

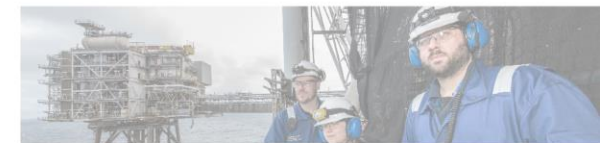


# Introduction to Upstream Oil and Gas for the Net Zero World

## Upstream Economics



Long Wang  
Group Chief Economist  
Harbour Energy  
4 December 2024



# Agenda

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- Introduction
- Economics in Exploration and Production Life Cycle
- Cash Flow Analysis
- Financing Upstream Oil & Gas Projects
- Q&A

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How long have you worked in or with an upstream oil and gas company?



**What do you like to learn in the next 40 minutes?**

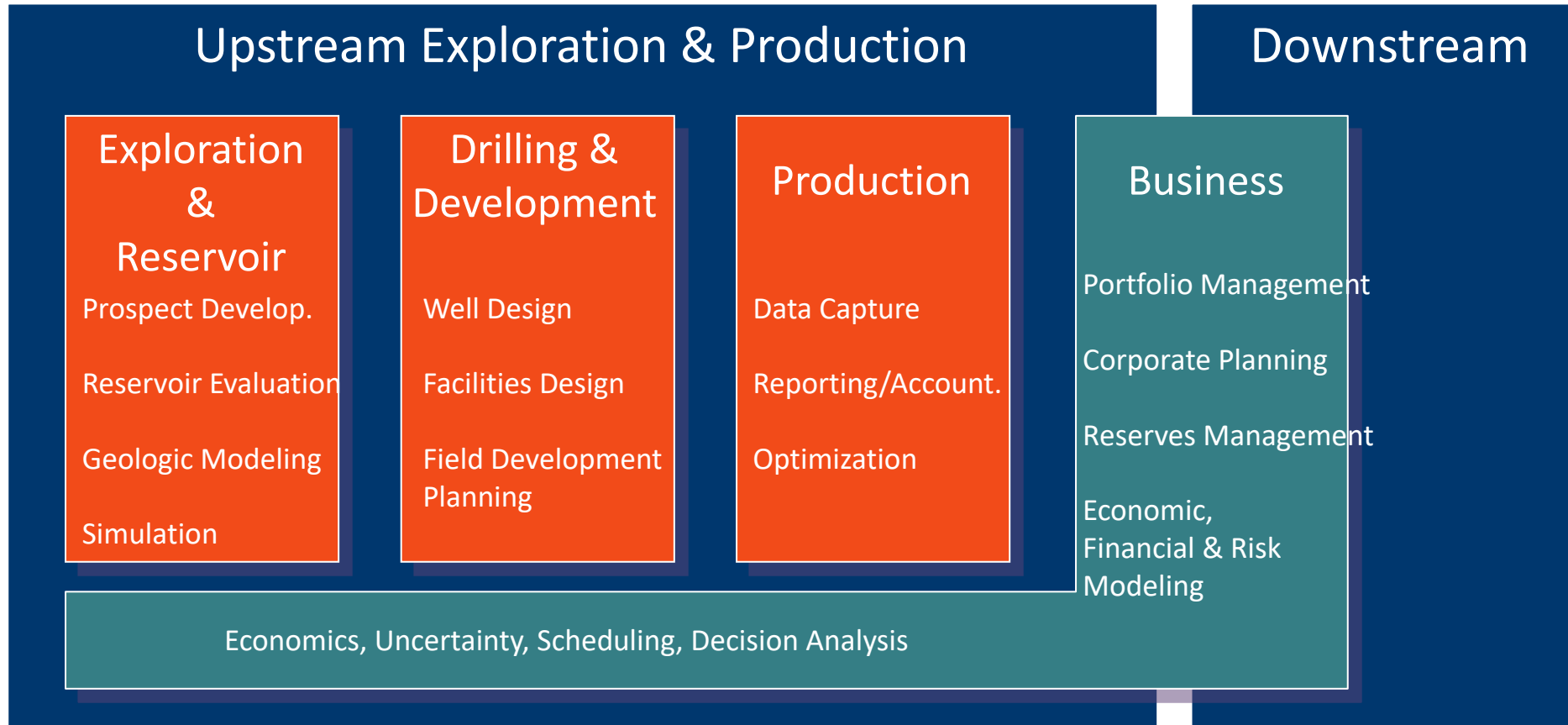
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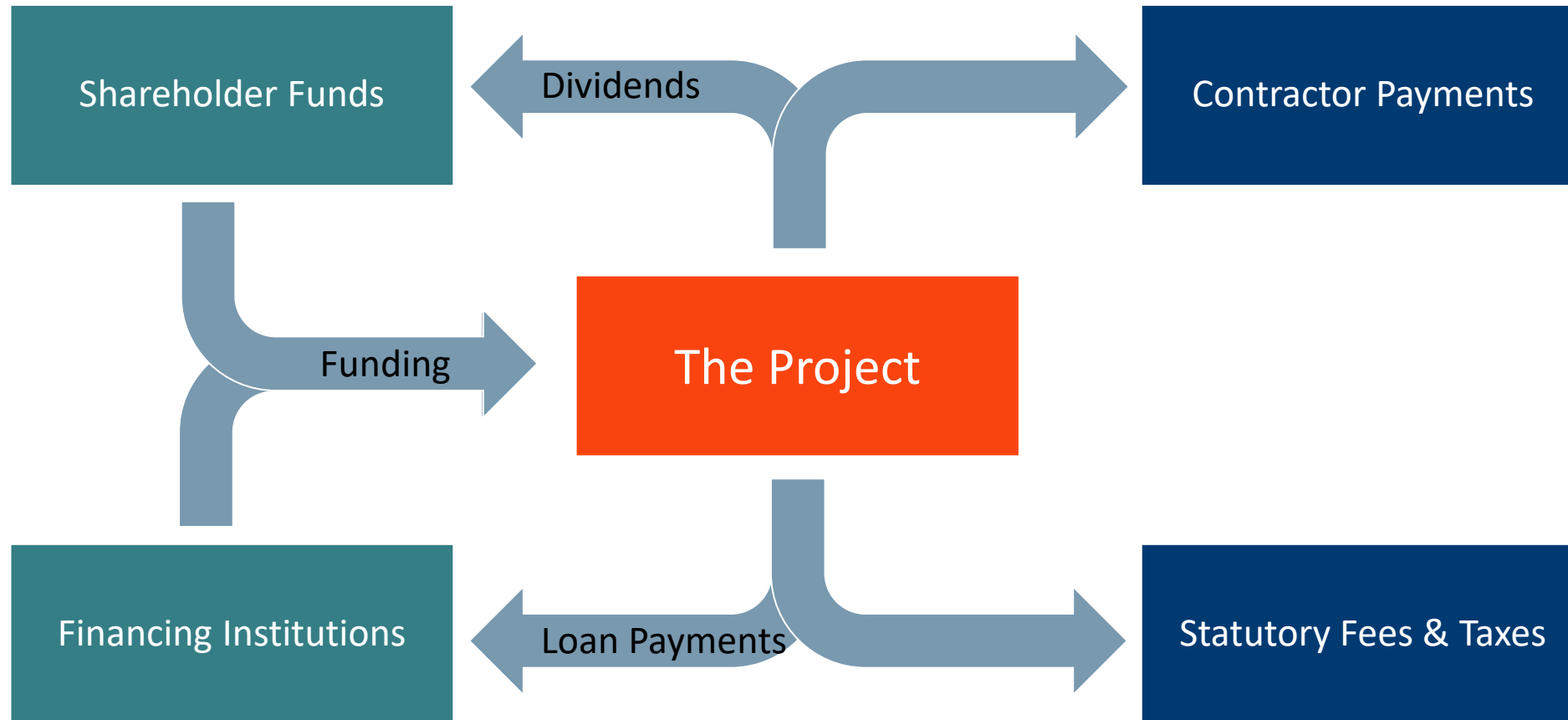
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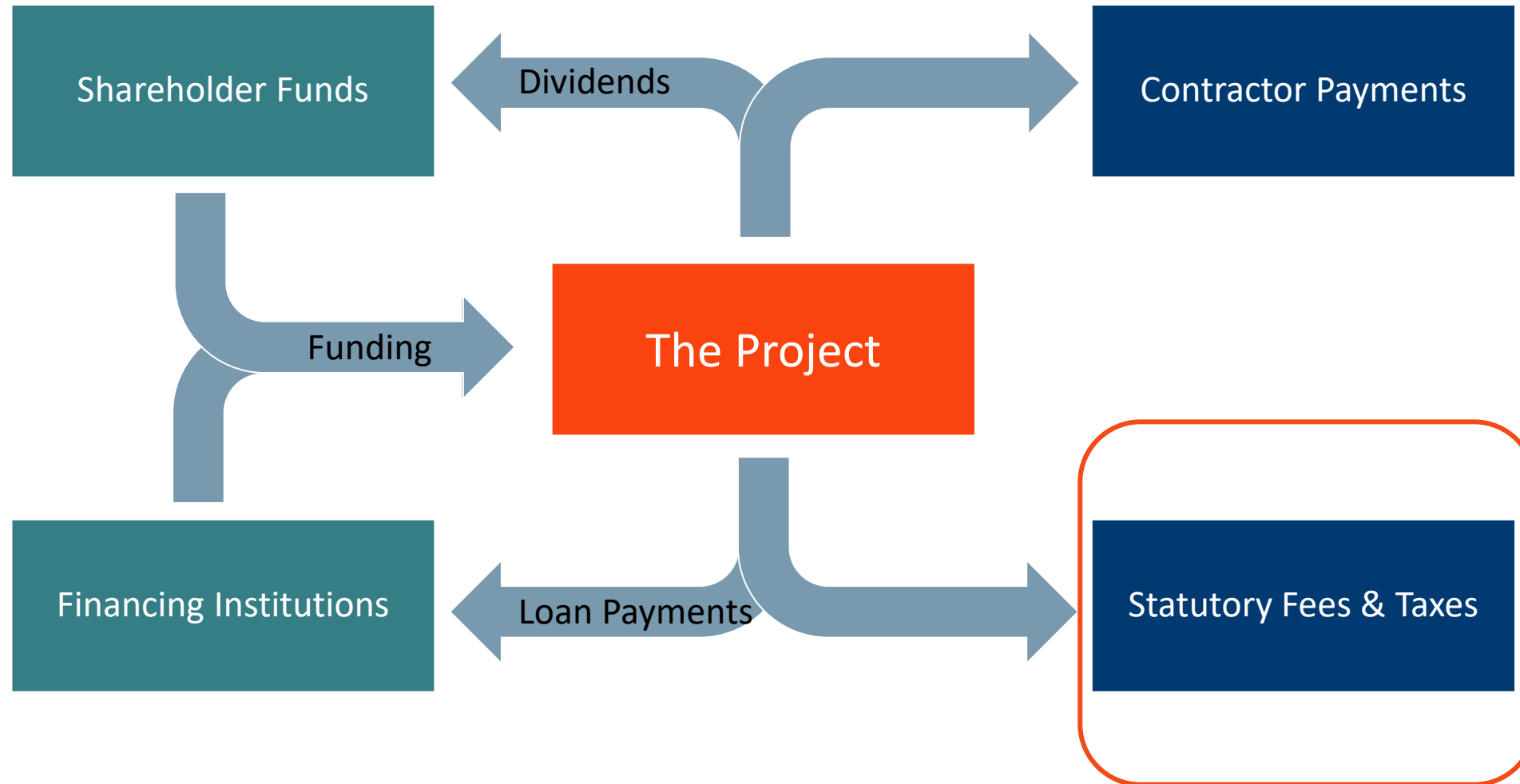
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# Economists View of a Project



