita:	Maersk (43.6%)
▪ Ula:	BP (15%)
▪ Gyda:	Talisman (34%)
▪ Tambar:	BP (43.2%)
▪ Alve:	Statoil (15%)
▪ Ormen Lange:	Norske Shell (10.3%)

Projection: Mercator (world) [not to scale]

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DONG Energy Project Model

Project Categorisation

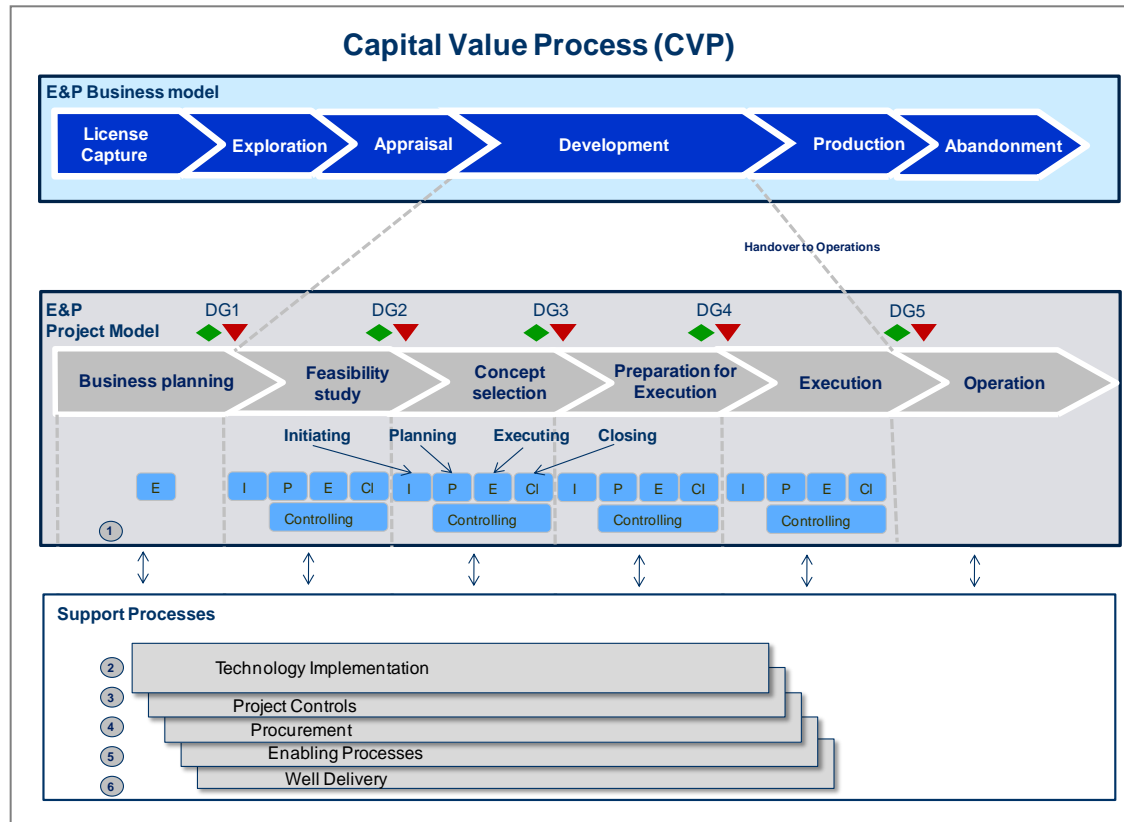


- Most E&P projects are Category A project according to the DONG E&P Project Model i.e. Capex > 500 mill DKK
- It is mandatory that 'A' projects pass through all decision gates
- For each phase/gate a list of mandatory deliverables are defined by the Project Model

