



THE OXFORD  
INSTITUTE  
FOR ENERGY  
STUDIES

A RECOGNIZED INDEPENDENT CENTRE OF THE UNIVERSITY OF OXFORD



# Decision making at energy corporations

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December 2017

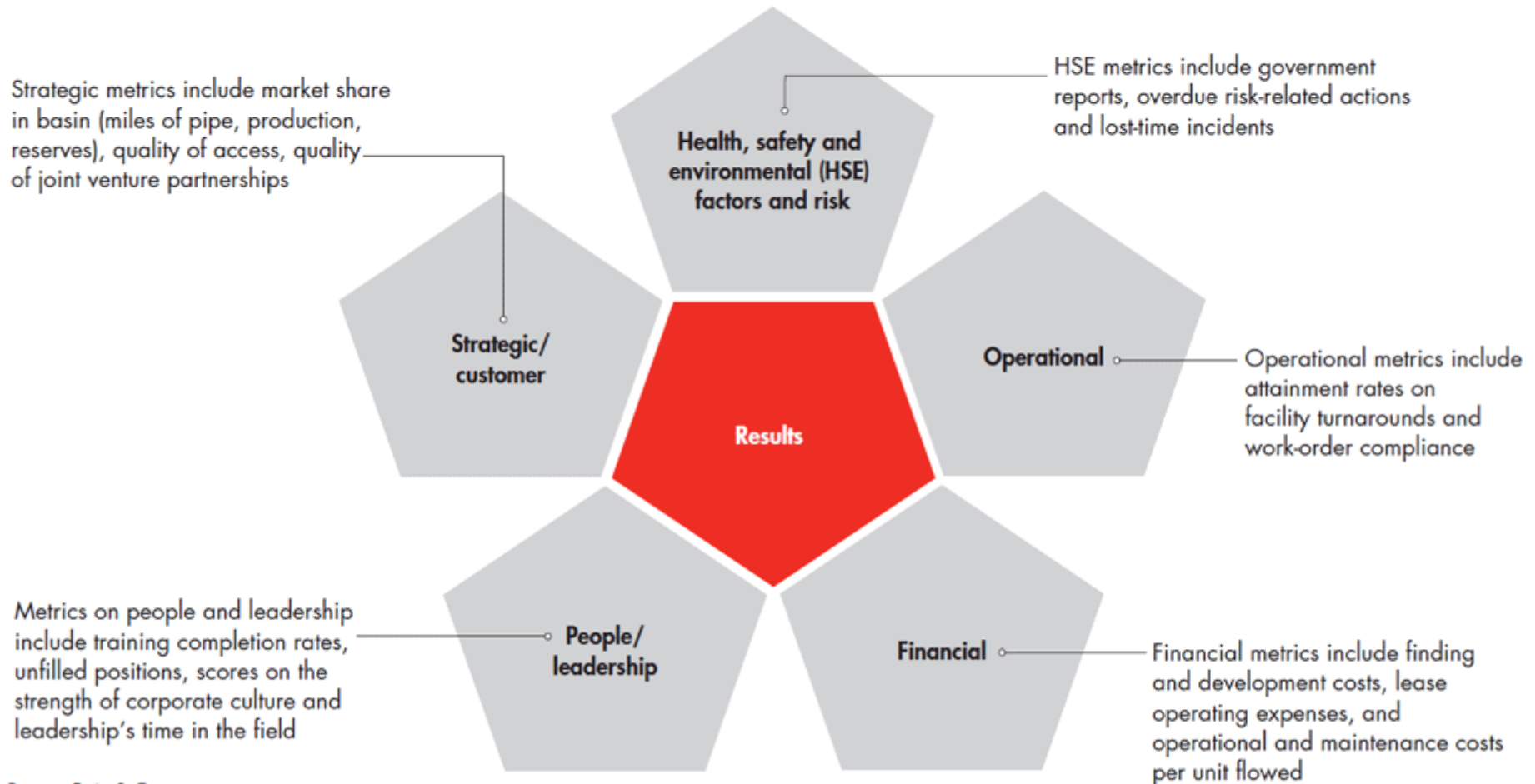
# Key Questions for Company Management

- How much profit can I generate?
- How can I grow the business?
- Where can I grow the business?
- What are the long-term prospects for my industry?
- What are my competitors doing?
- What rules must I abide by?
- What government support can I expect?
- What do my owners / shareholders want out of their investment?
- Have I got enough money to invest in my business?
- How do I stay competitive?
- How important is public opinion and how do I keep it on my side?



# Managements have a broad range of responsibilities

*Figure 1:* KPIs should provide a balanced view of the business to give a complete picture of a company's health and performance



Source: Bain & Company



# Important to highlight what the owners want

## **Total Value**

Enterprise Value

Net Present Value

## **Profitability**

Earnings per share

Price/Earnings Ratio

Price to Earnings Growth

## **Solvency**

Price to Cashflow

Price to Book Value

## **Pay-out**

Dividend per share

Dividend Payout Ratio

Dividend Yield

- Priority will be allocated according to the size, maturity and business model of the company being evaluated



- Detailed breakdown of company operating and financial performance
- Investment analysts are responsible for asking fundamental questions of senior management
- There is pressure to perform across a broad range of metrics
- A “Sell” recommendation can have big implications

## Petroleo Brasileiro S.A. (PBR)

# Bad news!

Stock Rating: UNDERWEIGHT

Income statement (BRLmn)	2016A	2017E	2018E	2019E	CAGR
EBITDA (adj)	69,076	96,614	119,885	120,155	20.3%
EBIDA (adj)	62,095	79,251	95,530	96,630	15.9%
Net income (op basis)	-3	21,257	35,640	35,257	N/A
EPS (adj) (\$)	0.00	1.10	2.00	1.95	N/A
Diluted shares (mn)	6,522.2	6,522.2	6,522.2	6,522.2	0.0%
DPS (BRL)	0.00	0.00	0.00	1.09	N/A

Return data	Average				
ROACE (%)	2.3	5.8	8.2	8.0	6.1
ROAE (%)	-0.0	8.7	13.8	12.1	8.6
ROMC (%)	3.3	8.4	12.3	13.2	9.3

Balance sheet and cash flow (BRLmn)	CAGR				
Shareholders' equity	250,230	241,248	276,649	304,539	6.8%
Net debt/(funds)	316,676	266,058	195,632	142,220	-23.4%
Total debt	385,784.0	357,003.1	333,978.2	279,878.1	-10.1%
Market capital employed	585,629	521,402	481,548	432,681	-9.6%
Cash flow from operations	89,709	123,001	128,252	127,617	12.5%
Capital expenditure	-49,744	-59,698	-44,656	-47,641	N/A
Dividends paid	0	0	0	-7,128	N/A
Free cash flow	39,965	63,303	83,596	79,976	26.0%
Net cash surplus/(deficit)	-28,737	21,837	47,401	-688	N/A

Valuation and leverage metrics	Average				
P/E (adj) (x)	N/A	8.3	4.6	4.7	5.9
EV/EBITDA (adj) (x)	7.2	4.7	3.2	2.7	4.4
EV/EBIDA (adj) (x)	8.1	5.7	4.0	3.4	5.3
Equity FCF yield (%)	67.3	106.5	140.7	134.6	112.3
Dividend yield (%)	0.0	0.0	0.0	3.9	1.0
Total debt/capital (%)	60.7	59.7	54.7	47.9	55.7
Total debt/equity (%)	154.2	148.0	120.7	91.9	128.7
NAV per share	N/A	N/A	N/A	N/A	N/A
EV/boe	N/A	N/A	N/A	N/A	N/A

### Selected operating metrics

Upstream					
Oil production (000 b/d)	2,224.3	2,185.0	2,362.2	2,531.8	
Gas production (000 cf/d)	3,396.0	3,025.1	3,015.4	3,026.4	
Total production (000 boe/d)	2,790.3	2,689.2	2,864.7	3,036.2	
Realisations (\$/boe)	37.5	61.3	74.9	71.4	
Downstream					
Refining capacity (000 b/d)	N/A	N/A	N/A	N/A	
Refining throughput (000 b/d)	1,945.0	1,977.0	N/A	N/A	

Price (22-Mar-2017) USD 9.11  
Price Target USD 11.00

**Why Underweight?** Despite an attractive NAV valuation, we believe shares will be held captive with limited upside, as the market continues to focus on the unsustainable debt levels and cash flow outlook as well as headlines surrounding the ongoing corruption investigation. Between the two share classes, we believe the preferred offer much better value and upside potential.

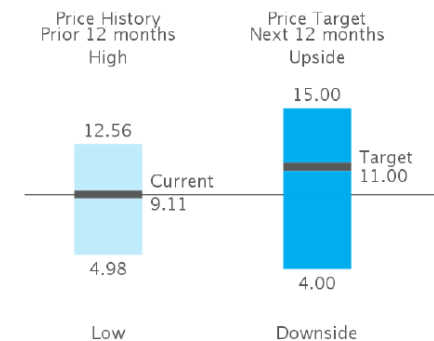
**Upside case** USD 15.00

Our upside case assumes a long-term Brent price deck of \$90/bl in our NAV analysis plus a potential premium/discout.

**Downside case** USD 4.00

Our downside case assumes a long-term Brent price deck of \$50/bl in our NAV analysis plus a potential premium/discout.

