



Sharp Reflections User Meeting – 23.10.23

# IMPROVING THE DECISION BASIS IN E & P

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# TALK OUTLINE

- Introduction
- Global context and dilemma
- What comprises a good decision basis?
- Thoughts on continuous improvement
- Summary

## TO START - A FEW QUESTIONS TO PONDER

- The purpose of your work is to create ***the best possible basis for a good decision.***
  - What does that mean to you and how you do your work?
  - How can Sharp Reflections software be employed in creating that decision basis?
  - How can you improve your company's decision basis and exploration process with Sharp Reflections software?

# GLOBAL CONTEXT: SUPPLY AND DEMAND SCENARIOS

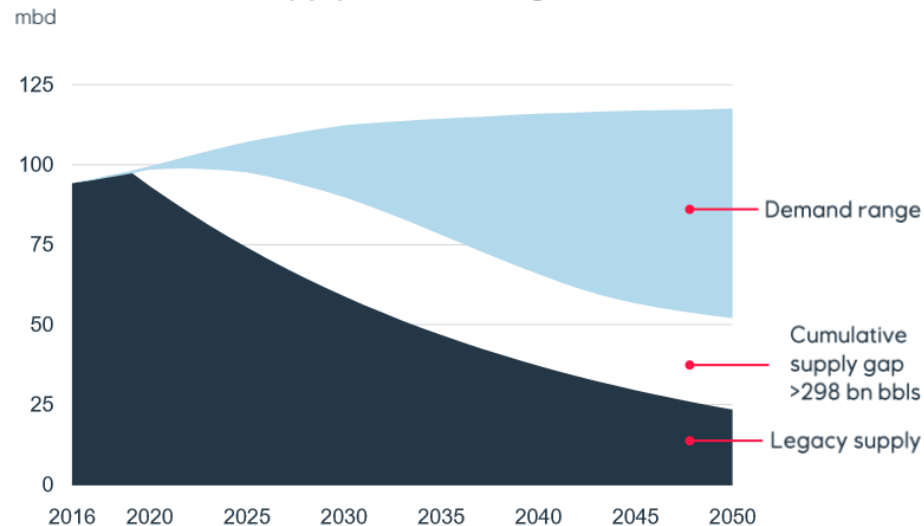
## EQUINOR ENERGY PERSPECTIVES

### What is the need for new oil and gas investments?

Large oil and gas investments in all scenarios, although significantly less in Renewal

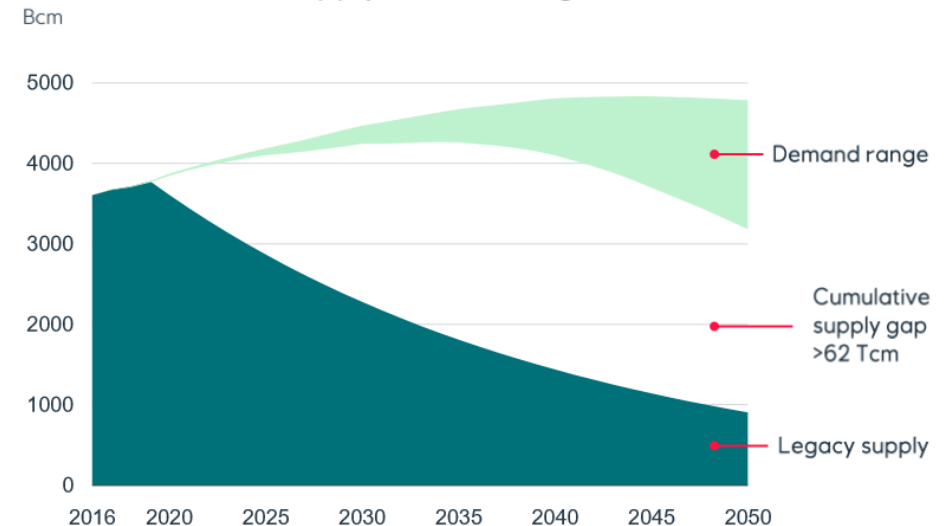


#### Oil demand and supply from existing fields



Source: IEA (history), Equinor (projections)

#### Gas demand and supply from existing fields



Source: IEA (history), Equinor (projections)

# GLOBAL DILEMMA

- Fewer wells are drilled each year and each well proves less on average.
- Finding new resources has become more challenging, but is still critical to achieve.
- Managing discovered and developed resources will take more precedence over time.
- Less capital, fewer people and less experience in sum will be devoted to those tasks going forward.