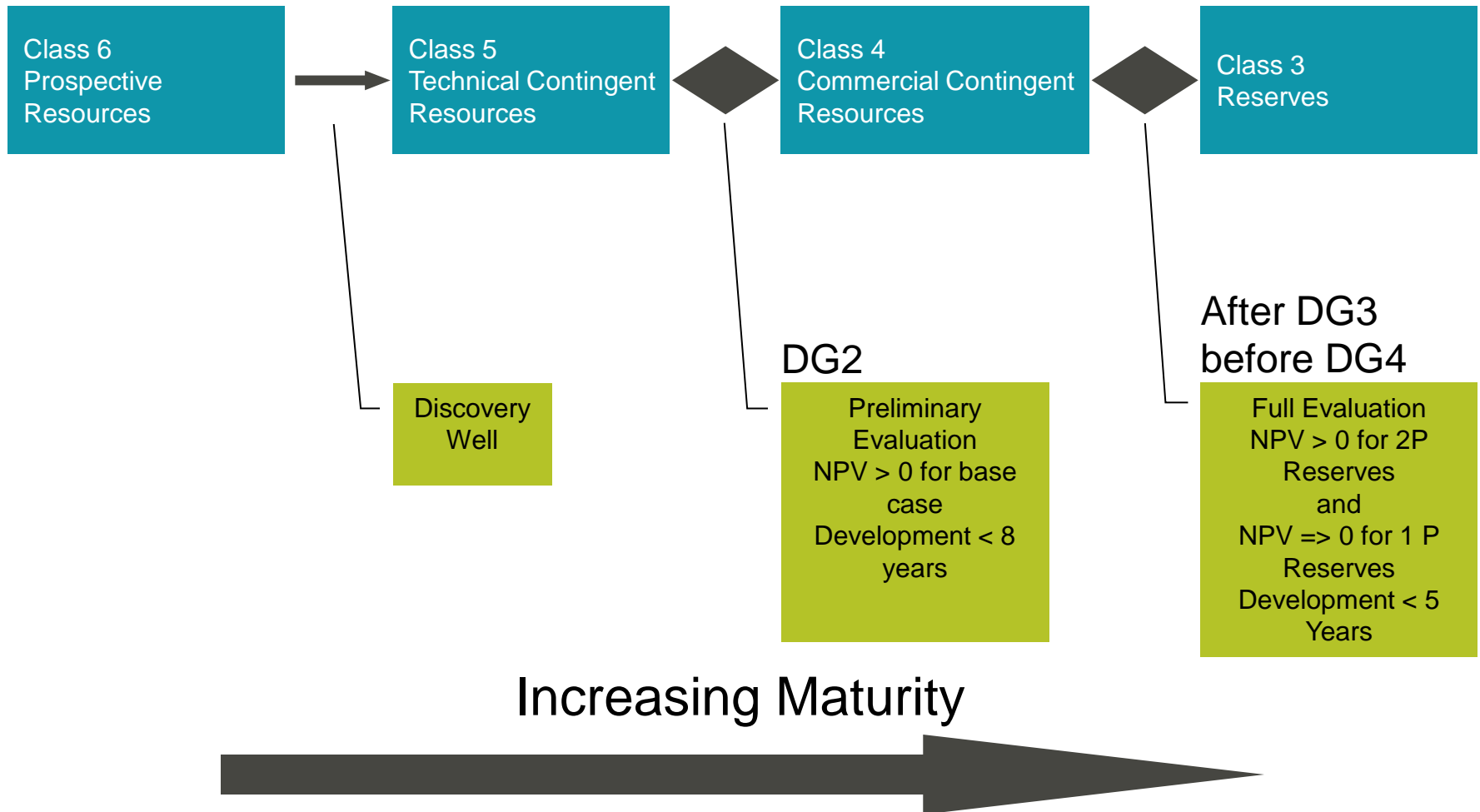
DONG Energy Project Model

DONG E&P Capital Value Process (CVP)

- The CVP is DONG E&P's decision-making process for investment projects
- Project Work Processes are aligned with the requirements of the CVP process



