



# **The Development of Risk Management in the GCC Oil and Gas Sector**

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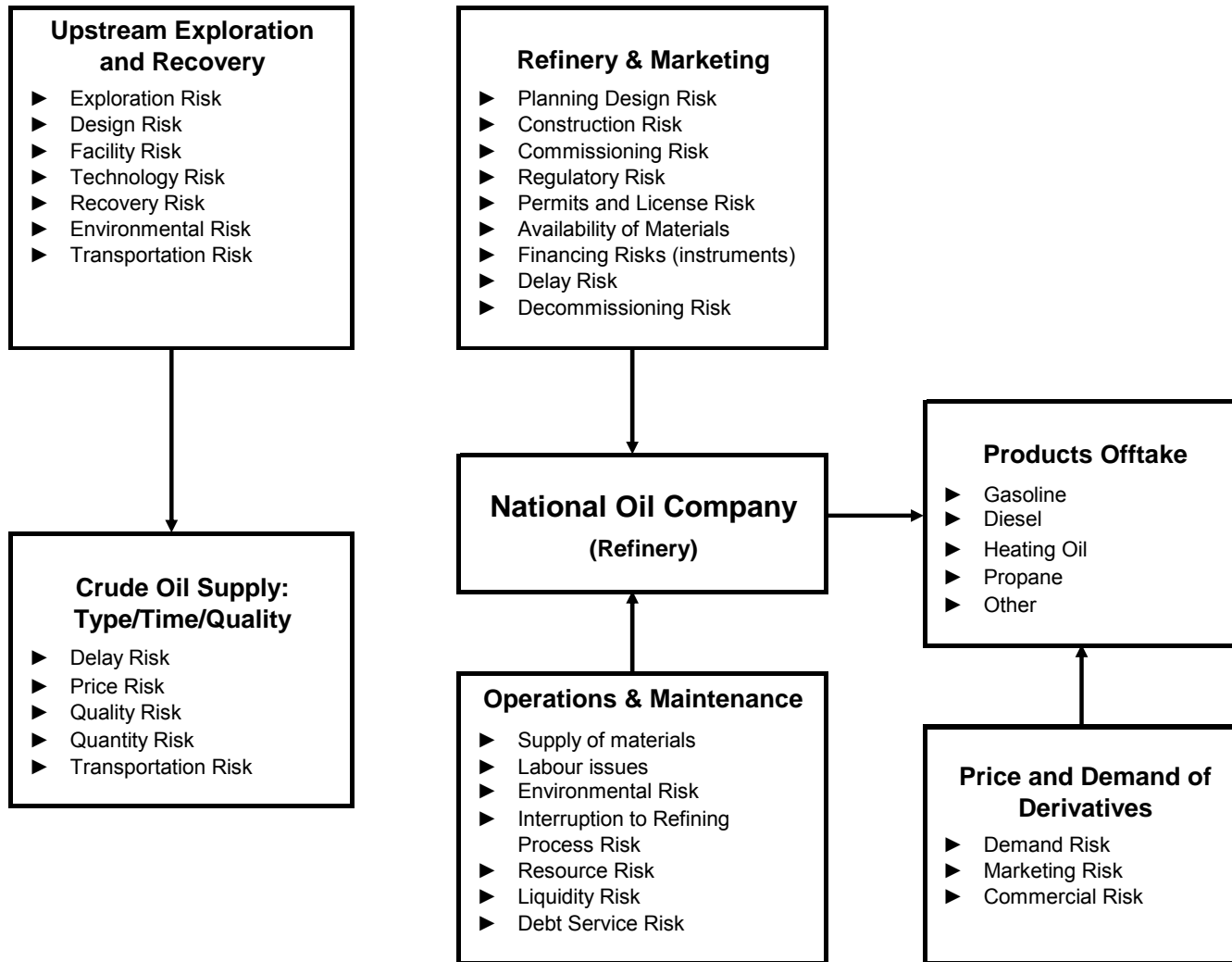
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## Characteristics of Oil and gas Industry

- **Oil and gas industry is prone to uncertainty**
  - Oil reserve uncertainty
  - Exploration uncertainty
  - Crude price uncertainty
  - Product price uncertainty
  - Demand uncertainty
  - Supply uncertainty
- **Oil and gas industry is a complex industry affected by**
  - Global risks (political, legal, commercial and environmental)
  - Element risks (construction, operation, financing and revenue generation)
  - Both risks categories affects upstream and downstream phases
- **Crude oil characteristics significantly affect oil field margin and refining margin**
  - API gravity
  - Sulfur content
  - Location of production
  - Transportation
  - Recovery cost