# Economists View of a Project





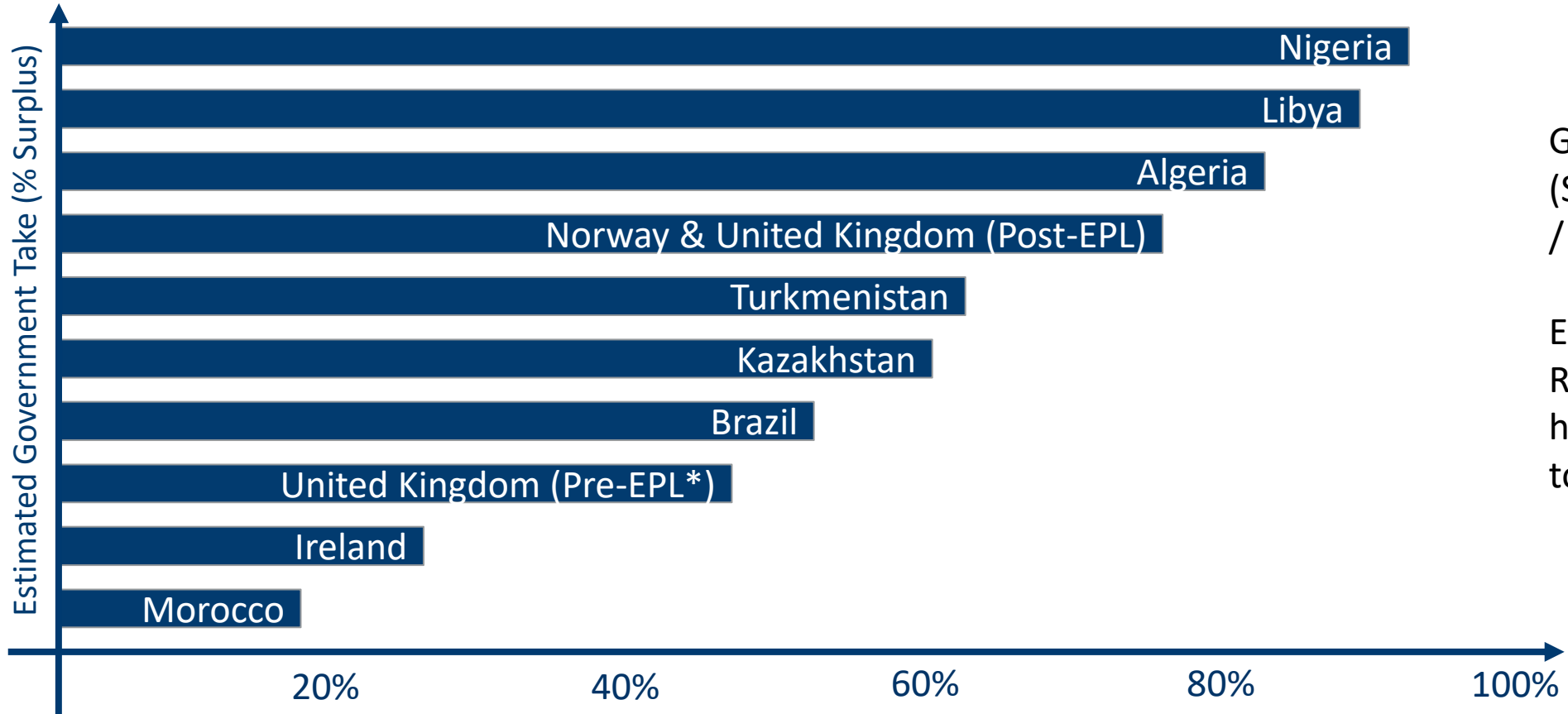
## Key concepts: Types of Exploration & Production (E&P) contracts