### Upside/Downside scenarios



# Comparison with Peer Groups

Comparative multiples-based valuations						
	P/E			EV/EBITDA		
	2016E	2017E	2018E	2016E	2017E	2018E
<b>Russia and FSU</b>						
Gazprom	4.1	6.4	4.3	4.5	4.1	3.6
Lukoil	11.4	5.1	5.0	4.3	3.3	3.2
Novatek	9.8	13.9	15.0	13.5	11.0	11.6
Gazprom Neft	5.5	3.6	3.3	5.1	3.7	3.6
Surgutneftegaz	neg	4.4	5.5	neg	neg	neg
Tatneft	10.5	7.4	7.1	5.9	4.9	4.6
Rosneft	13.3	6.9	6.3	7.8	5.5	5.3
Transneft	6.6	8.4	6.4	4.7	4.5	3.9
KazMunaiGas EP	11.1	6.7	6.6	0.1	0.1	0.1
Bashneft	11.0	6.9	6.2	6.0	4.5	4.2
<b>Emerging markets</b>						
Sinopec	16.0	12.8	11.0	5.2	4.6	4.0
CNOOC	neg	14.2	10.1	7.0	4.3	3.6
PetroChina	175.5	30.0	20.5	7.4	6.1	5.3
Petrobras	neg	17.5	10.5	7.0	5.6	4.7
ONGC	17.2	12.2	10.1	4.6	4.1	3.5
<b>Developed markets</b>						
Royal Dutch Shell	27.5	15.3	12.2	9.4	6.4	5.6
BP	34.3	15.5	12.8	7.8	5.4	4.8
ChevronTexaco	85.5	24.4	17.9	12.8	7.2	6.0
ConocoPhillips	neg	137.1	46.1	17.0	7.9	6.4
ENI	neg	24.8	16.6	7.0	4.5	3.7
Exxon Mobil	39.7	20.3	17.5	12.3	7.9	7.4
Statoil	122.7	18.0	14.6	5.4	3.7	3.3
Total	15.4	12.4	10.8	7.7	5.7	5.0

Note: based on prices as of January 24, 2017. Bloomberg consensus estimates are used for foreign companies and Sberbank Investment Research estimates for Russian and FSU companies.

Source: Bloomberg, Sberbank CIB Investment Research



## Two elements of investor returns – short and long term

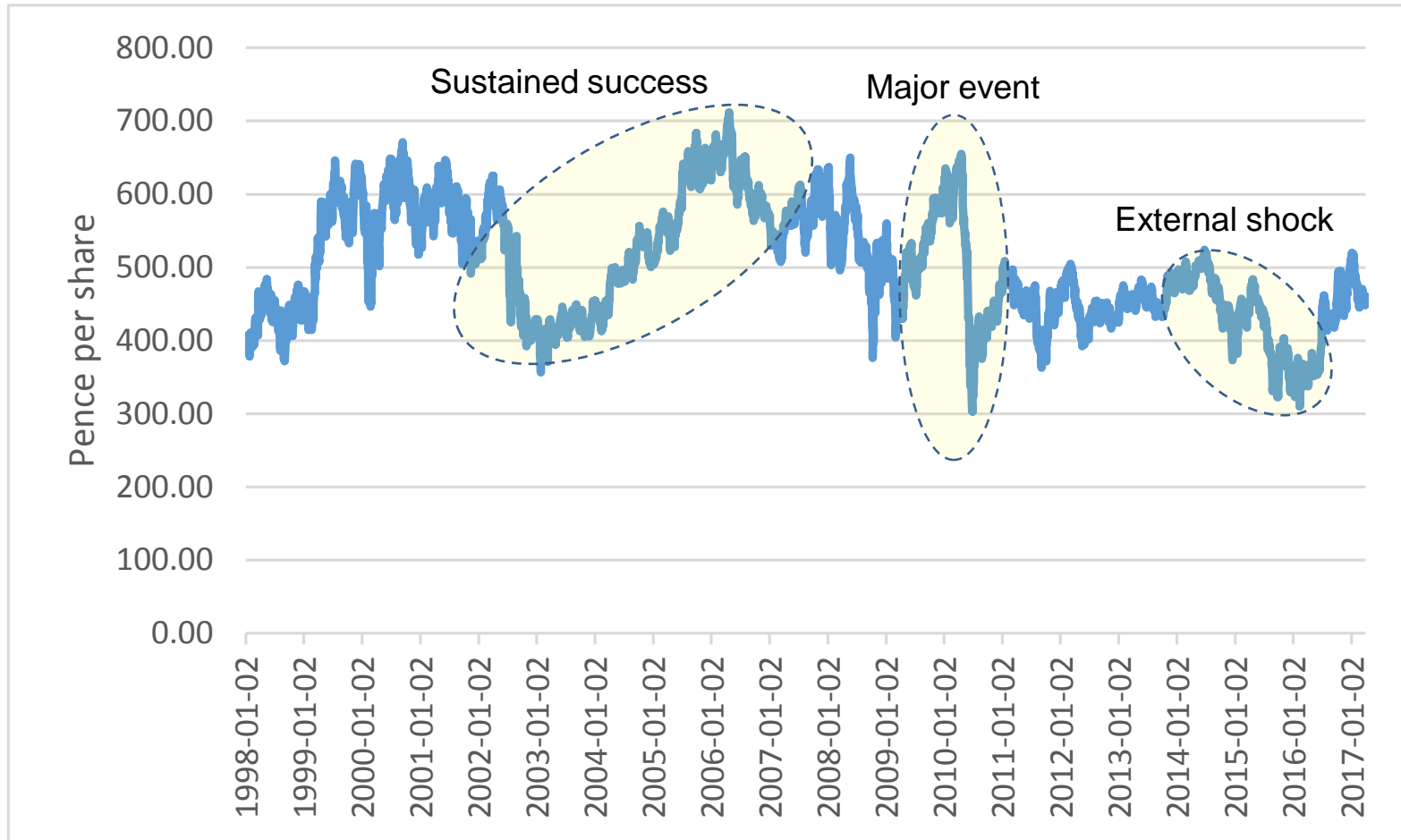
### Expected dividend yields for companies under coverage

	2015	2016E	2017E	2018E
Gazprom *	5%	5%	5%	5%
Lukoil	5%	5%	6%	6%
Rosneft	3%	2%	5%	6%
Novatek	2%	2%	2%	3%
Gazprom Neft	3%	5%	7%	7%
Surgutneftegaz commons	2%	2%	2%	2%
Surgutneftegaz prefs	19%	2%	10%	7%
Tatneft commons	2%	3%	3%	4%
Tatneft prefs	4%	5%	6%	7%
Bashneft commons **	4%	4%	6%	7%
Bashneft prefs **	11%	11%	17%	19%
KazMunaiGas EP	0%	1%	2%	2%
Transneft prefs	0%	1%	1%	1%

- Investors want a return on their investment
  - Dividend pay-out on an annual basis, based on yearly cashflow and profits
  - Share price growth, normally based on long-term prospects