# YOUR WORK AND FLOWS WILL NEED TO BE:

## efficient

achieving **maximum productivity with minimum wasted effort** or expense.

More ideas, prospects and wells with fewer resources

&

## effective

**Successful** in producing a desired or **intended result**

Identifying the prospects with the best chance of success and correctly predicting volumes

# MAKING THE DECISION

## Positive indicators

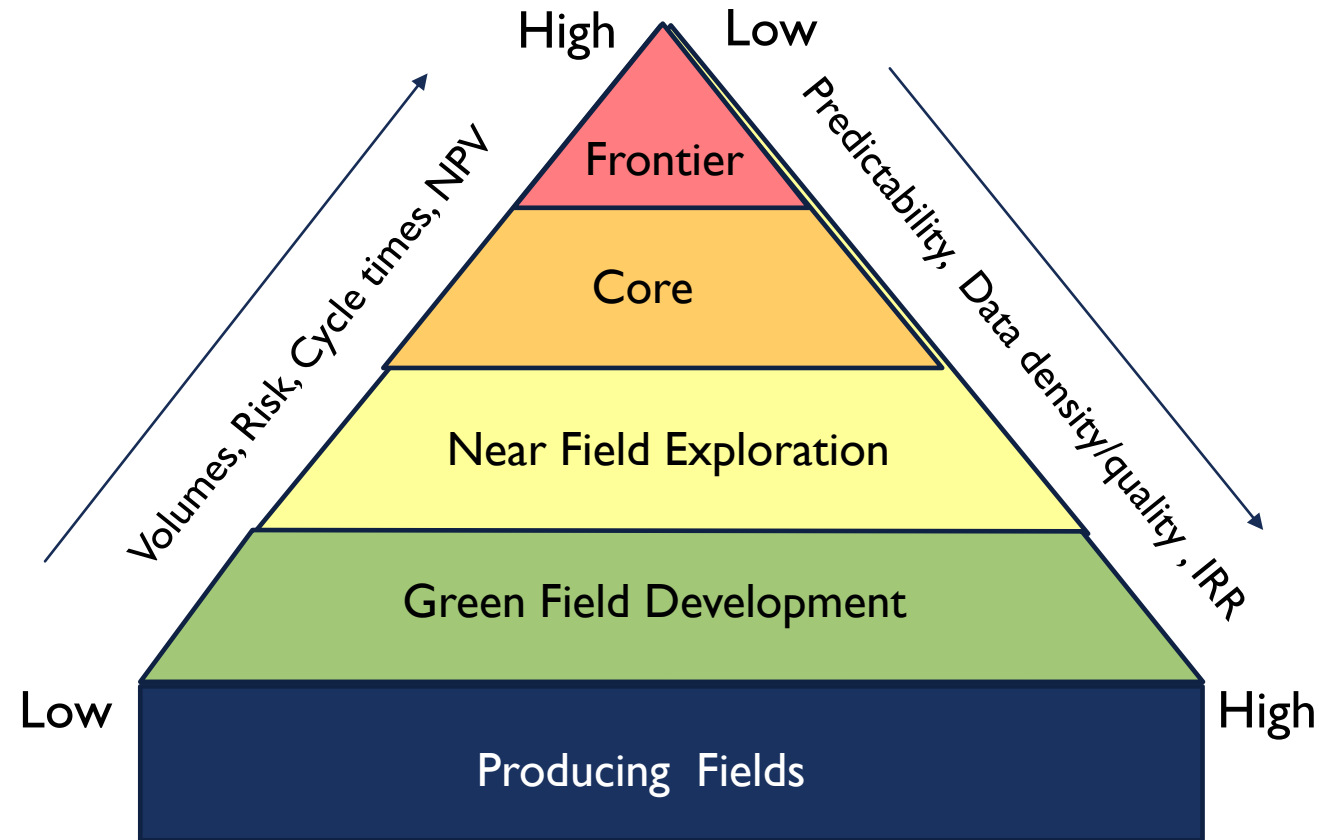
- Good data, good image
- Neutral and critical technical judgements
- Data supports the interpretation
- Model has successful analogues
- Each risk factor determination well supported by data
- Seismic support through
  - Amplitude conformance
  - HWC imaged
  - AVO, amplitudes and attributes match the model