DONG Decision Gates for Approving Resources/Reserves



The E&P Field Development Model

Value Chain



Project Responsible



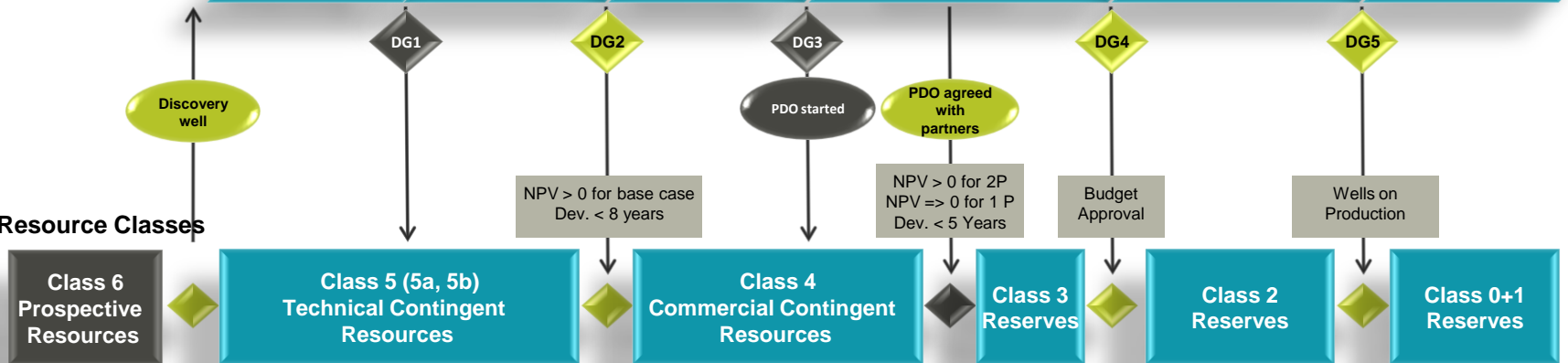
Gatekeeper



Project Model



Resource Classes



DONG Energy Procedure of Resources and Reserves Classification

We apply SPE PRMS



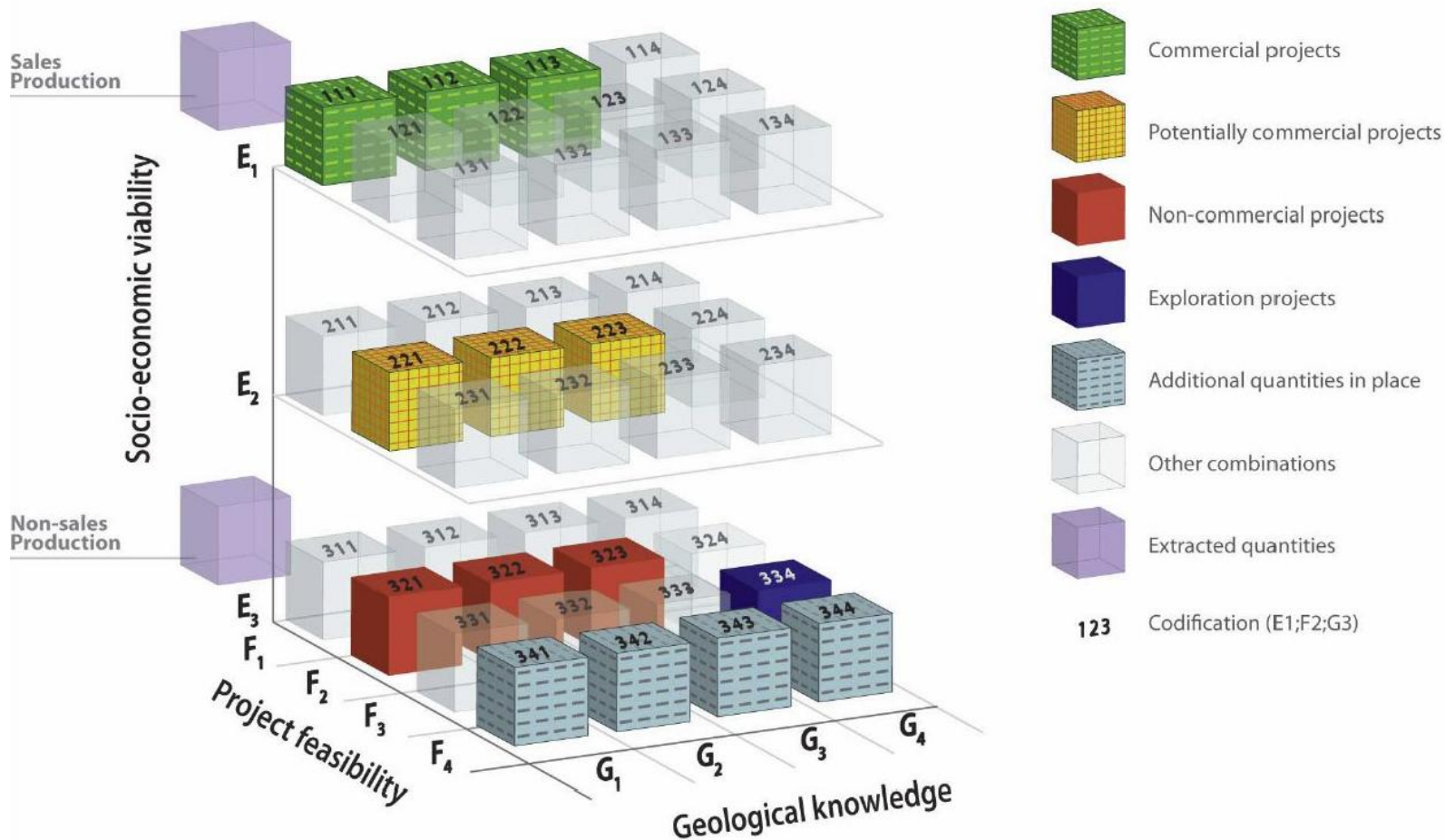
Gate Class

TOTAL PETROLEUM-INITIALLY-IN-PLACE	DISCOVERED PETROLEUM-INITIALLY-IN-PLACE	COMMERCIAL	PRODUCTION			PROJECT STATUS		LOWER RISK PROJECT MATURITY ↑ HIGHER RISK	DG5	1
			RESERVES			On Production	C1		DG4	2
			PROVED	PROVED plus PROBABLE	PROVED plus PROBABLE plus POSSIBLE	Approved for Development	C2			3
				Justified for Development	C3		4			
	DISCOVERED PETROLEUM-INITIALLY-IN-PLACE	SUB-COMMERCIAL	CONTINGENT RESOURCES							5
			LOW ESTIMATE	BEST ESTIMATE	HIGH ESTIMATE	Development Pending	S1			6+
						Development on Hold	S2			
	UNRECOVERABLE									
	UNDISCOVERED PETROLEUM-INITIALLY-IN-PLACE	PROSPECTIVE RESOURCES								
		LOW ESTIMATE	BEST ESTIMATE	HIGH ESTIMATE	Prospect	E1				
			Lead	E2						
UNRECOVERABLE										
← RANGE OF UNCERTAINTY →										