- E&P contracts have changed and grown in complexity.
- There are three main family types of contracts globally.
- Each contract has its pros and cons

	Royalty / Concession Regime	Production Sharing Agreements/Contracts (PSA/PSC)	Service Agreements Risk Contracts
Risks	Contractor	Shared	State
Ownership	Contractor	State	State
Countries	UK, NO, US, CA,	ID, AO, MX	VN, IR, IQ, EC, MX
From a Contractor point of view			
Royalties	Likely (UK/NO exceptions)	Depends	-
Tax	Yes	Yes	Yes
Bonus	No	Yes	No
Firm commitment	Yes	Yes	
Share of production	All production	Part of production	No

# Fiscal Lever, Government Take

Is one Barrel = one Barrel?



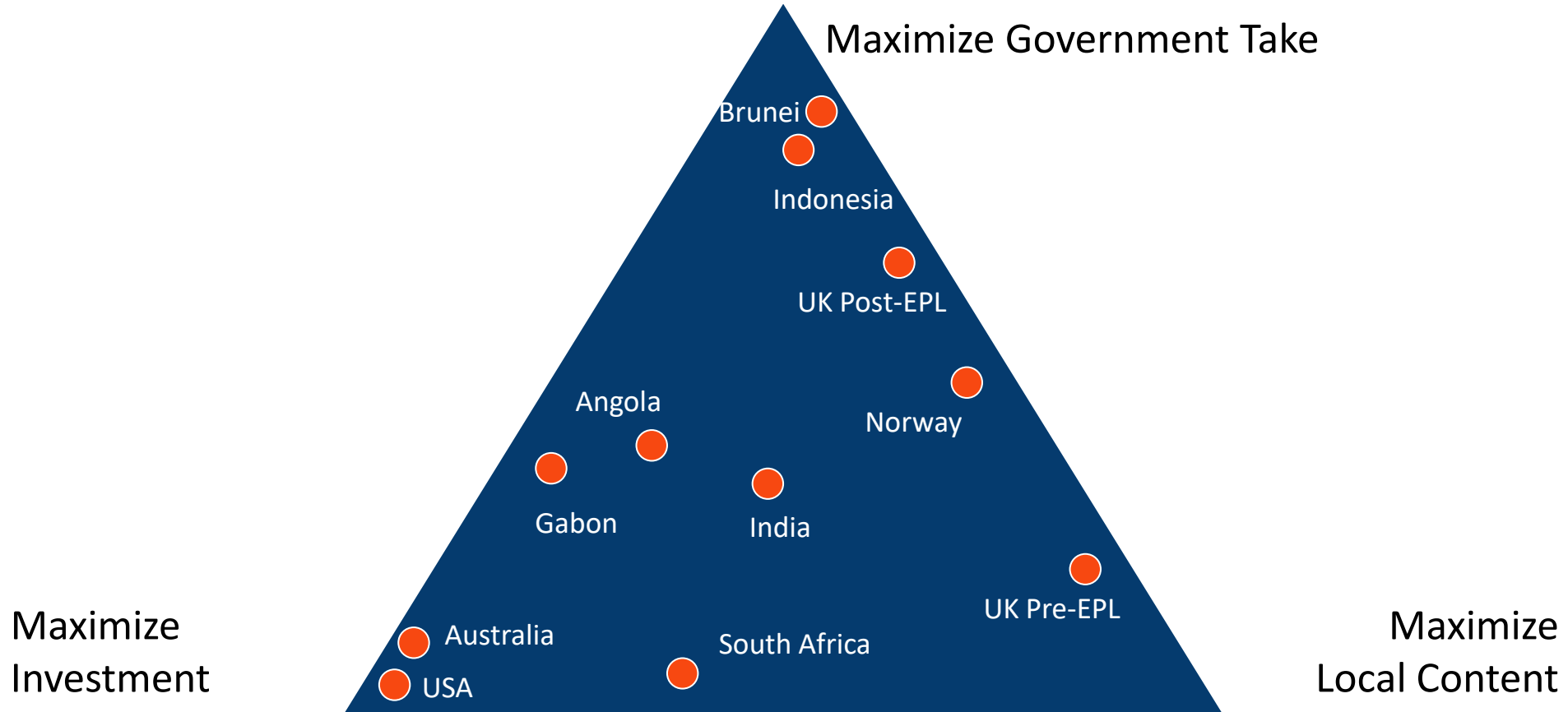
Government Take =  
(Statutory Fees & Taxes)  
/ Economic Surplus

Economic Surplus =  
Revenue from sale of  
hydrocarbon minus cost  
to produce them

Source: Rystad Energy

\*EPL stands for Energy Profit Levy

# Strategic Drivers of Host Governments



## Exercise: Government Take

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- Oil Price=100\$/bbl
- Royalty=10%
- Capex=30\$/bbl
- Opex=10\$/bbl
- Income Tax=30%
- Government Take=?

## Exercise: Government Take

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- Oil Price=100\$/bbl
- Royalty=10%
- Capex=30\$/bbl
- Opex=10\$/bbl
- Income Tax=30%
- Government Take = (Royalty+ Income Tax) / Surplus  
= [100\*10%+(100(1-10%)-30-10)\*30%]  
/(100-30-10)  
=25/60  
=42%