# Key Management Driver = The Share Price

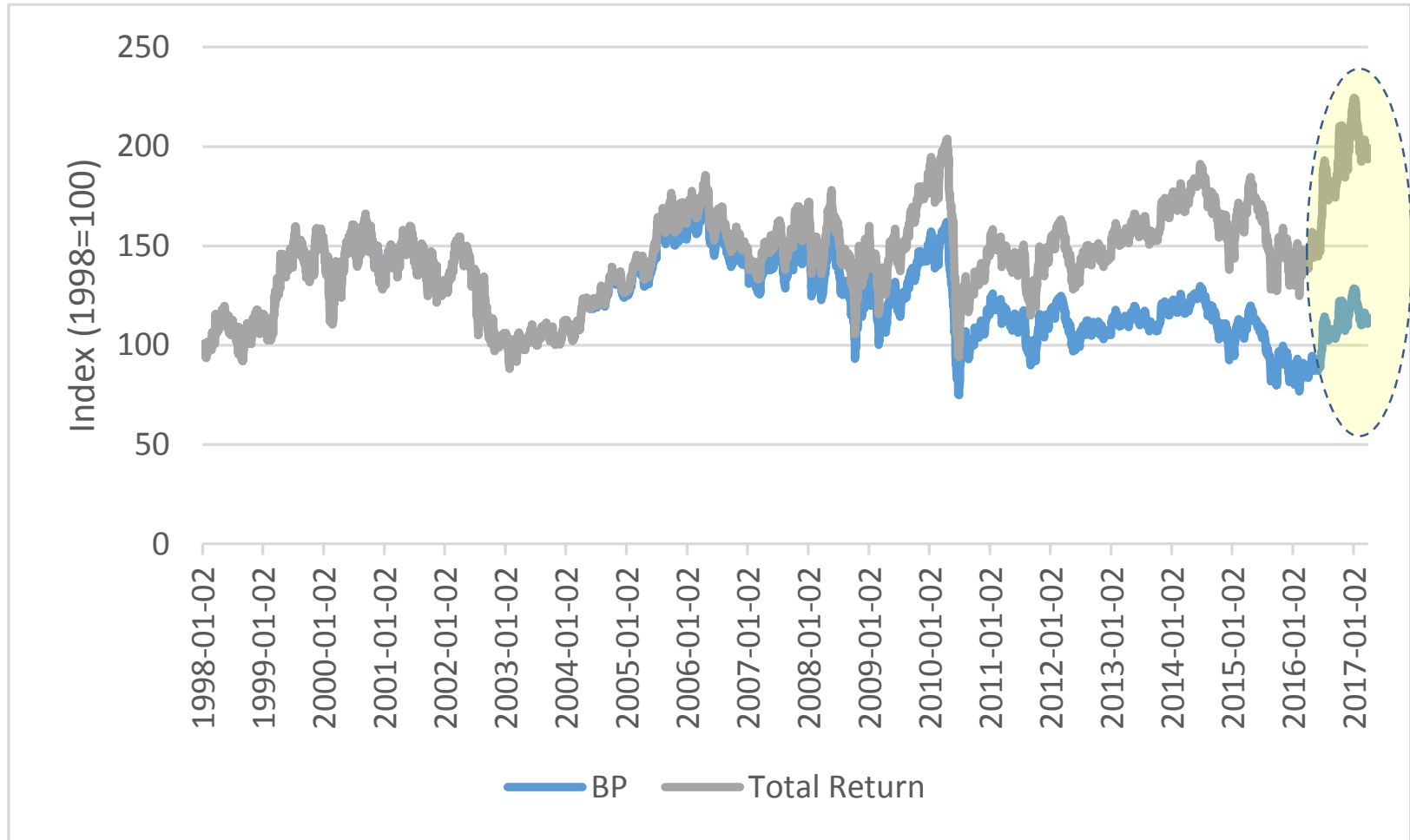


- Management incentives often driven by the share price as one key objective





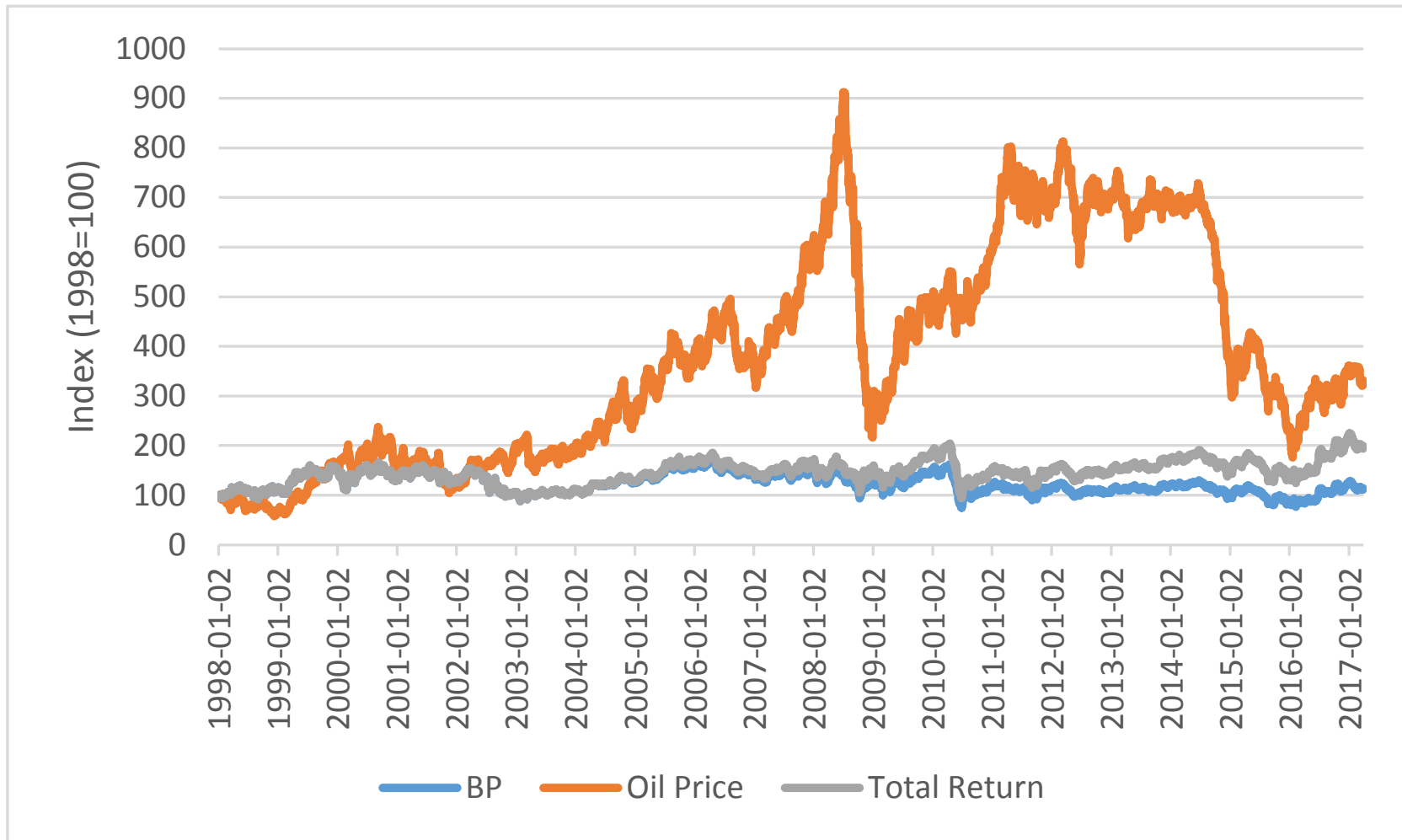
# Total return to shareholders



- Almost no gain in share price terms over almost 20 years
- Shareholders doubled their money when dividends and other incentives are included



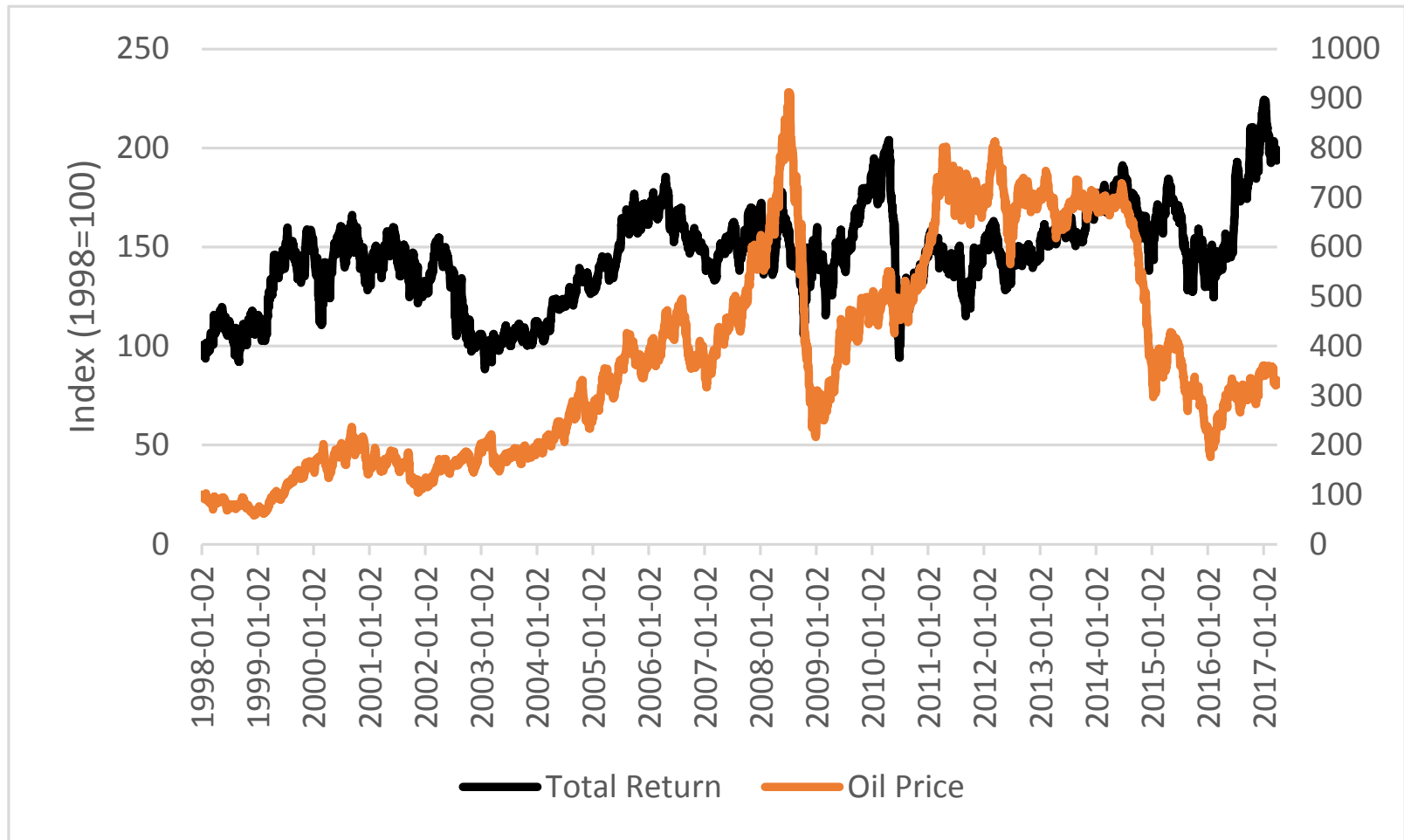
# Performance relative to oil price



- Not as close as you might expect
- The benefits (or otherwise) of vertical integration