# Typical Risks in the Oil and Gas Industry



## GCC National Oil Companies Main Risks

- Terrorism and criminal activities
- Availability of oil and gas resources
- Energy price volatility
- Infrastructure and development issues
- Political and regulatory risk issues
- Risk of natural disaster
- Recruitment and retention of qualified workforce
- Outbreak of pandemic
- Environmental issues
- Financial risk
- Supply chain risk

## Why Risk Management is becoming important in the oil and gas industry

- The risks encountered both upstream and downstream need to be addressed to ensure commercial viability of an oil and gas project.
- In the upstream sector, the industry is characterized as “high-risk” industry due to the sizeable investment level, geological uncertainties and other risks related to fiscal and political uncertainties with host producing countries.
- Downstream sector bears risk which is related to uncertainty of the crude (supply) and the product market (off-take).
- Risk management can be applied to marginal oil and gas fields (projects) to improve/make them commercially viable.

# Techniques and Software used for Risk Management in Oil and Gas Industry

## ▪ Qualitative Techniques

- Brainstorming
- Assumptions analysis
- Interviews
- Checklists
- Risk registers
- Risk mapping
- Probability impact table
- Other

## ▪ Quantitative Techniques

- Decision Trees
- Monte Carlo Simulation
- Sensitivity Analysis
- Probability, Impact Grid (PIG) Analysis
- @ Risk
- Crystal Ball
- Excel Spreadsheet
- CASPAR (Computer Aided Simulation for Project Appraisal and Review)
- Other

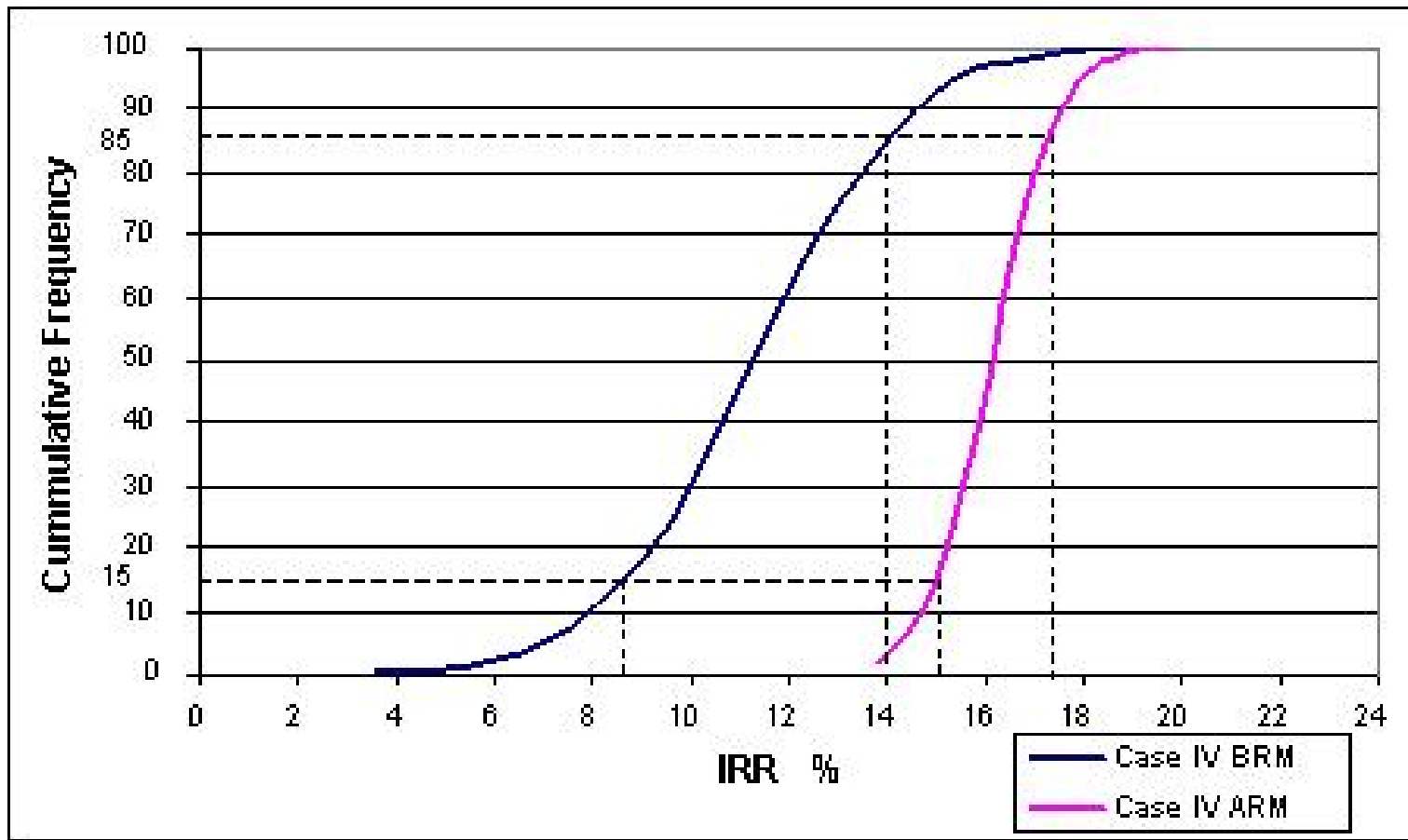
## Distribution of Risks before Risk Mitigation Methods (BRM) Upstream Case Study