# Agenda

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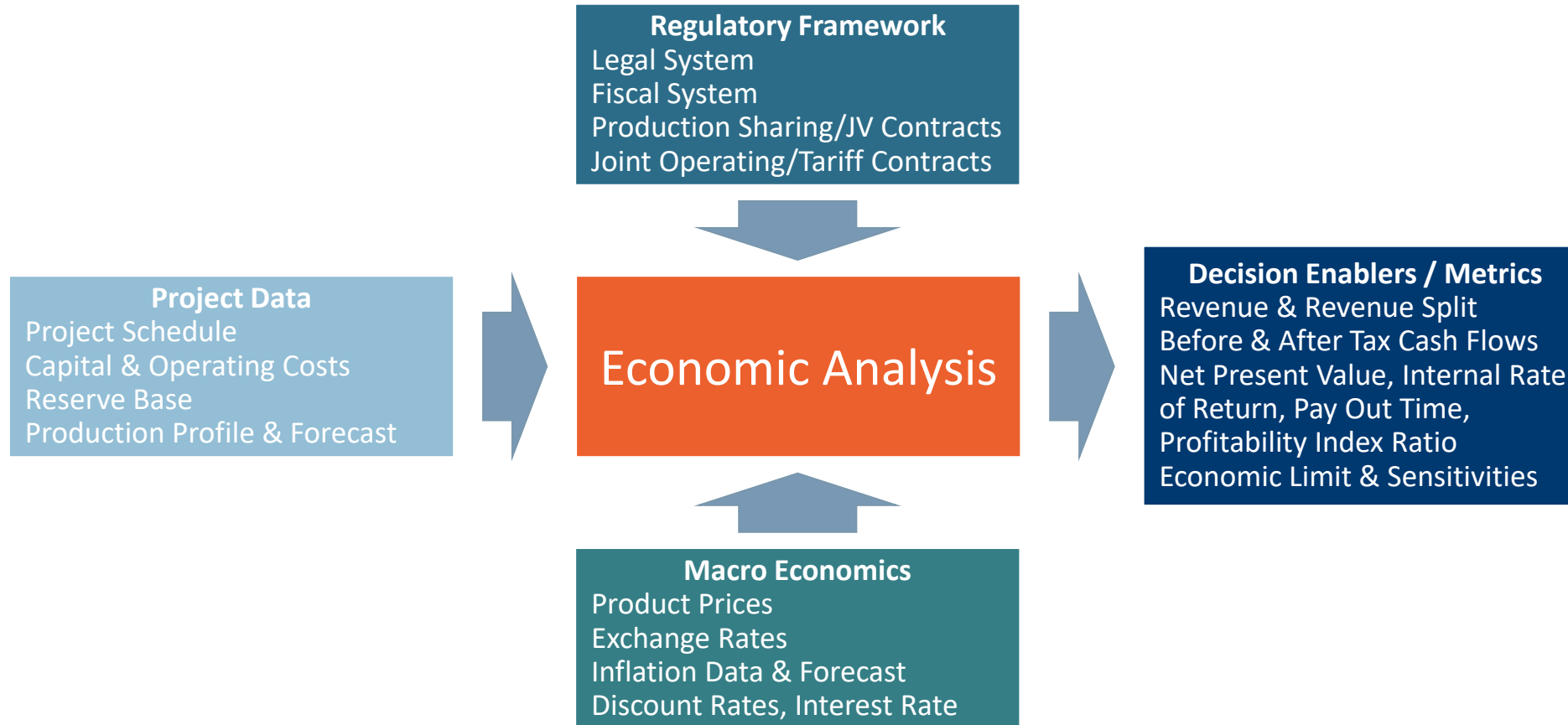
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## Why Do We Study Petroleum Economics?

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- Quantifying attractiveness of investment
- Determining the value of a lease bid
- Selecting the best development option
- Contributing to budget proposals
- Maximizing the value of existing assets
- Evaluating opportunities for farm-ins, acquisitions, divestments
- Assessing the impact of tax changes
- Supporting negotiations of contracts or equity determinations

# Economics of an Upstream Project





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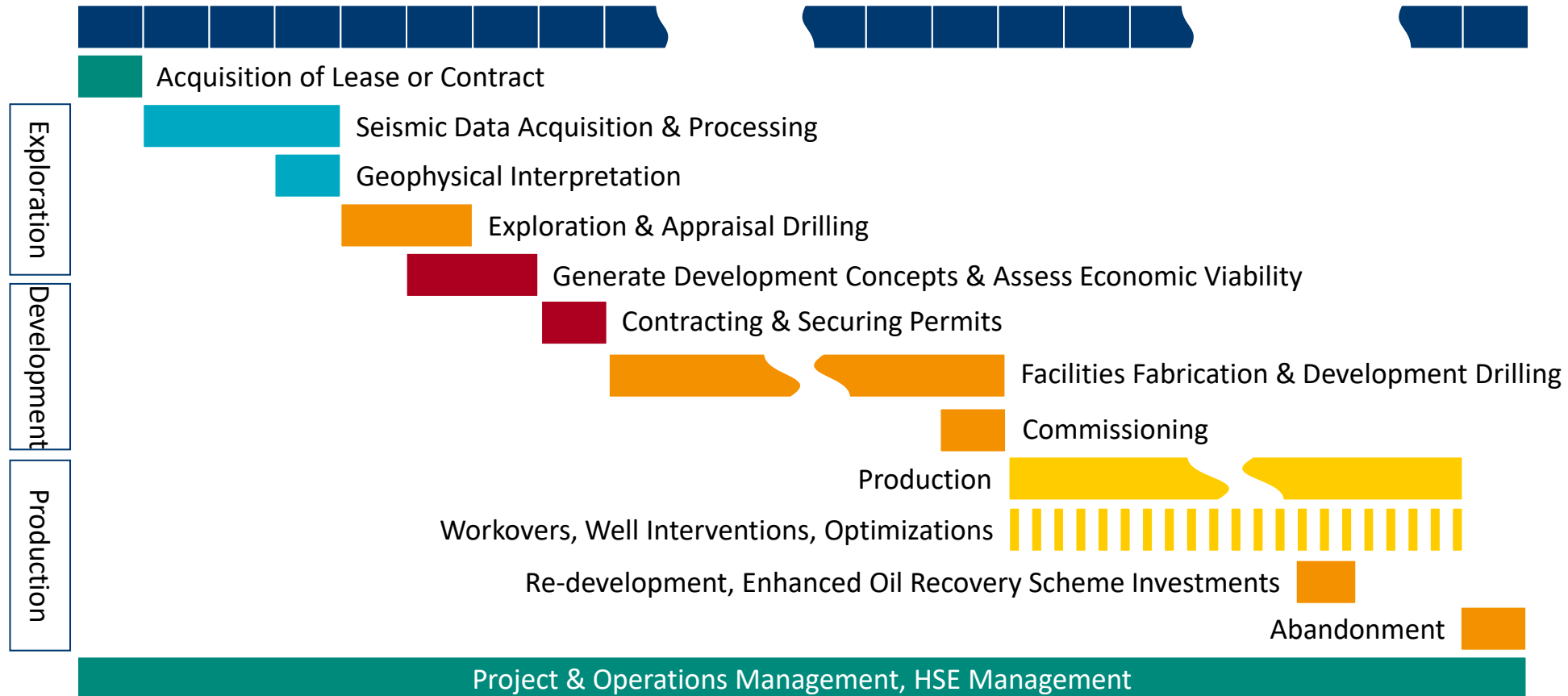
## Revenue Sources

- Gross Revenues from sale of Hydrocarbons
- Tariffs received from renting out facilities
- Payments from farming out an interest in the venture