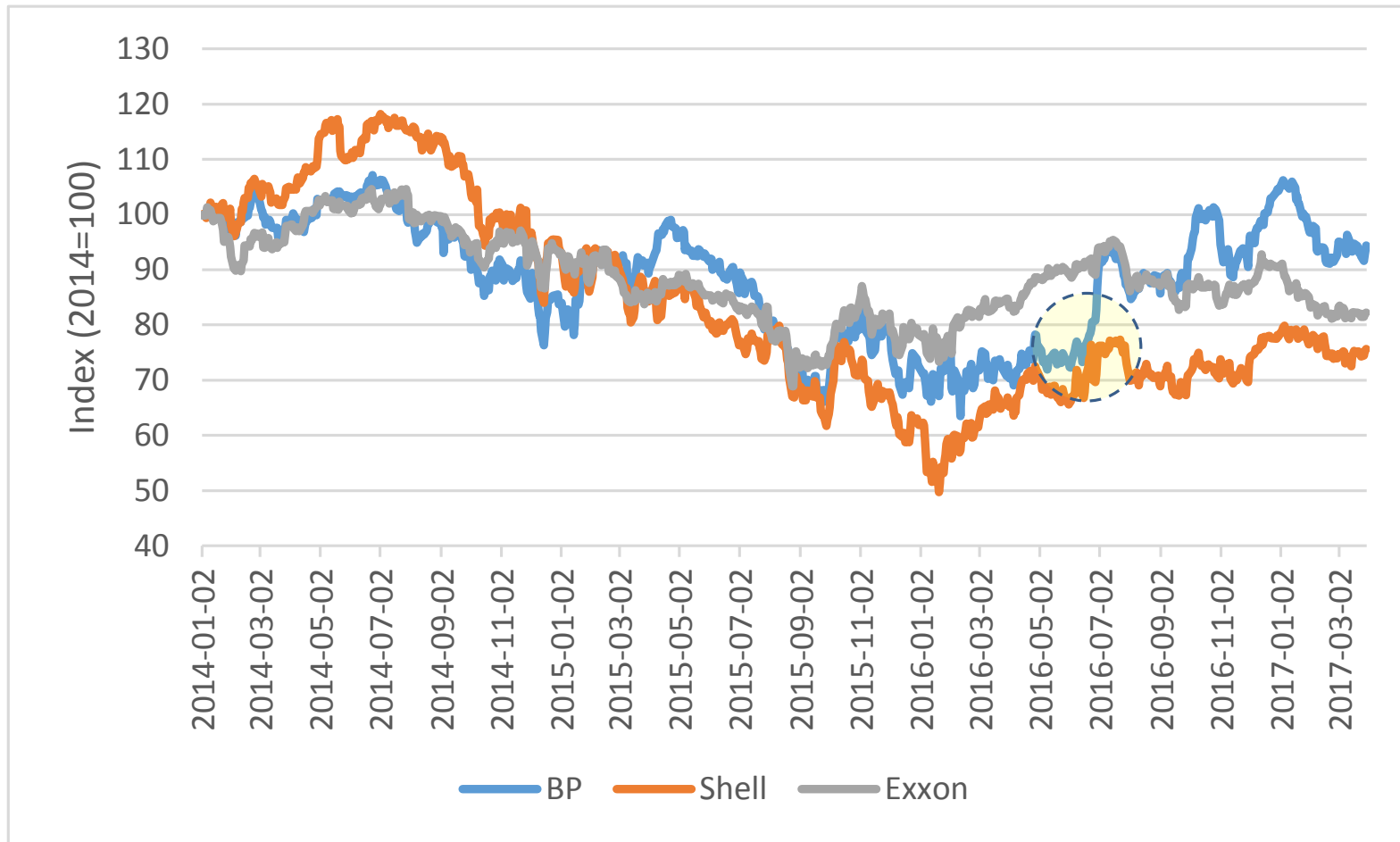
# An alternative view



**If you don't like the view, change the axis!**



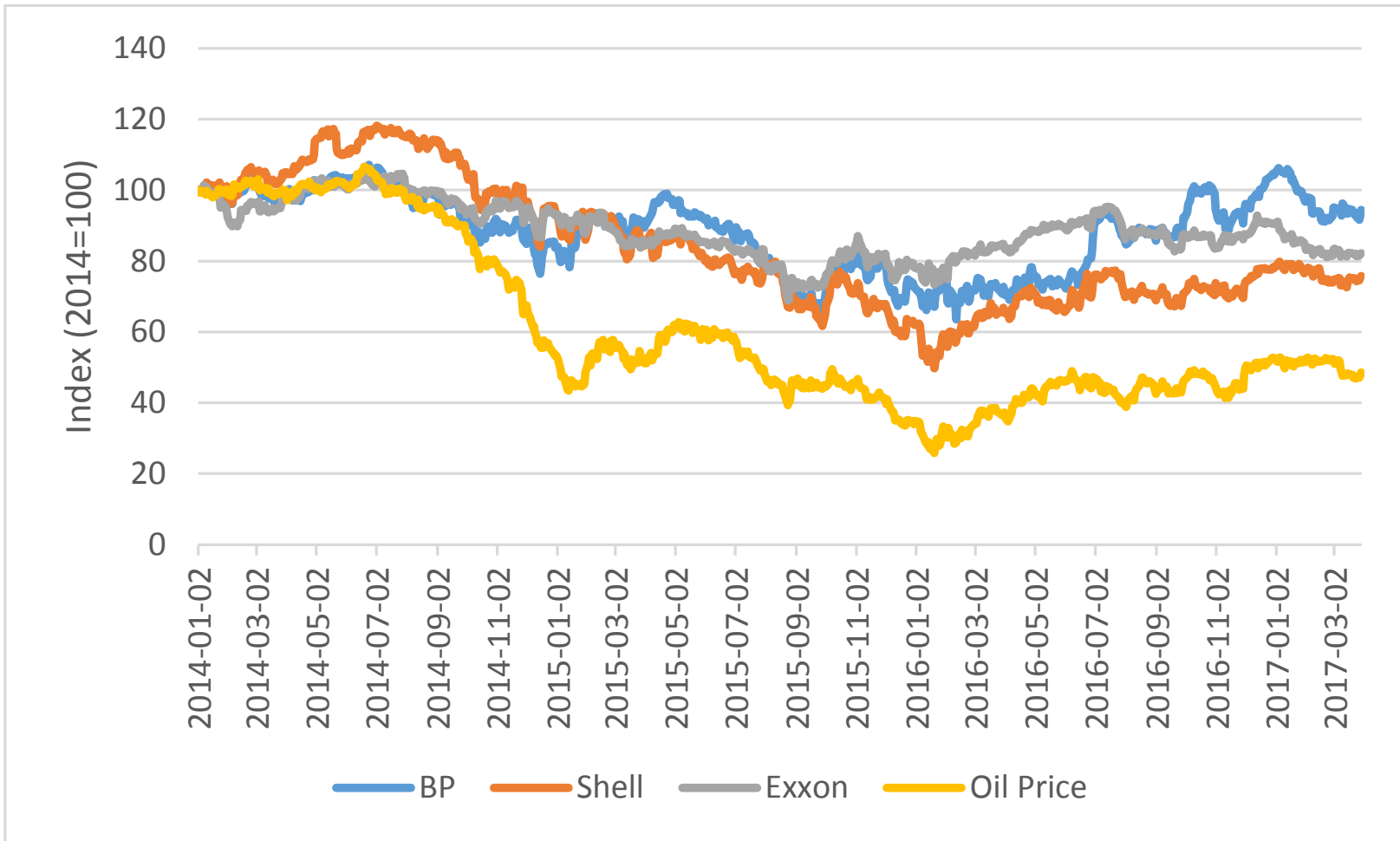
# Share price relative to Peer Group



- In the shorter term, BP has outperformed its major European and US competitors
- BP has been in recovery mode, but the final settlement of US court action has provided a boost



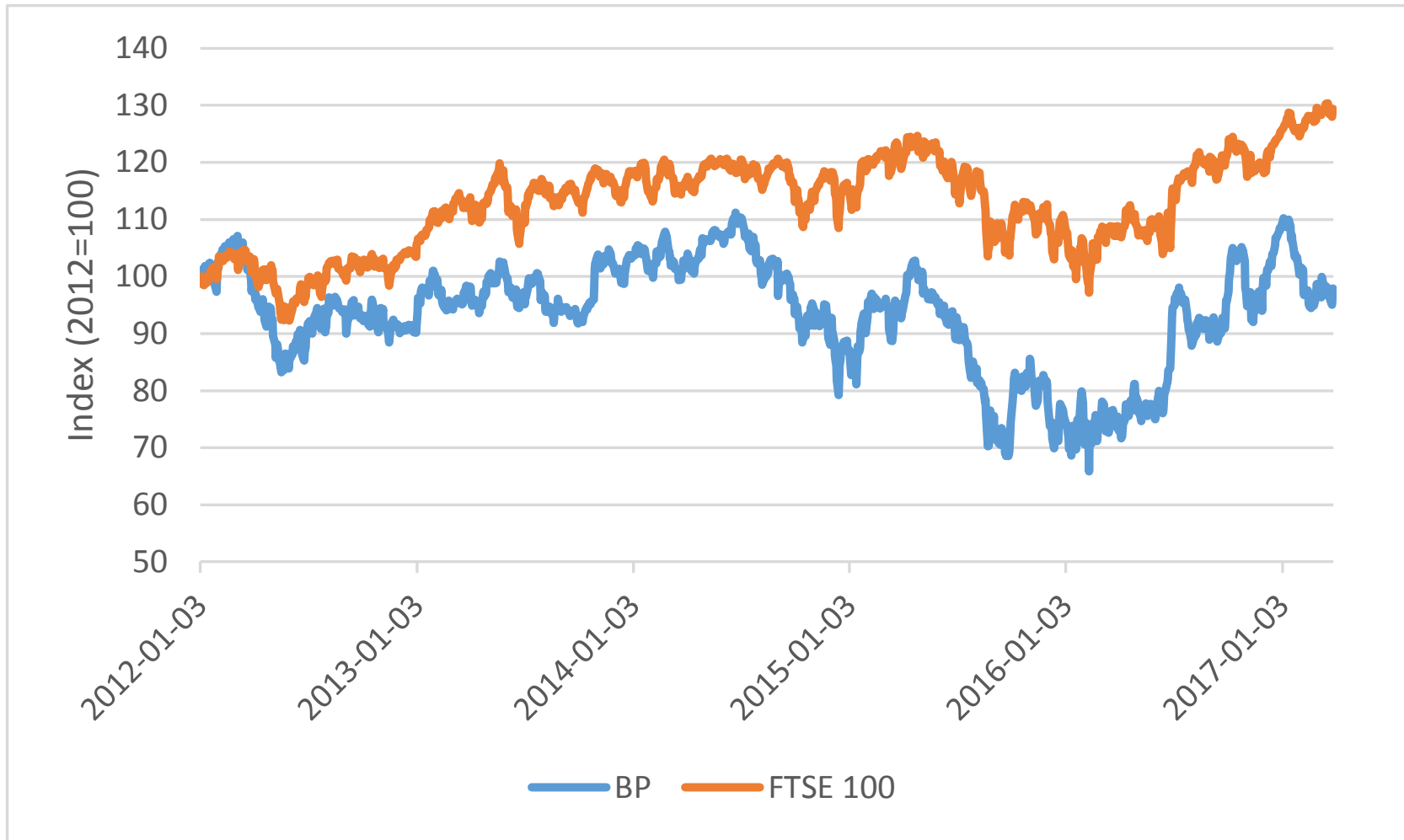
## And all three relative to the oil price