ID	Type of Risks	Affected Activity	Sample	Distribution Range		Changes is the IRR%
				Lower	Upper	
1	Exploration	AA	EXP	0	20	-1%
2	Technical Feasibilities	WC, OC, MC	TFB	0	20	-12.5%
3	Approval	WD, OD, EC, OC, MC	APP	0	20	-15.9%
4	Design	WC, OC, MC	DES	0	20	-12.3%
5	Site Conditions	WC, OC, MC	SCO	0	20	-10.5%
6	Construction Delay	WC, OC, MC	COD	-10	20	+6%, -10.5%
7	Weather	WC, OC, MC	WTH	0	10	-6.7%
8	Supply	WC, OC, MC	SUP	-10	20	+6%, -10.5%
9	Operation Maintenance	O & M	O & M	0	20	-1.6%
10	Environmental Risks	O & M	ENV	0	20	-1.6%
11	Price	RR	PRI	-20	20	+18.5%, -22%
12	Reserve Durability	RR	RSD	0	15	-16.0%
13	Political	RR	POL	0	30	-34.9%
14	Taxation	RR	TAX	0	20	-0.4%
15	Interest	FEC	INT	-20	20	+2%, -2%

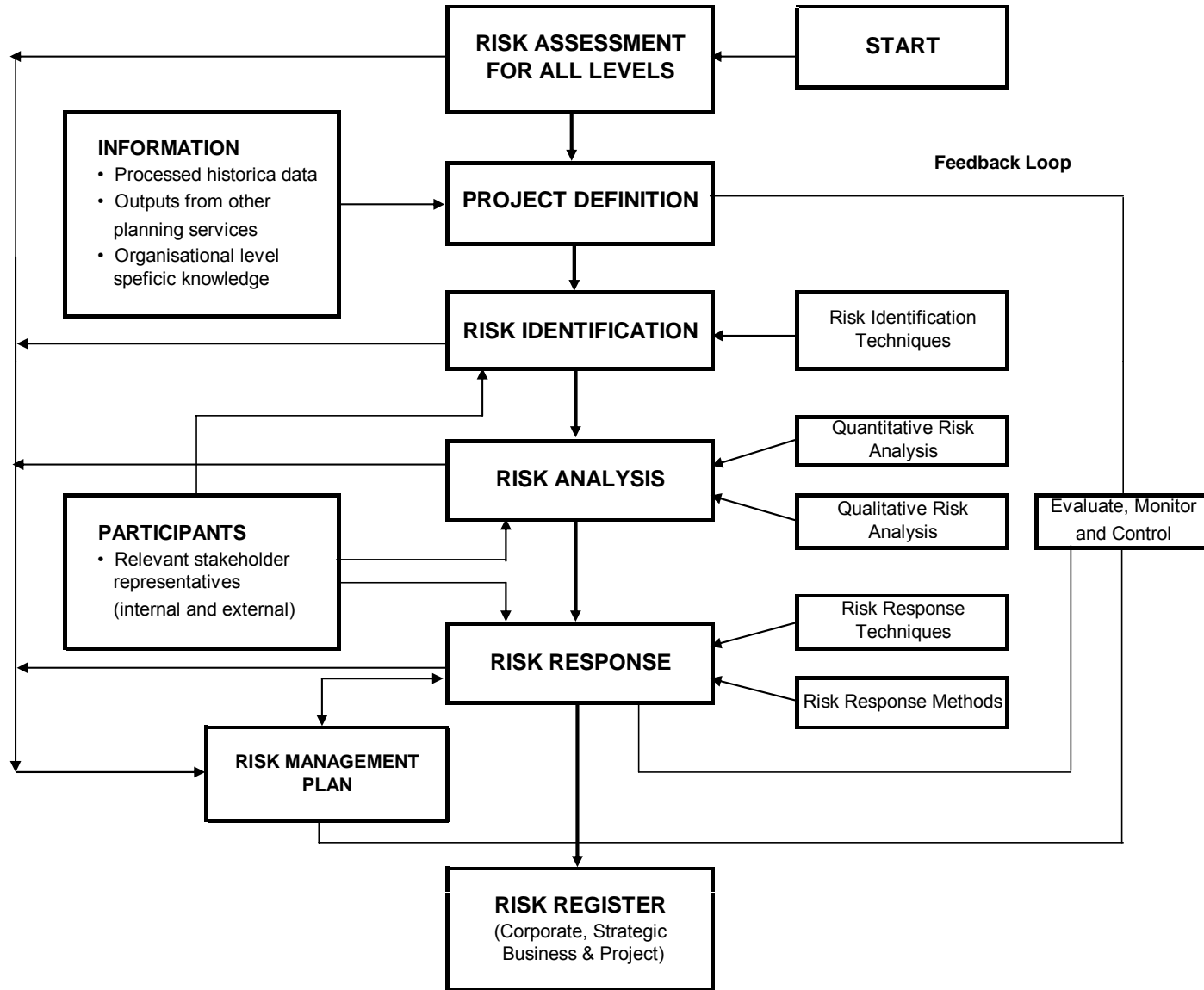
## Risk Distributions and Effect of the IRR after risk mitigation (ARM)