## Not a good sign if ...

- Poor data, poor image
- Biased technical judgements
- Model at odds with basin analogues
- One or more risk factors poorly supported by the data
- Work is incomplete or rushed
- Seismic response does not match the model
- Data does not help to discriminate the risk

# AREA MATURITY SETS EXPECTATIONS

- Higher volumes and NPV increase risk tolerance.
- Smaller volumes and strategic infrastructure, timing considerations decrease risk tolerance.
- Data quality improvements are often the differentiator in Core and Frontier exploration.
- Data quality must be high, risk low and workflow highly efficient in development and production.





# PRIORITIES IN IMPROVING THE DECISION BASIS

- Improving predrill predictability
  - Improving data quality, both amplitude fidelity and image
  - Extracting more critical information from the data
  - Implementing the improvements in a sustainable and robust work process and risk assessment process
- Improving collaboration and teamwork
- Reducing the time and resources to go from data acquisition to final investment decision

# IMPROVEMENTS - SEISMIC VALUE CHAIN



- Holistic planning - fit for purpose seismic
- Improve level of integration in software, db's and competence
- Standardize data organization, terminology and presentation

# T COMPETENCES AND HIGH PERFORMING TEAMS

← Cross Discipline Competence →

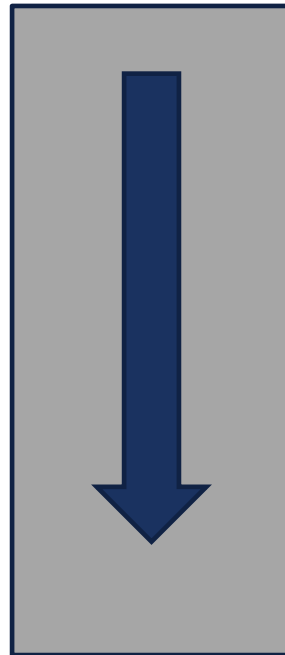
Geology

Reservoir  
engineering

QI

Prospect  
Analysis

Petrophysics



Deep Discipline  
Expertise

# SUMMARY

- Your work is critical. The world will need access to hydrocarbons for decades to come. But even more important than ever is that the work is carried out efficiently and effectively.
- Your task is to create the best possible decision basis for your company to evaluate their investments with.
- You can improve that decision basis through
  - Effective teamwork
  - An unbiased assessment of data quality, uncertainty, risk and interpretation
  - Considering and implementing improvements in the seismic workflow
  - Using your competence to correctly polarize risk



THANK YOU

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# THE DECISION BASIS: RISK AND VOLUME