- Outperforming in a declining oil price environment – the real benefit of vertical integration



# Oil and gas has not been a good investment relative to the rest of the economy



- BP has significantly underperformed the FTSE 100 UK Index over the past five years



# Bankers and Credit Agencies think about financial solvency

## EXXON MOBIL

Ratio	2014	2013	Interpretation
Current Ratio	0.82	0.83	Exxon had \$0.82(2014) \$0.83(2013) in current assets for every dollar of current liabilities
Quick Ratio	0.56	0.60	Exxon is not currently paying back its all current liabilities
Current Cash Debt Coverage	0.66	0.66	Exxon has a low ability to satisfy its short-term obligations
Accounts Receivable Turnover	12.89	12.35	Exxon takes approximately 28 days to turn over its A/R (365/12.89)
Inventory Turnover	16.26	18.56	The inventory stays approximately 21 days on hand. 16.26 times(2014) 18.56 times( 2013)
Asset Turnover	1.13	1.24	For every dollar in assets, Exxon generates 1.13 (2014) 1.24 (2013) from sales
Profit Margin on Sales	8.25%	7.74%	Exxon has a net income of \$0.08 for each dollar of sales
Return on Assets	9.34%	9.57%	9.34 % of Exxon's net income comes from assets
Return on Equity	18.67%	19.17%	18.67% of Exxon's net income comes from owner's investments (stockholder equity)
Earnings Per Share	7.59	7.37	\$7.59 EPS for Exxon's shareholders
Price-Earnings Ratio	12.08	13.25	Investors are willing to pay \$12.08 for one dollar of current earnings

- The key question is “will I get my money (plus interest) back?”



# Credit ratings impact the cost of debt, as well as investor preceptions

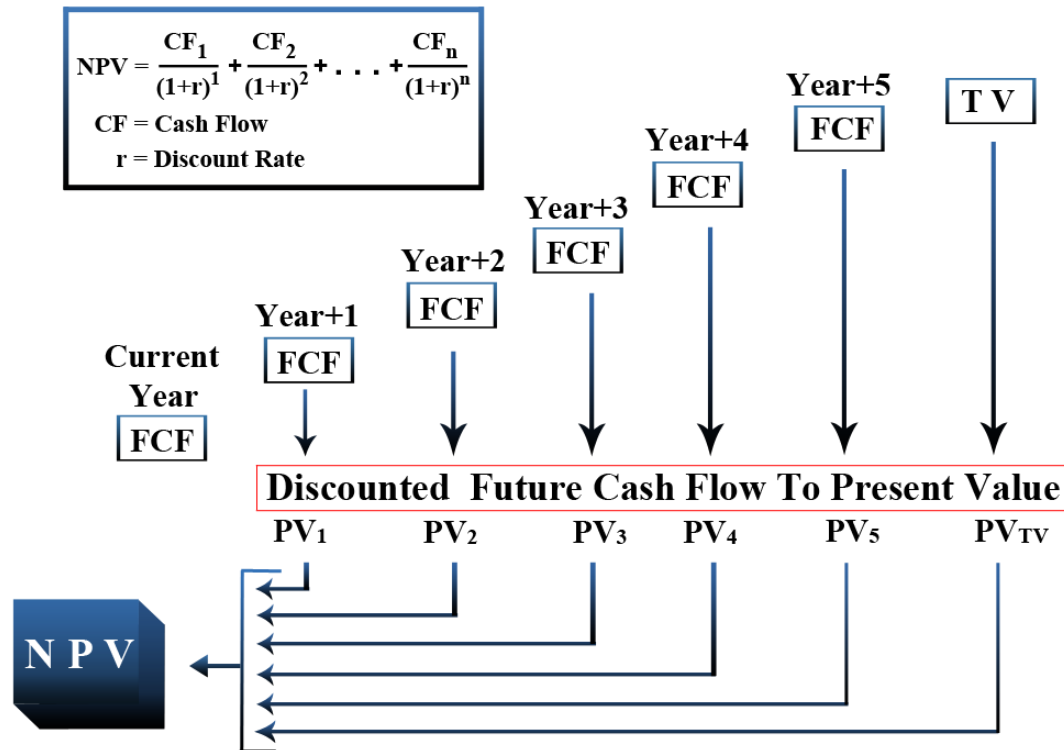
	MOODY'S		S&P		FITCH		
	Long term	Short term	Long term	Short term	Long term	Short term	
INVESTMENT GRADE	Aaa	Prime 1 Prime 2 Prime 3	AAA	A-1+ A-1 A-2 A-3	AAA	FI+ FI F2 F3	HIGHEST
	Aa1		AA+		AA+		
	Aa2		AA		AA		
	Aa3		AA-		AA-		
	A1		A+		A+		
	A2		A		A		
	A3		A-		A-		
	Baa1		BBB+		BBB+		
	Baa2		BBB		BBB		
	Baa3		BBB-		BBB-		
NON-INVESTMENT GRADE	Ba1	Not prime	BB+	B C D	BB+	B C D	LOWEST
	Ba2		BB		BB		
	Ba3		BB-		BB-		
	B1		B+		B+		
	B2		B		B		
	B3		B-		B-		
	Caa		CCC		CCC		
	Ca		CC		CC		
	C		C		C		
			D		D		

Source: The Association of Corporate Treasurers





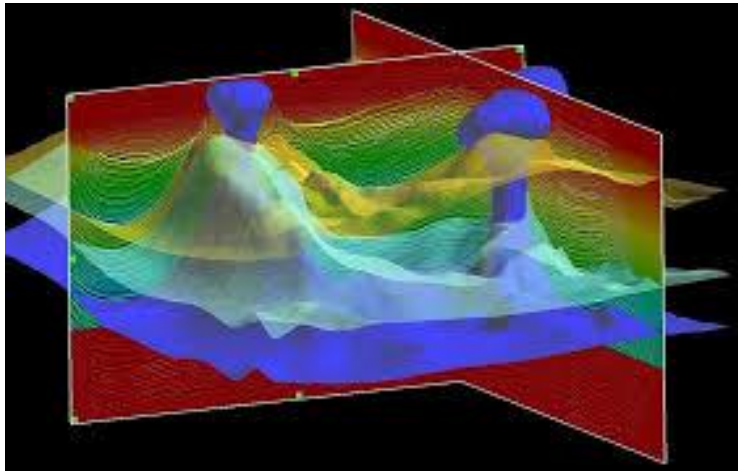
# The DCF Calculation as a foundation



- Management thought process is encapsulated in the DCF model
  - Key assumptions include price, cost, tax, long-term outlook, short-term cashflow and the value of money
- Management must ensure at all times that the combined value of their assets remains NPV positive, and should aim to maximise the return on their assets

What is the management thought process?