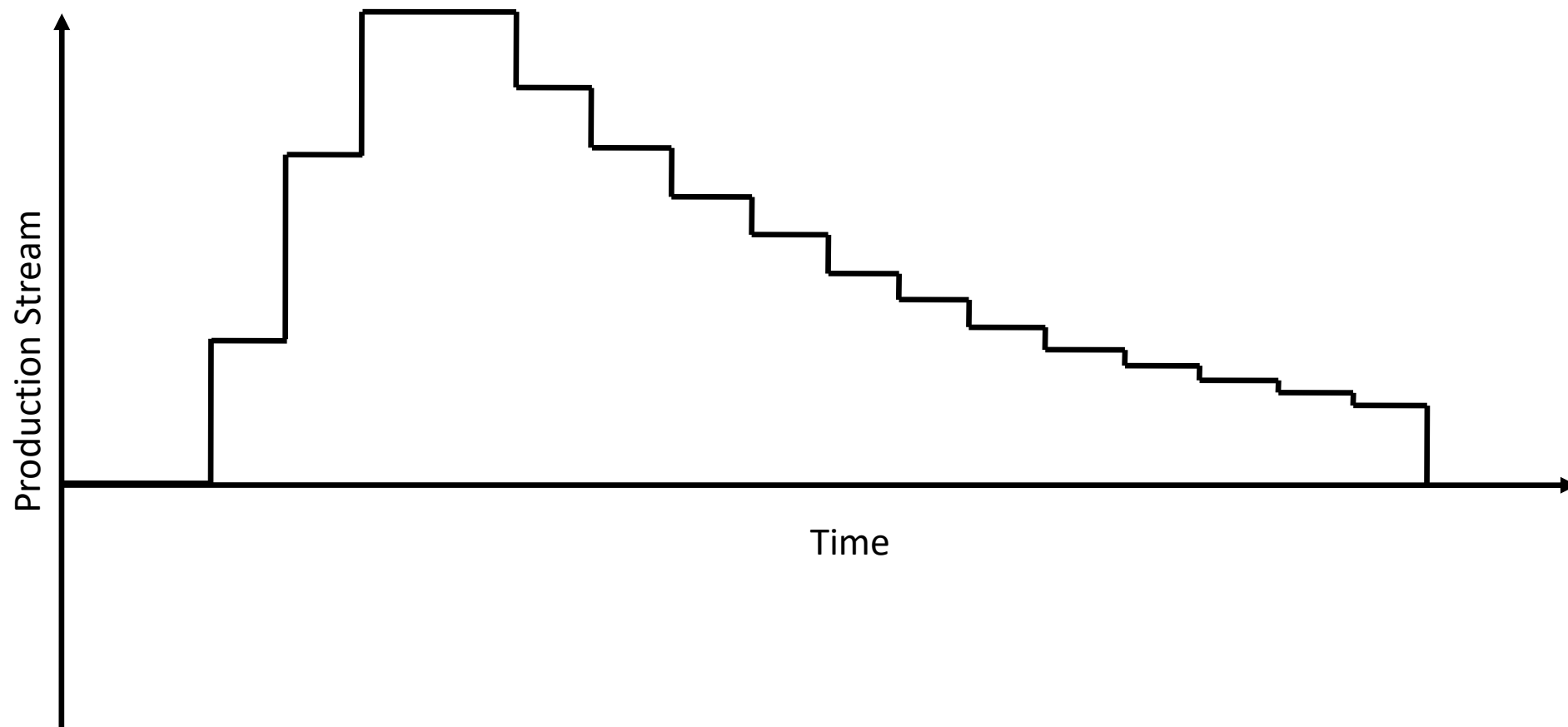
## Expenditure Items

- Capital Expenditures (Capex), e.g. Platforms, Facilities, Wells
  - Operating Expenditures (Opex), e.g. Maintenance, Salaries
  - Government Take, Royalties, Taxes, Land Use Fees
-