$$P_g = P(\text{reservoir}) \times P(\text{trap}) \times P(\text{source})$$

Presence  
Quality

Closure  
Seal

Presence  
Maturity  
Migration

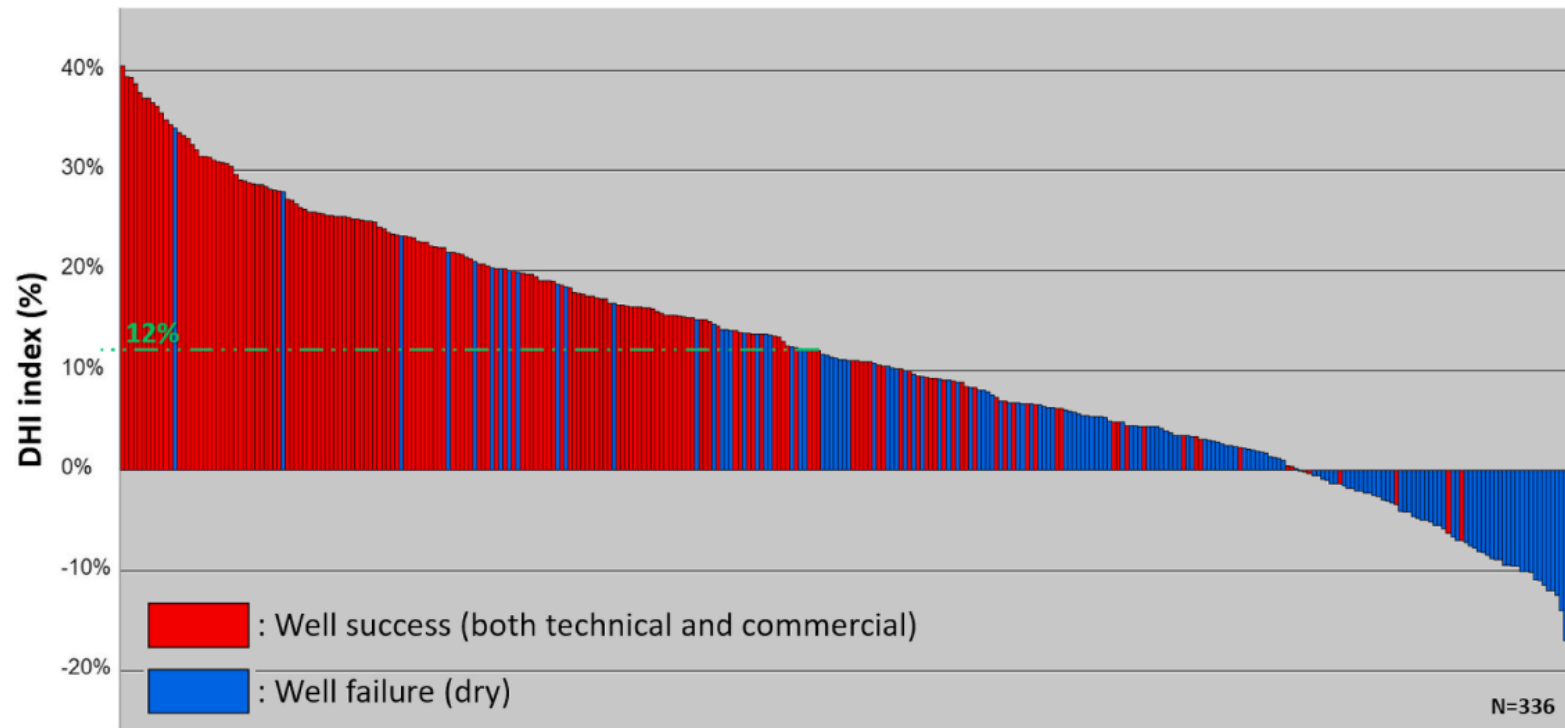
$$\text{Recoverable Volume} = \text{Bulk Rock volume} \times \text{Porosity} \times \text{Saturation} \times E_f \times R_f$$

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# DHI'S ARE VERY STRONG RISK DISCRIMINATORS

N. Nosjean et al.

Journal of Petroleum Science and Engineering 202 (2021) 108515



**Fig. 8.** Drilling results of Prospects versus DHI Index for the DHI Consortium Database. This graph, which was extracted from the DHI Consortium database, shows each of the Consortium's 336 calibration prospects (as of 2019) as a vertical bar colored red for geological / technical successes or blue for dry holes. The prospects have been sorted left to right from largest DHI Index to smallest. We can observe some false positives and false negatives in the well results, due to particular pitfalls, such as low saturation gas, seismic artifact responses and other seismic data quality related issues. For prospects with DHI Indexes above 12-15%, most of the wells are successful. For wells with DHI Indexes below 12% the positive impact of DHIs diminishes including negative DHI Indexes.

# BUSINESS MODEL – SIMULATION AREA B

## Portfolio High Grading

- Better prospect discrimination results in
  - Improved discovery rates
  - Improved commercialisation rates
  - Shorten cycle times
- Improved discovery rates and volumes leads to
  - Significant value add
  - Increased Portfolio Value

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