**Exploration and production company planning an exploration well**



# Key Issues

- Current state of company portfolio
- Past experience in the region
- Geology
- Geography
- Risk of success
- Cost
- Source of funding
- Possible economic outcome
- Partner companies
- Commercial environment
- Political environment



# Topics of interest

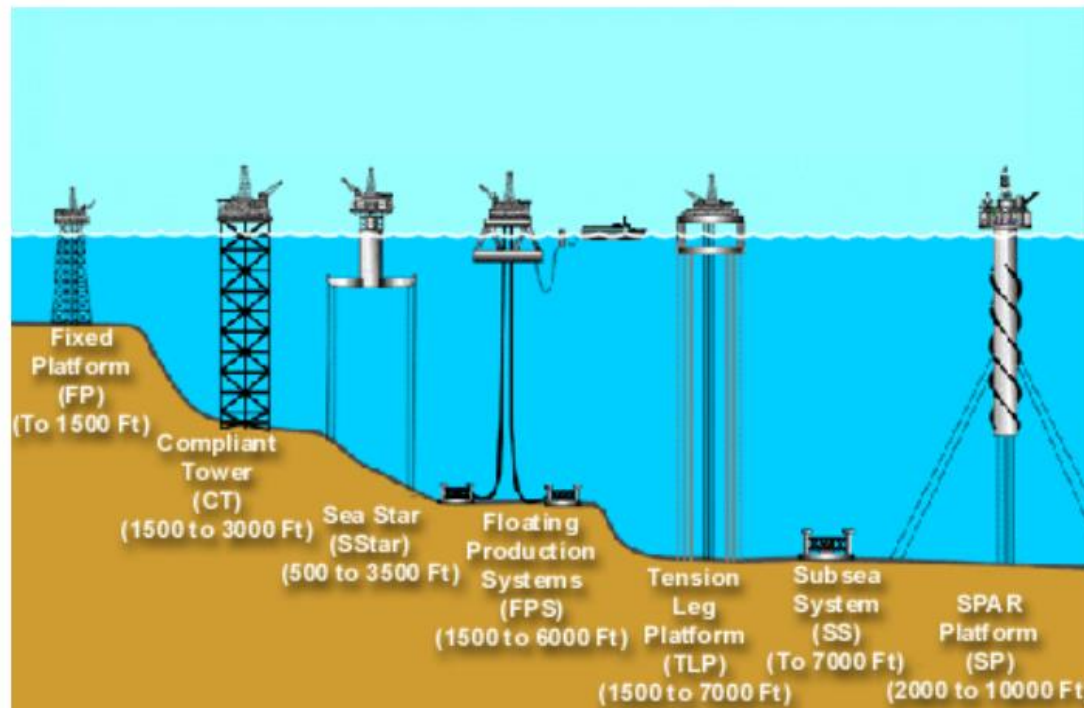
- Access to licences
- Onshore / offshore
- Infrastructure
- NOCs as partners
- Small independent companies as entrepreneurs
- Tax incentives
- Arctic / deep-water



# What is the management thought process?

## Development of an oil discovery

### WATER DEPTH AND TYPE OF PLATFORM



# Key Issues

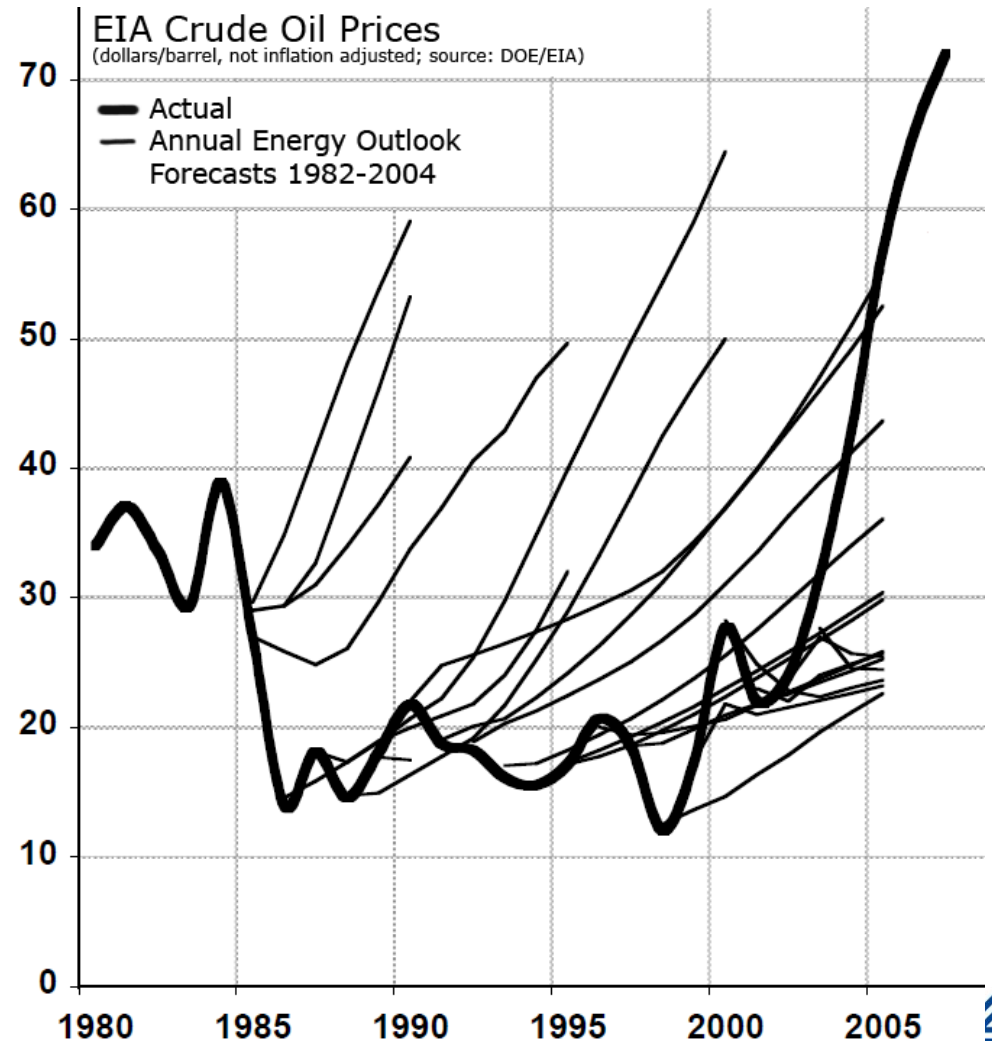
- Size of discovery
- Location / access to infrastructure
- Tax regime
- Local content requirement
- Development cost
- Net present value
- Future oil price expectation
- Future oil demand expectation
- Local politics
- Legal and institutional framework
- Type of financing
- Partner credit-worthiness
- Time to cost recovery
- Breakeven oil price



# Oil price forecasting – an imprecise art largely based on optimism

## *Various US oil price forecasts*

- Consensus is normally that prices will rise from current levels
- Companies plan using a “worst case” scenario assumption – any project must be viable at “US\$xx/bbl
- Scenario planning attempts to create alternative outcomes
- Safest assumption is that the consensus will always be wrong



# Topics of interest

- Impact of new technology
- Cost inflation/deflation and the oil price
- Changing tax regimes
- Political risk
- Partner risk
- Oil companies and their local responsibilities
- Health and Safety
- Shareholder responsibilities
- Corporate and social responsibility
- Oil spill risk
- Electric and gas-fuelled cars





# What is the management thought process?

## Development of a gas field



# Key Issues

- Access to market
- Export technology
- Total cost
- Outlook for medium and long-term gas demand
- Outlook for coal demand and price
- Competing sources of gas supply
- Breakeven gas price
- Associated liquids
- Length of sales contract available
- Price formation mechanism
- Securing finance
- HSE issues



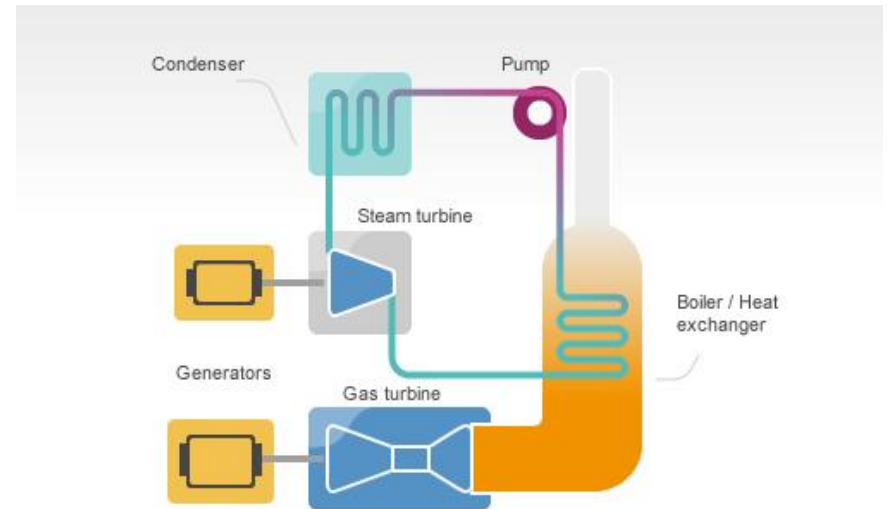
# Topics of interest

- Is the gas market becoming like the oil market
- Is gas the cleanest fossil fuel?
- The impact of Russia on security of supply concerns
- Shale gas – a good or bad thing?
- Can anywhere else replicate US shale gas success?
- Pipeline gas versus LNG – which to choose?
- Domestic versus export markets
- Subsidised prices



# What is the management thought process?

## Construction of a fossil fuel power station



# Key Issues

- Economics of project
- Pricing mechanisms
- Likely plant utilisation
- Availability of government support
- Security of supply for fuel input
- Expected cost of fuel input
- Availability of renewable energy at zero marginal cost
  - Domestic
  - Imported
- Grid infrastructure requirements
- Country plan for power generation mix to 2050
- Possible carbon capture technology
- Development of off-grid power sources



# Topics of interest

- Biogas as an alternative power source
- Carbon capture and storage – will it ever be viable?
- Coal versus gas power – the energy trilemma
- Is gas-fired power the ideal back-up for renewables?