ID	Type of Risks	Affected Activity	Sample	Distribution Range		Changes is the IRR%
				Lower	Upper	
1	Exploration	AA	EXP	0	5	-1%
2	Technical Feasibilities	IC, OC, PC	TFB	0	5	-3.5%
3	Approval	ID, OD, IC, OC, PC	APP	0	5	-5.8%
4	Design	IC, OC, PC	DES	0	5	-3.5%
5	Site Conditions	IC, OC, PC	SCO	0	5	-2.8%
6	Construction Delay	IC, OC, PC	COD	-10	5	+6%, -5.5%
7	Weather	IC, OC, PC	WTH	0	10	-3.5%
8	Supply	IC, OC, PC	SUP	-10	5	2.9%, -2.8%
9	Operation Maintenance	O & M	O & M	0	5	-0.4%
10	Environmental Risks	O & M	ENV	0	5	-0.4%
11	Price	RR	PRI	-20	10	+9.6%, -10.4%
12	Reserve Durability	RR	RSD	0	5	-5.1%
13	Political	RR	POL	0	10	-10.4%
14	Taxation	RR	TAX	0	5	-0.1%
15	Interest	FEC	INT	-5	5	+0.5%, -0.5%

## Comparison of Probability Analysis BRM and ARM for GPP



# Risk assessment for all levels of an organization





## Risk Management for Decision-making

- Effective risk management is as much about looking to make sure that **you are not missing opportunities as it is ensuring you are not taking inappropriate risk.**
- Risk management provides a framework to **improve decision-making.**
- Risk management involves identifying risks, predicting how probable they are and how serious they might become, **deciding what to do** about them and implementing these decisions.
- The risk analysis and subsequent risk mitigation **provides financial information** to potential lenders, promoters or equity providers for each project scenario.
- Improvement of project or business planning by answering “**what if**” questions with imaginative scenarios.
- Provision of alternative plans and appropriate contingencies and consideration concerning their management as part of **a risk response.**
- The generation of **imaginative response** to risks.
- Decisions are supported by thorough analysis of the data available estimates can be made with greater **confidence both technical and financial.**
- **Development of a risk register** to cover all elements of the process and the response to identified risks by stakeholders to the project investment.
- Determines **the commercially viability of a project** for mean, pessimistic and optimistic scenarios.

## Conclusion

- The management of risk is one of the most important issues facing oil and gas organizations today.
- Risk management can be considered as the sustainability of a business in the environment it is in.
- All risks need to be assessed at all levels (corporate level, strategic business level and project level).
- Risk management can be applied effectively to oil and gas project like any other investment project.
- The results of risks analysis, both sensitivity and probability can identify the quantitative effect on a project economics should such risk occur.
- Risk management creates confidence in decision making.
- Potential losses and gains can be identified and managed.
- No decision can be taken without a comprehensive risk assessment.
- Effective risk management improves the commercial viability of oil and gas projects.



**THANK YOU**