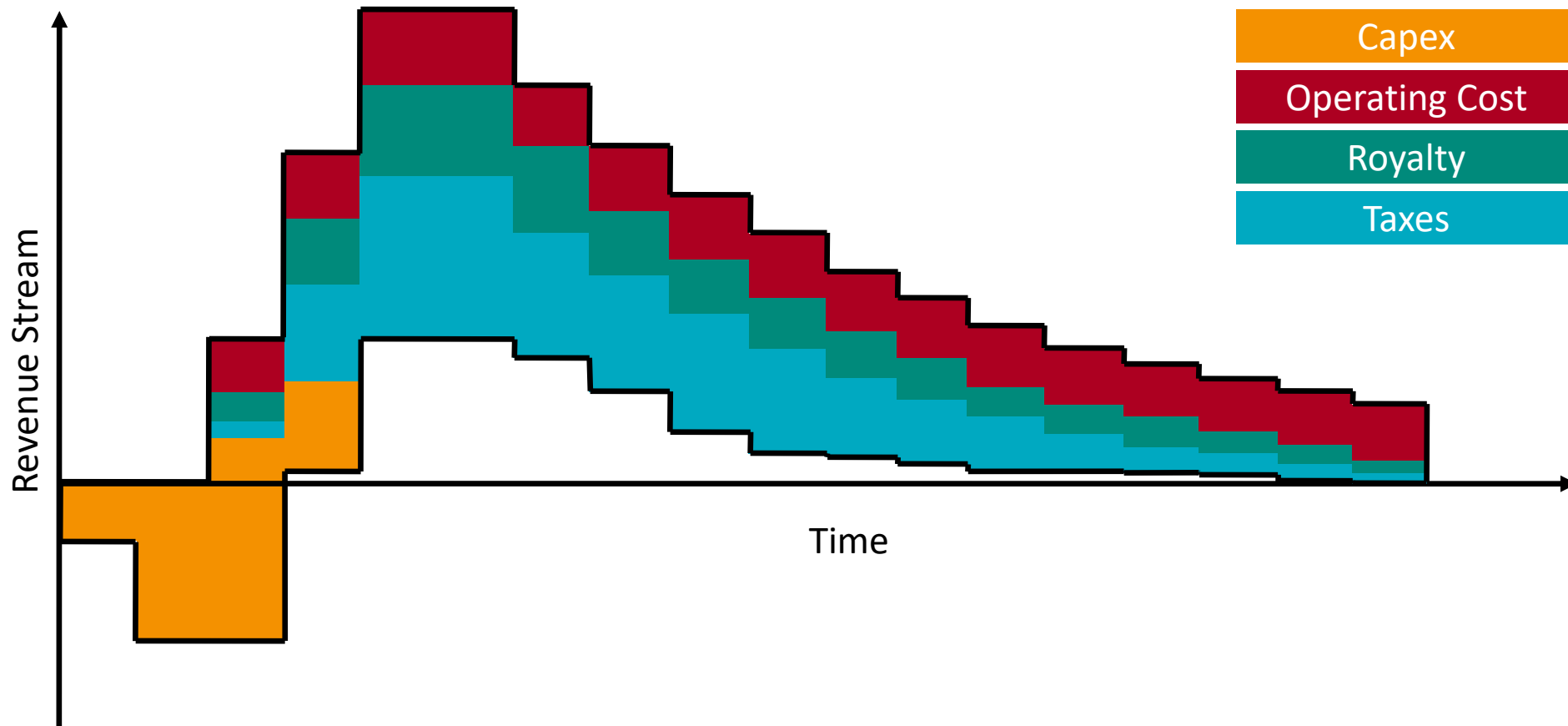
# Life Cycle of an E&P Project



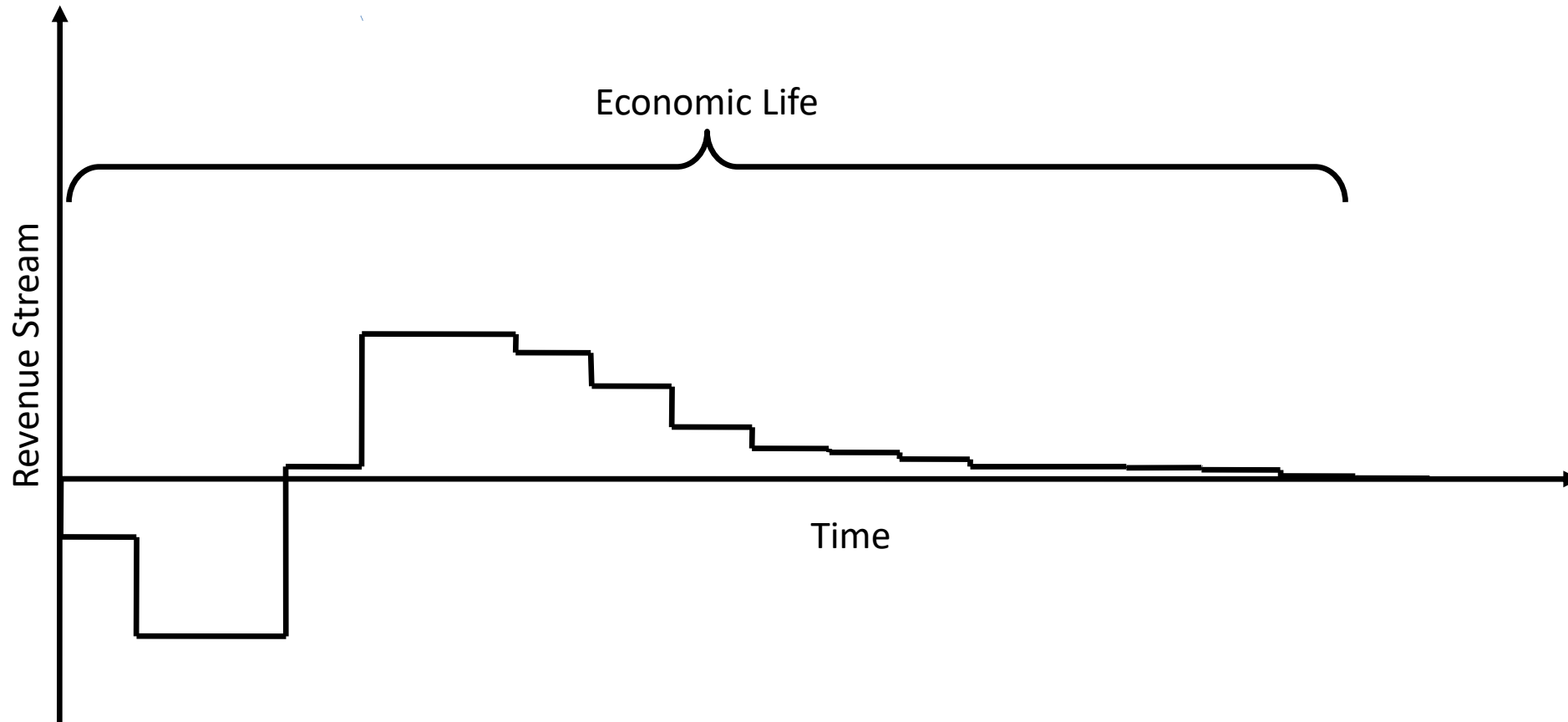
# Profile of an E&P Project



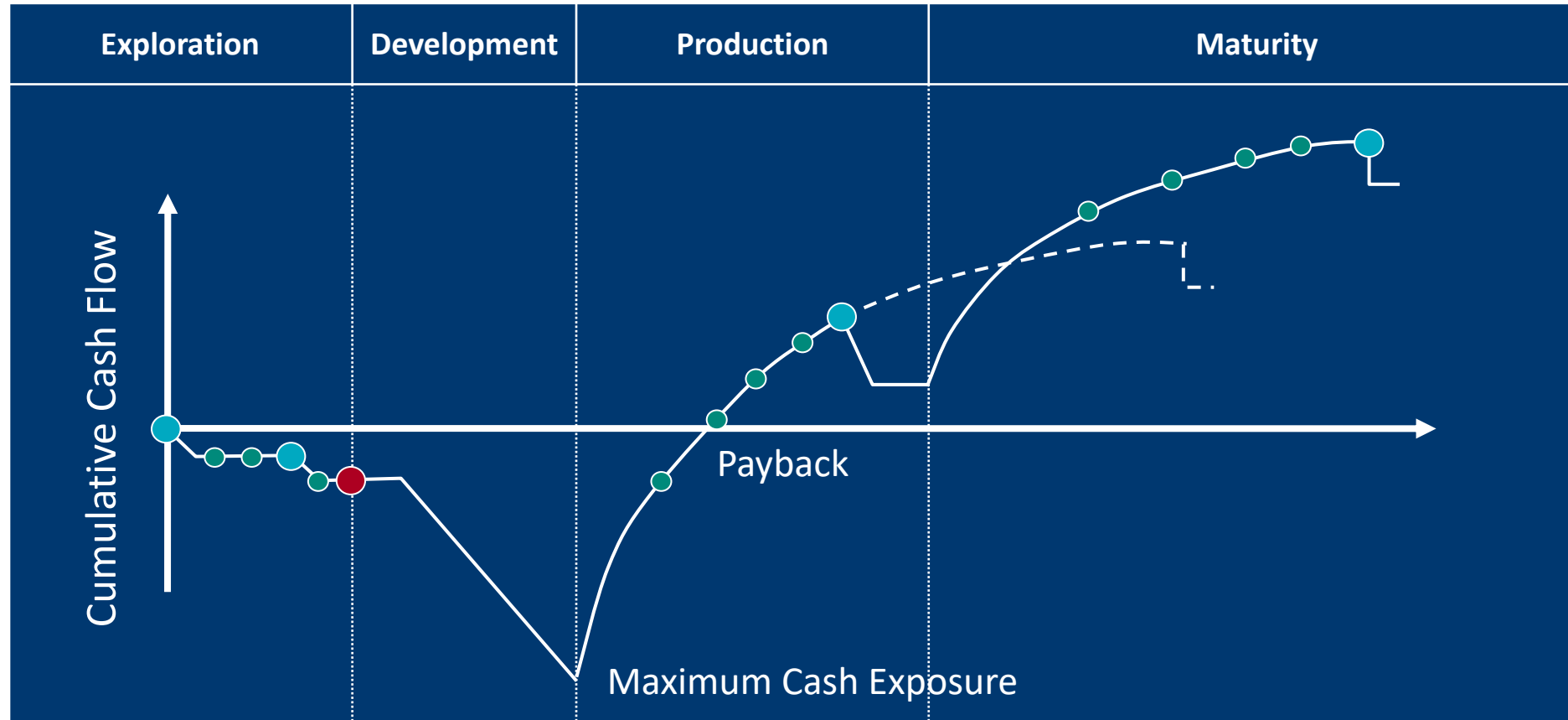
# Profile of an E&P Project

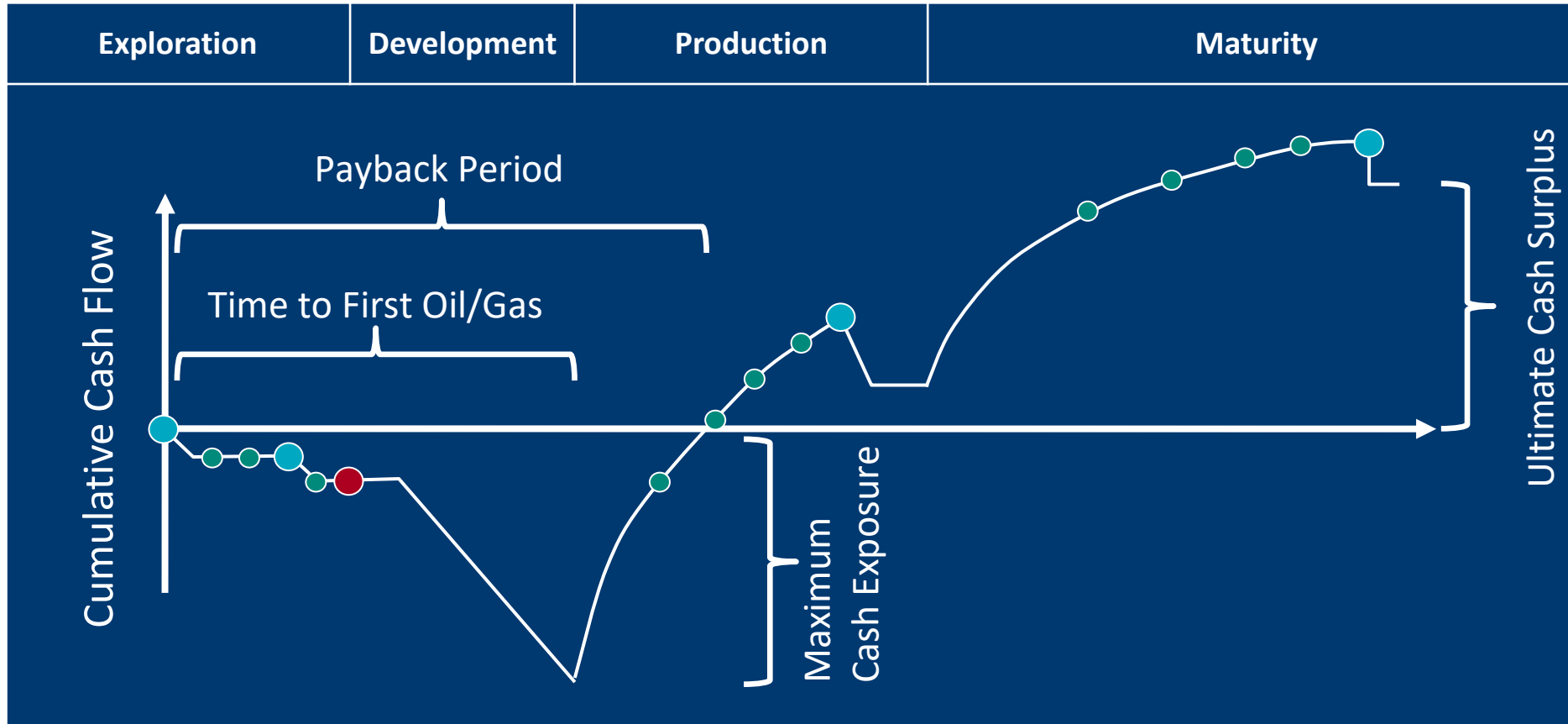


# Profile of an E&P Project



# Life Cycle of an E&P Project from Cashflow Perspective





# Value Measures

	Unit	Worth	Efficiency	Risk	Timing
Economic Life	yr	✗	✗	✓	✓
Maximum Exposure	\$	✗	✗	✓	✗
Payback Time	yr	✗		✓	✓
Ultimate Cash Surplus (UCS)	\$	✓	✗	✗	✗
Profit to Investment Ratio (PIR)	x	✗	✓	✓	✗
Profit to Capital Exposure Ratio	x	✗	✓	✓	✗
Unit Technical Cost	\$/bbl		✓	✓	✗
Net Present Value	\$	✓	✗	✗	✗
Real Term Rate of Return (RROR)	%	✗	✓	✓	✗
Internal Rate of Return (IRR)	%	✗	✓	✓	✗