# Carbon capture and storage

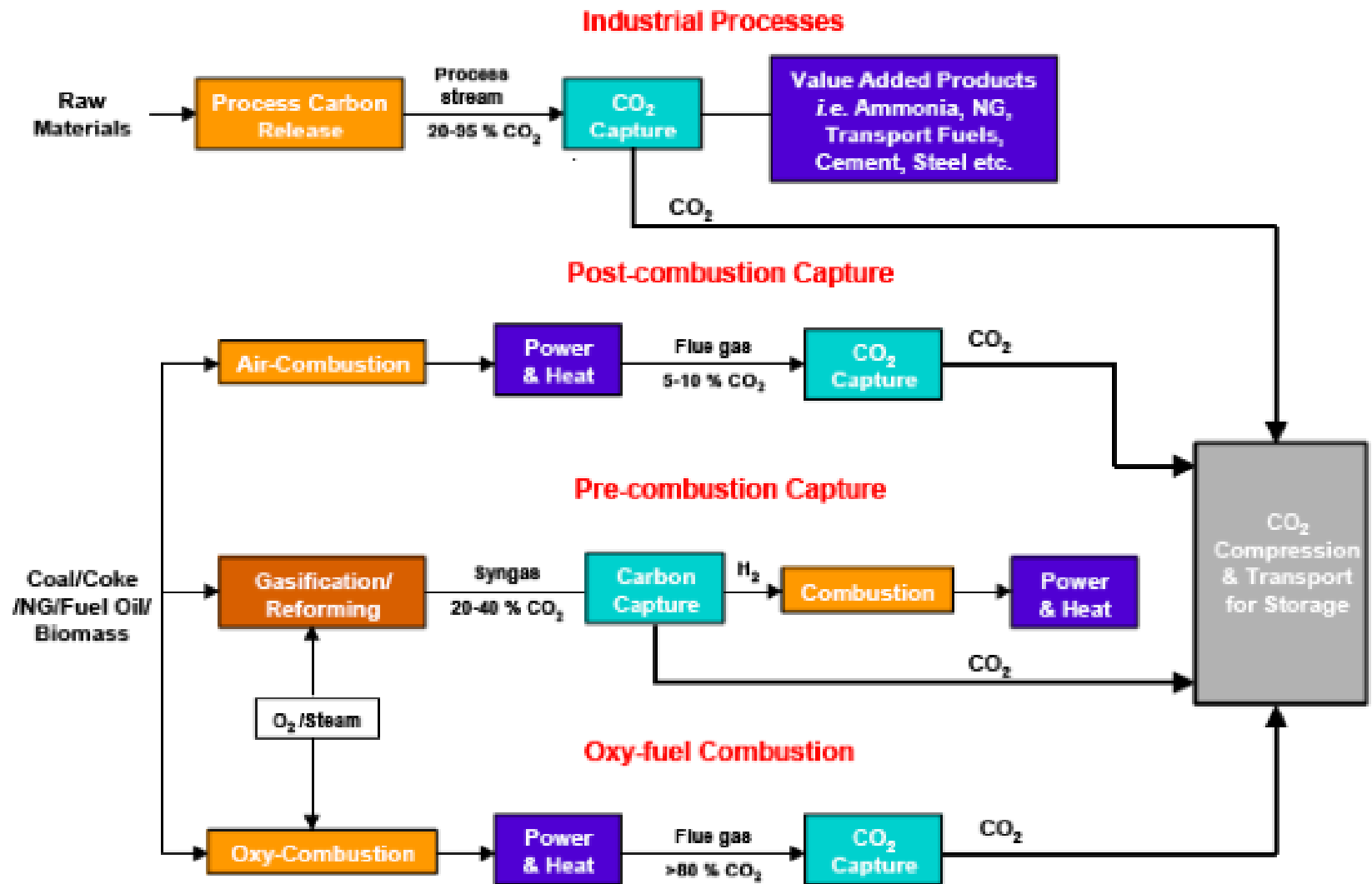
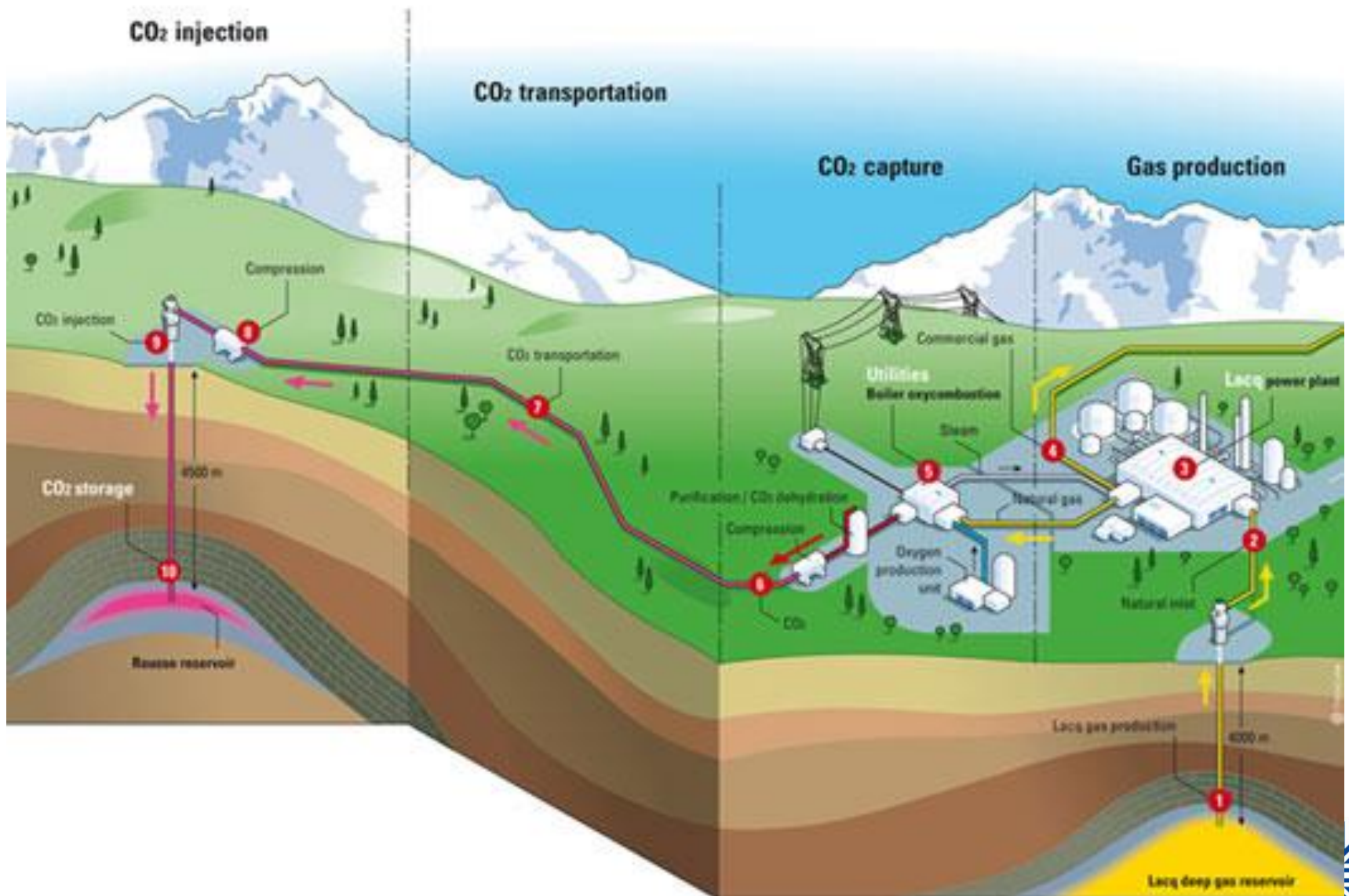


Figure 3: Technology CO<sub>2</sub> capture pathways in fossil fuel conversion and industrial processes (Courtesy of Gupta and Pearson, NRCan)

# Carbon capture and storage

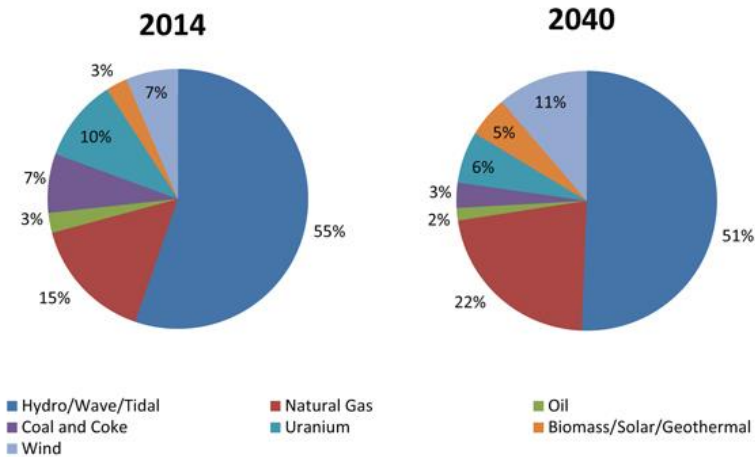




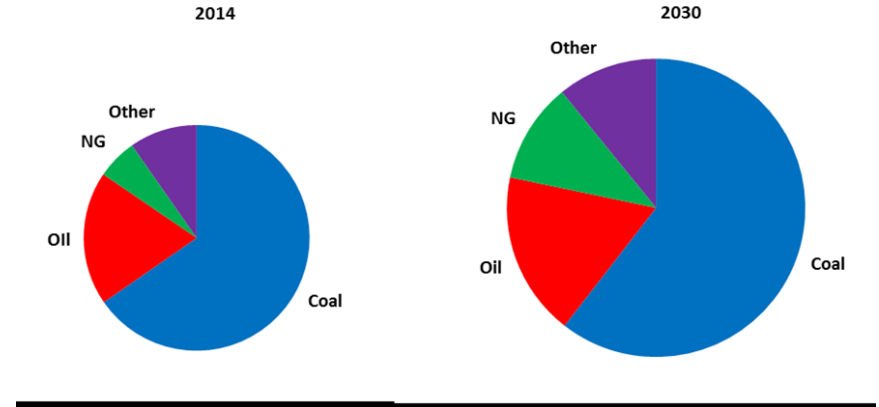
# What is the management thought process?