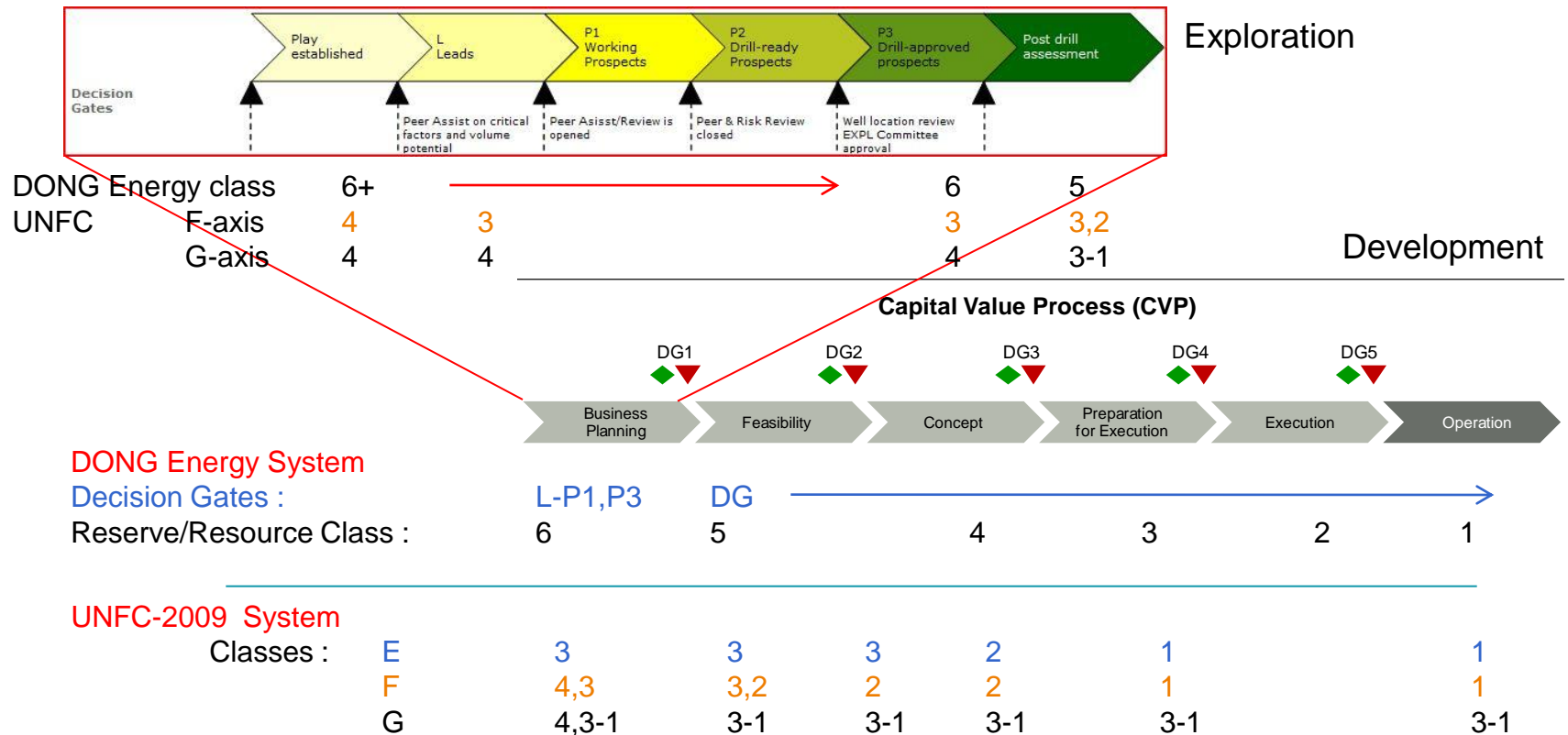


UNFC-2009

UNFC 2009 Classification

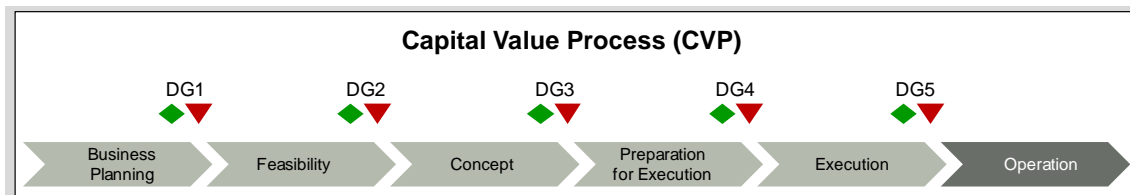


Mapping of UNFC-2009 upon the DONG Classification System



Possible further definition of G-axis would benefit Exploration (low, high cases not easily mapped clearly)

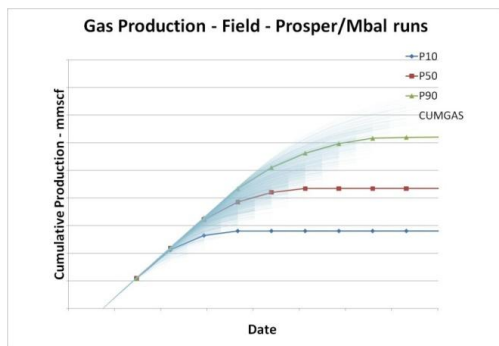
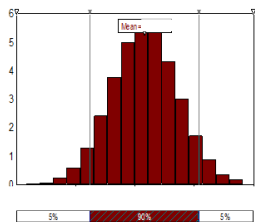
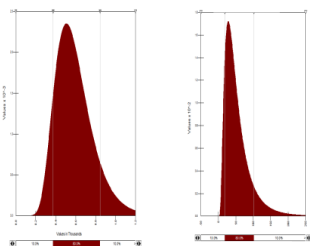
Examples of Final Calculations



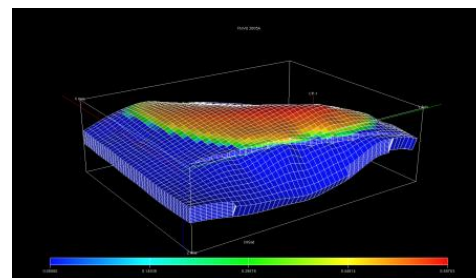
$$EUR = RF * HIIP$$

$$HIIP = Volume * Porosity * Sh * FVF$$

EUR=Estimated Ultimate Recovery
 HIIP=Hydrocarbon Initially In Place
 RF=Recovery Factor
 Sh=Hydrocarbon saturation
 FVF=Formation Volume Factor



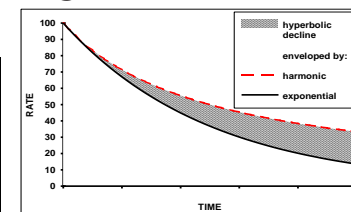
Small models



Static & Dynamic Modelling
(large models)