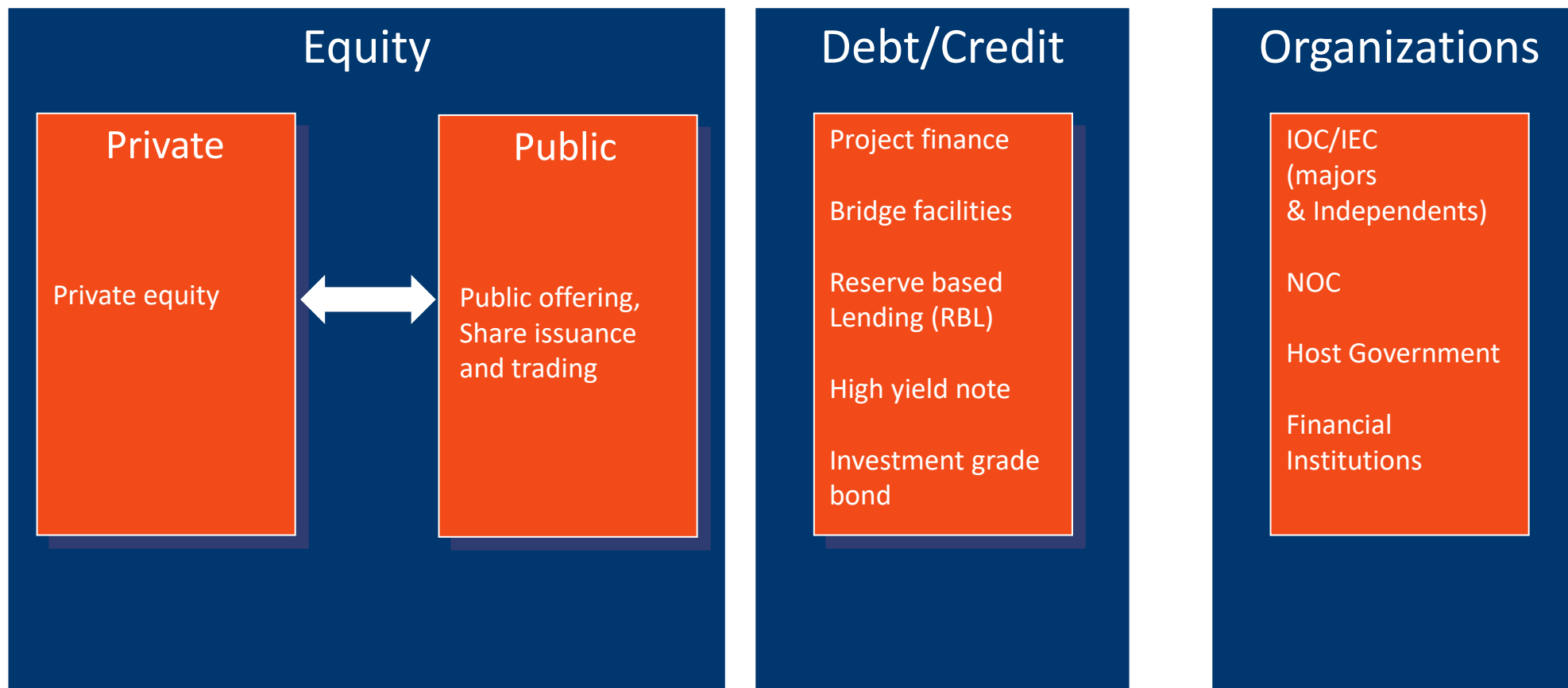


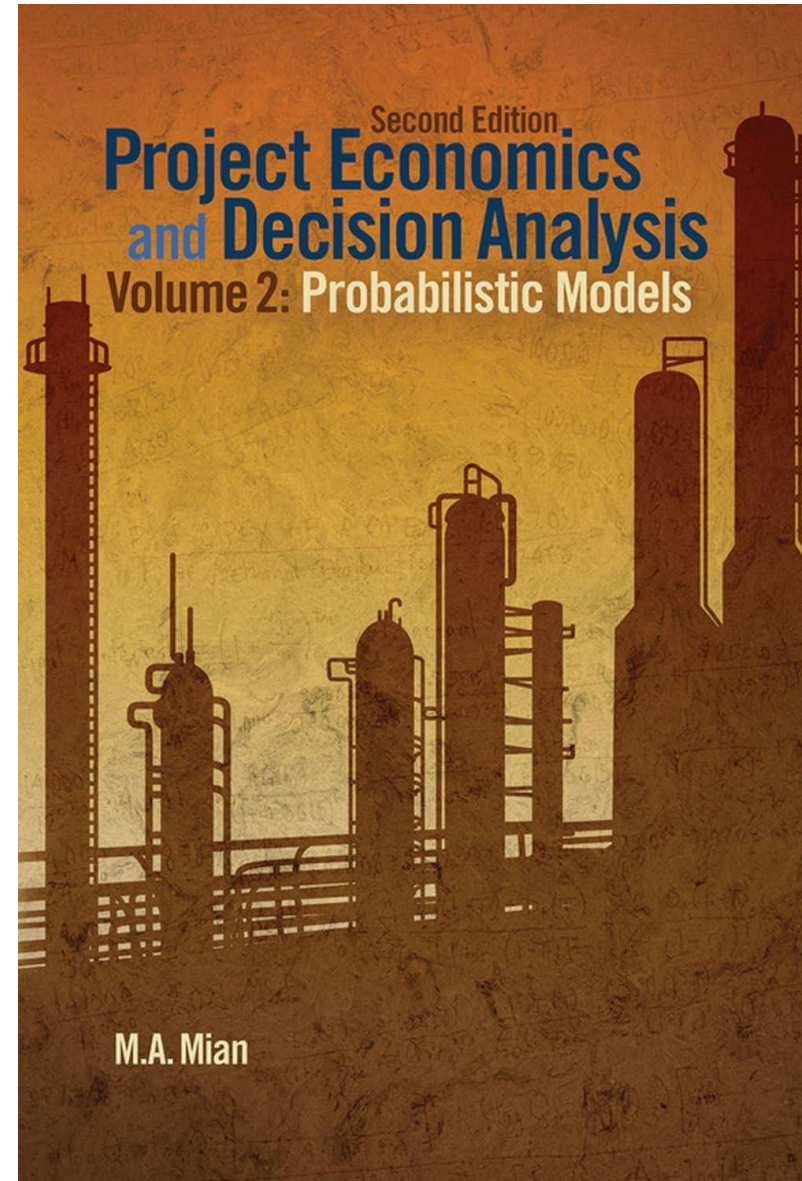
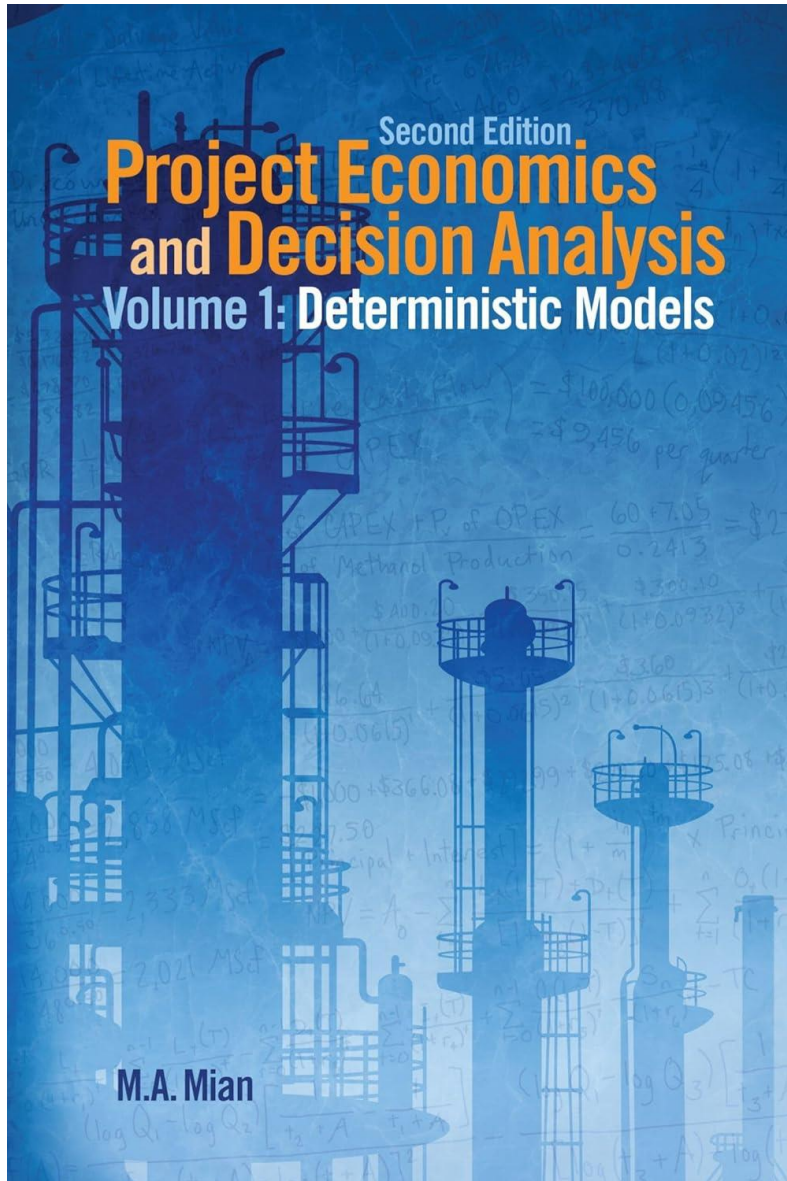
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# Financing Upstream Oil & Gas Projects





# Q&A

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