## Government trying to optimise the energy system

*Looking healthy*



*Big problem to solve*



# Key Issues

- Security of supply
- Cost of supply
- Environmental impact of supply
  - CO2
  - Air pollution
- Local employment issues
- Management of strategic energy assets
- Energy efficiency versus energy supply
- Energy prices and subsidies
- Revenue generation potential
  - Taxes
  - Dividends from state companies
  - Trickle down impact of successful domestic industry
- Local, regional and international politics



# Topics of interest

- Different issues for importing and exporting countries
- Risks for hydrocarbon producers
- Economic cost of switching to a low carbon economy
- Prioritising economic cost, security of supply and environmental impact
- Maintaining economic competitiveness in the global market
- Achieving global consensus on key issues
- Political timescales versus energy sector timescales
- Corporate influence on political decision-makers
- Public opinion versus economic reality



# What is the management thought process?

## Wholesale buyer of gas



# Key Issues

- Price
- Price mechanism
- Length of contract
- Competing fuel prices (coal, oil)
- Implied cost of power
- Future gas demand
- Security of supply
- Alternative gas supplies
- Pipeline gas or LNG
- Likely market regulation
- Customers for the gas



# Topics of interest

- Deregulation of gas markets has put wholesale buyers at greater risk
- End-users now have much more choice about price and supply
- The rise of renewables is making gas demand much more volatile
- Contracts must be much more flexible
- Spot purchases can provide flexibility and price diversification
- Security of supply becomes an issue as hubs are not liquid enough
- Gas projects are long-term; buyers need to provide some guarantee of offtake to encourage investment



# What is the management thought process?

**Major truck fleet owner or shipping magnate**



# Key Issues

- Relative fuel prices (short and long-term)
- Distance driven before re-fill / re-charge
- Environmental legislation
- Customer demands (public opinion)
- Cost of changing technology
- Re-fuelling infrastructure
- Commitment of truck/car/ship manufacturers
- Longer term technology advances
- Competitor activity (what is everyone else doing?)
- Social responsibility



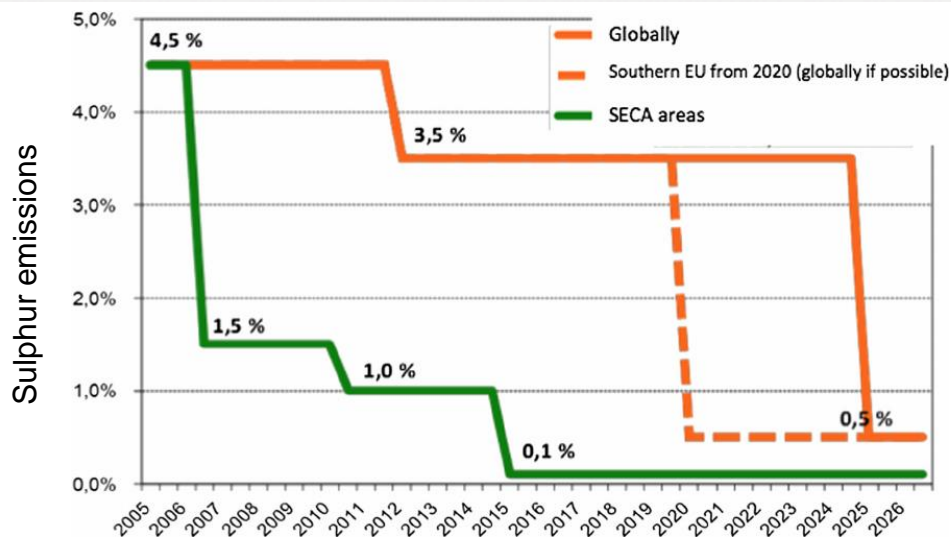


# Topics of interest









- Maritime shipping emissions legislation (IMO)
- Power of engines (LNG trucks versus electric vehicles)
- Trucking fleets with own infrastructure and standard routes
- Commitment of vehicle manufacturers – when does the market demand change
- Battery technology a key constraint
- Fuel efficiency versus change in fuel
- Impact of lower oil prices – reduces incentive to change
- Status quo effect – no-one ever got fired for choosing IBM



# IMO Worldmap for ECA's (Emission Control Areas)



# LOWER GREENHOUSE GAS EMISSIONS

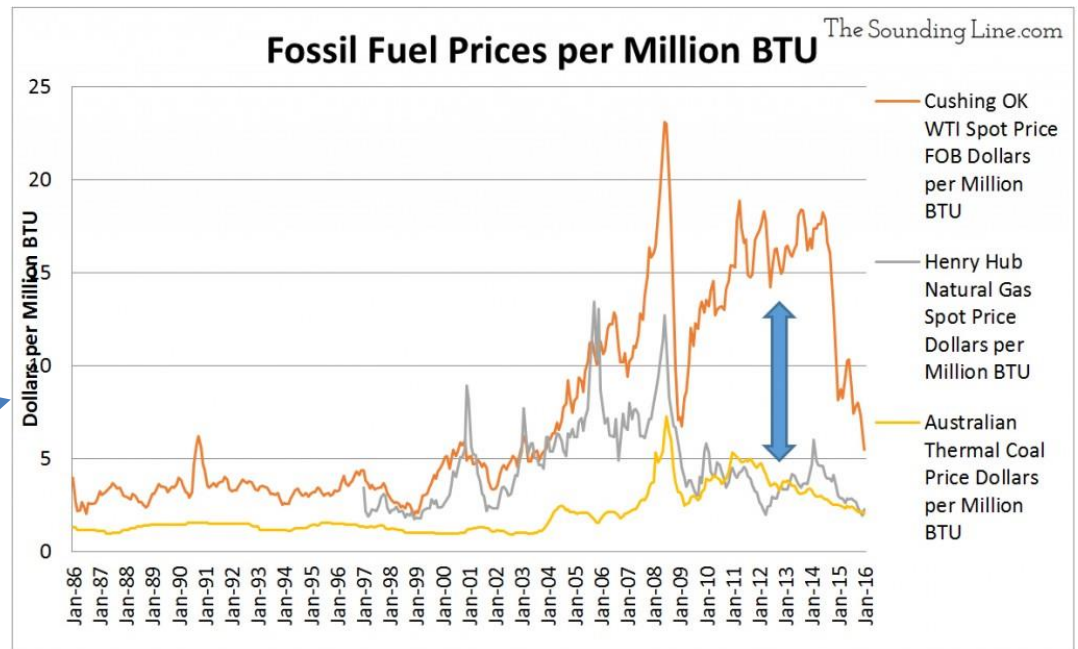
	Extraction	Processing	Transportation and storage	Emissions at end use	Total life cycle
Natural gas (LNG)	 94 g/km	 25 g/km	 55 g/km	 842 g/km	<b>1016 g/km</b>
Diesel	 148 g/km	 132 g/km	 6 g/km	 1079 g/km	<b>1365 g/km</b>

Based on Natural Resources Canada's GHGenius model, version 3.15.  
Assumes use of Westport Innovations 15 litre HD engine system.



The environmental case is relatively clear....

...but is only of interest to companies if the oil and gas price differential is wide



What is the management thought process?

**Construction or maintenance of a gas pipeline**



Image courtesy of Nabucco Gas Pipeline International GmbH



# Key Issues

- Sources of throughput
- Long-term future of fuel
- Payback timescale
- Government support (regulated prices)
- Alternative uses for pipeline
- Security of gas producing company
- Security of gas buyer
- Availability of finance
- Cost of dismantling asset



# Topics of interest

- Alternative uses for gas pipelines
  - Hydrogen (electrolysis or methane conversion)
  - Biogas (local grids)
  - CO2 (if CCS works)
- Pipeline networks are major national assets with strategic implications
- Pipeline tariffs may rise if the assets useful life shortens
  - Need to recover cost sooner





# What is the management thought process?

## Construction of a renewable energy power station



# Key Issues

- Geography
- Meteorology
- Cost of technology
- Government support
  - Prices
  - Finance
  - Renewables targets
- Local support / resistance
- Grid suitability
- Back-up generation
- Economic return (guaranteed?)
- Local service sector and R&D





# Conclusions

- The Energy Trilemma – Price versus Environmental Impact versus Security of Supply
- Economics normally trumps everything else
- Uncertainty creates a disincentive to invest, which creates its own security of supply risks
- Government support beyond renewables is almost inevitable – what does this say for free markets?
- As fossil fuels near the end-game, declining prices will affect energy companies but will also affect consumer choices
- Government revenues will also be significantly affected, with potential serious geo-political impacts
- Shareholders of energy companies have some interesting choices to make – what returns do they want from their investments?
- Renewables are causing huge disruption to the global energy economy – they are necessary to reduce global warming, but have potential security of supply implications



## Some challenges

- Human resources
- Bank financing
- Environmental pressure groups