Based on Production data

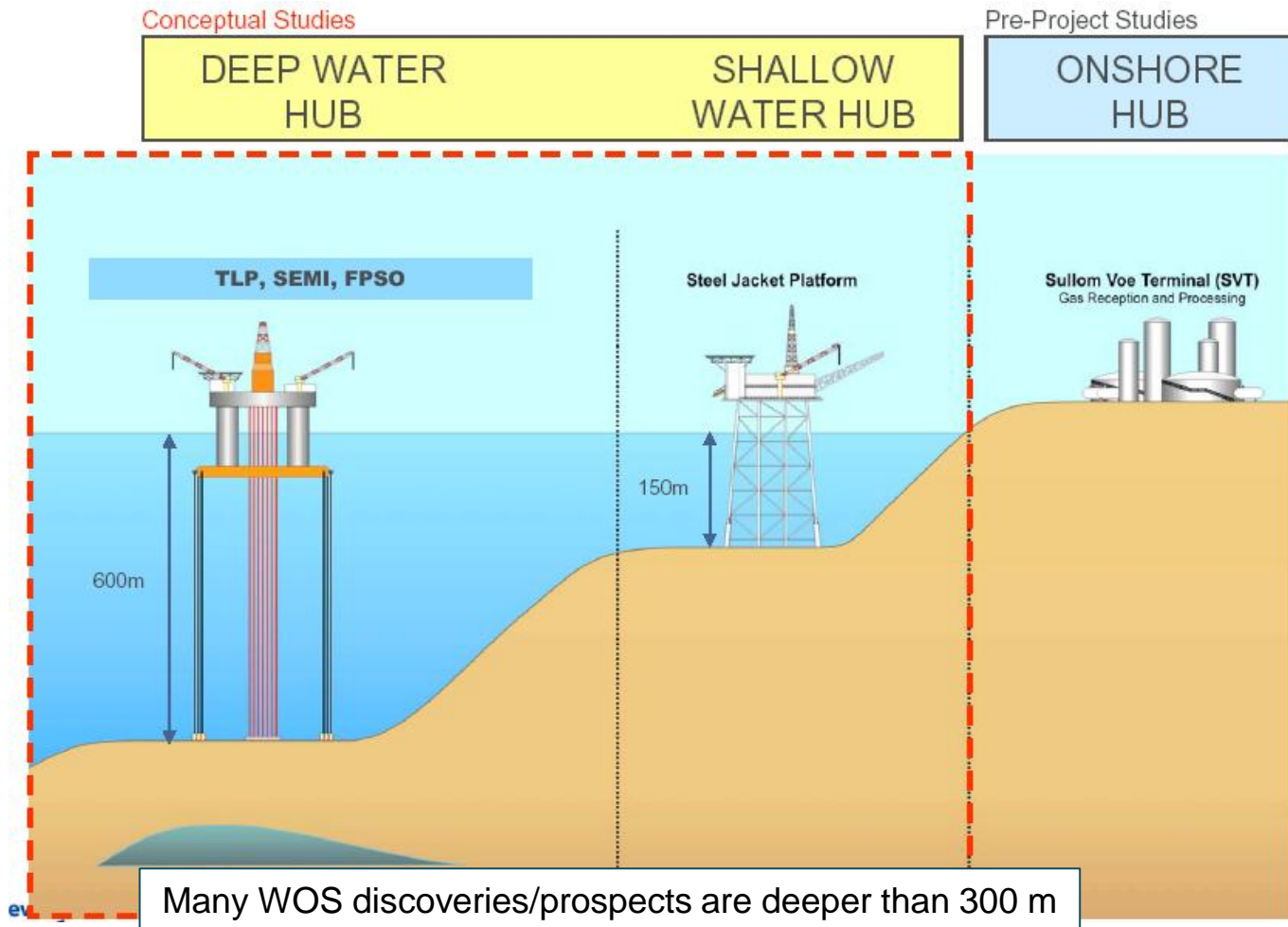
DCA



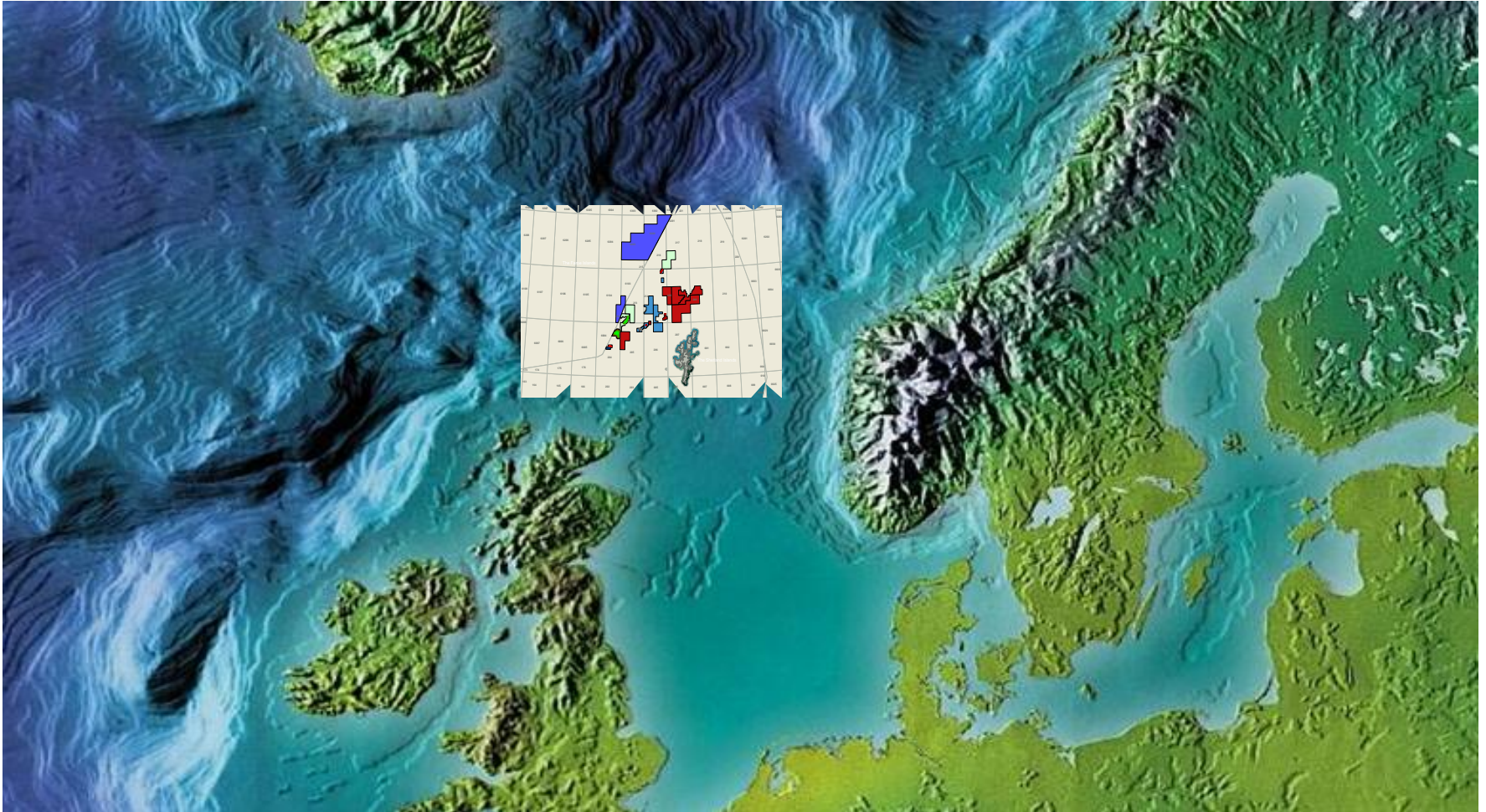
Supported by other tools !

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General – Concept Technical Screening

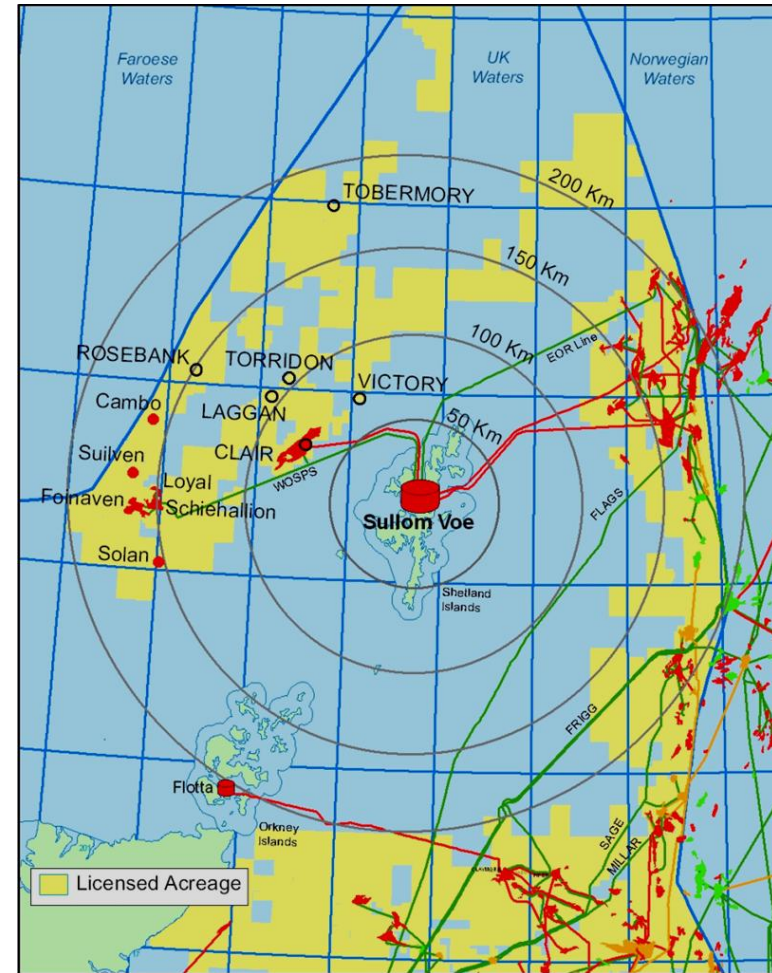


DONG E&P acreage in the UK and Faroese shelf (WoS)



West of Shetlands (WOS)

- Key Characteristics
- Hostile environment
 - Deep water, wind, waves, current, cold water temperatures
- Distant from gas market
 - High development cost
- No direct gas pipeline access to NTS
- Diverse partnerships
- 2 Tcf discovered gas
- Up to 2 Tcf upside on discovered resources
- Up to 4 Tcf of undiscovered potential



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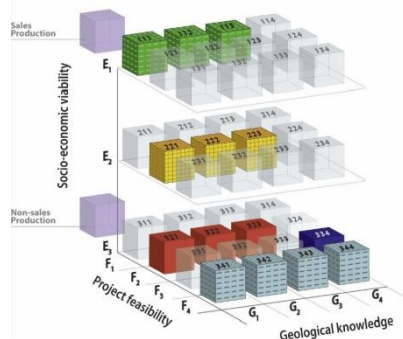


Example – Field

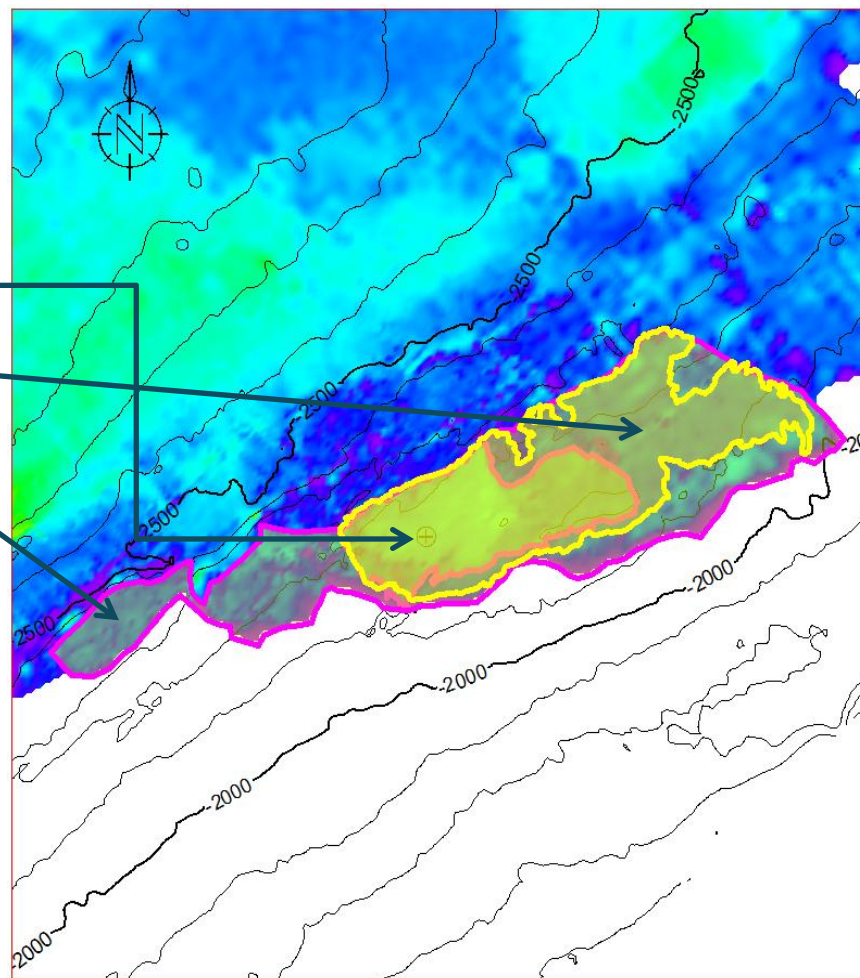


Dong Energy	UNFC-2009
Class 5 low	221
Class 5 mid	+122 (& 222)
Class 5 high	+123 (& 223,233)

Classification depending on commercial status



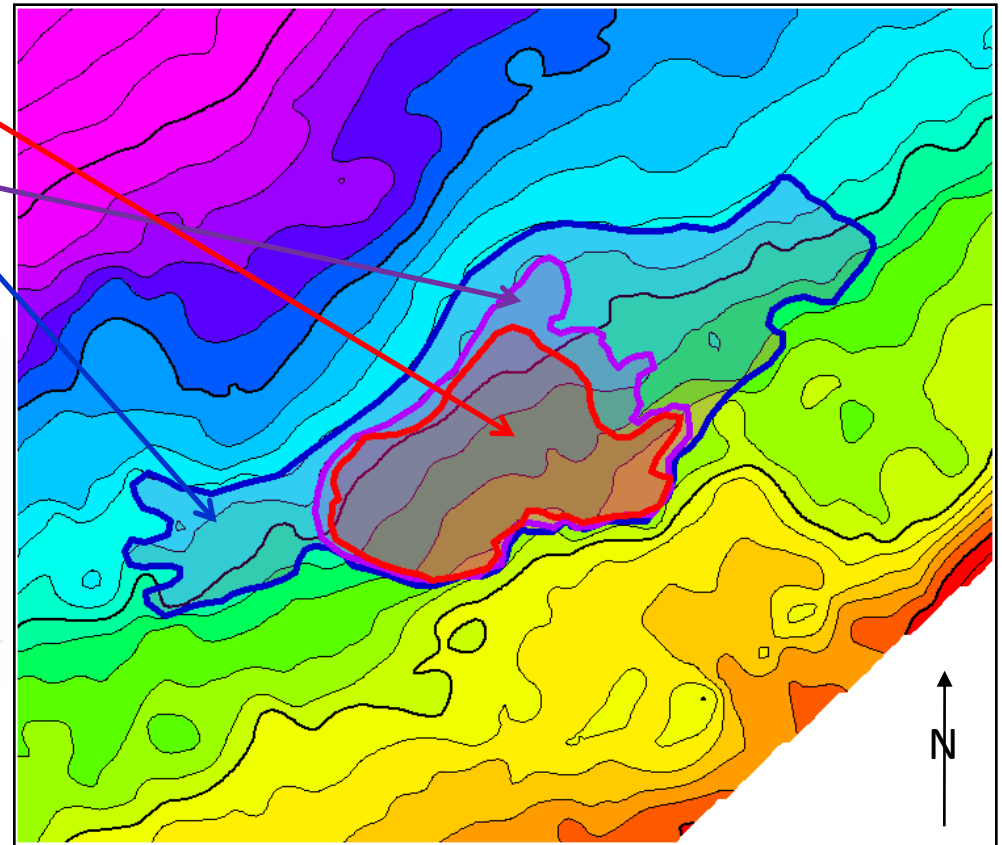
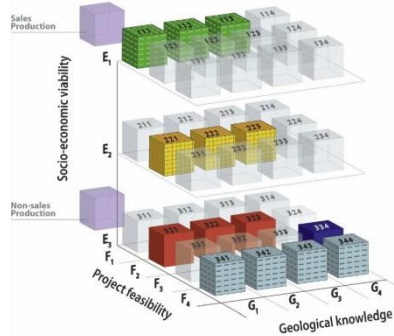
low case define classification status in DONG System for mid/high cases ('112' not possible without '111')



Example – Field – Exploration

Dong Energy	UNFC-2009
Class 6 low	334
Class 6 mid	334
Class 6 high	334 (or 234)

Classification very similar for DONG Exploration projects

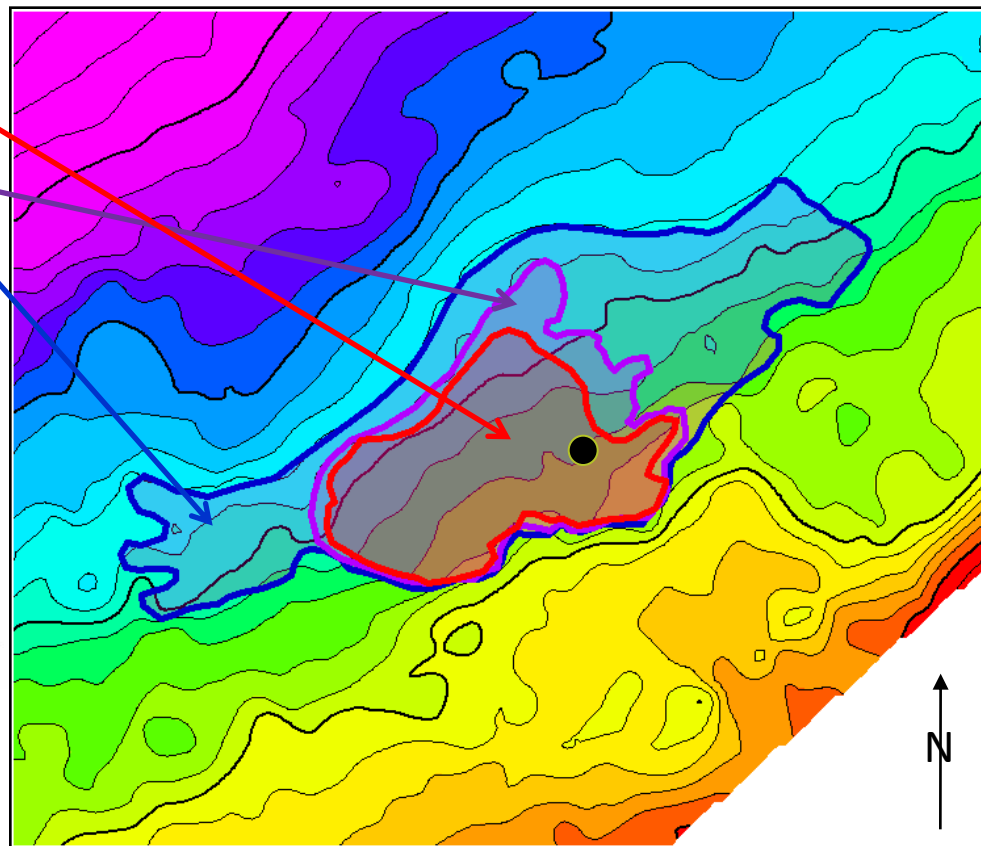
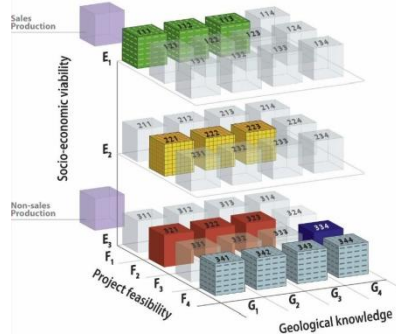


Geological definition less well defined, making ranges (high & low) difficult to show clearly
 This is currently being looked at via the UNFC Task Force specification work

Example – Field – Discovery

Dong Energy	UNFC-2009
Class 5 low	331
Class 5 mid	+332
Class 5 high	+333 (or +233)

Classification options suiting well for DONG development projects



Close out

- DONG Energy Volume booking process is closely linked the Company Project Model
- The company system can be mapped onto the UNFC 2009 system with no major modifications
- No major differences in booking numbers within major categories between the system for the examples used
- Some differences between the DONG System and UNFC-2009 with respect to Exploration
- The 3 dimensional (UNFC) system is generally considered more difficult within the company.
- UNFC 2009 is well suited for better comparing volumes between different systems (companies or national) - although not shown in this presentation

Thank you for your attention

