THE OXFORD INSTITUTE FOR ENERGY STUDIES

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Decision making at energy corporations

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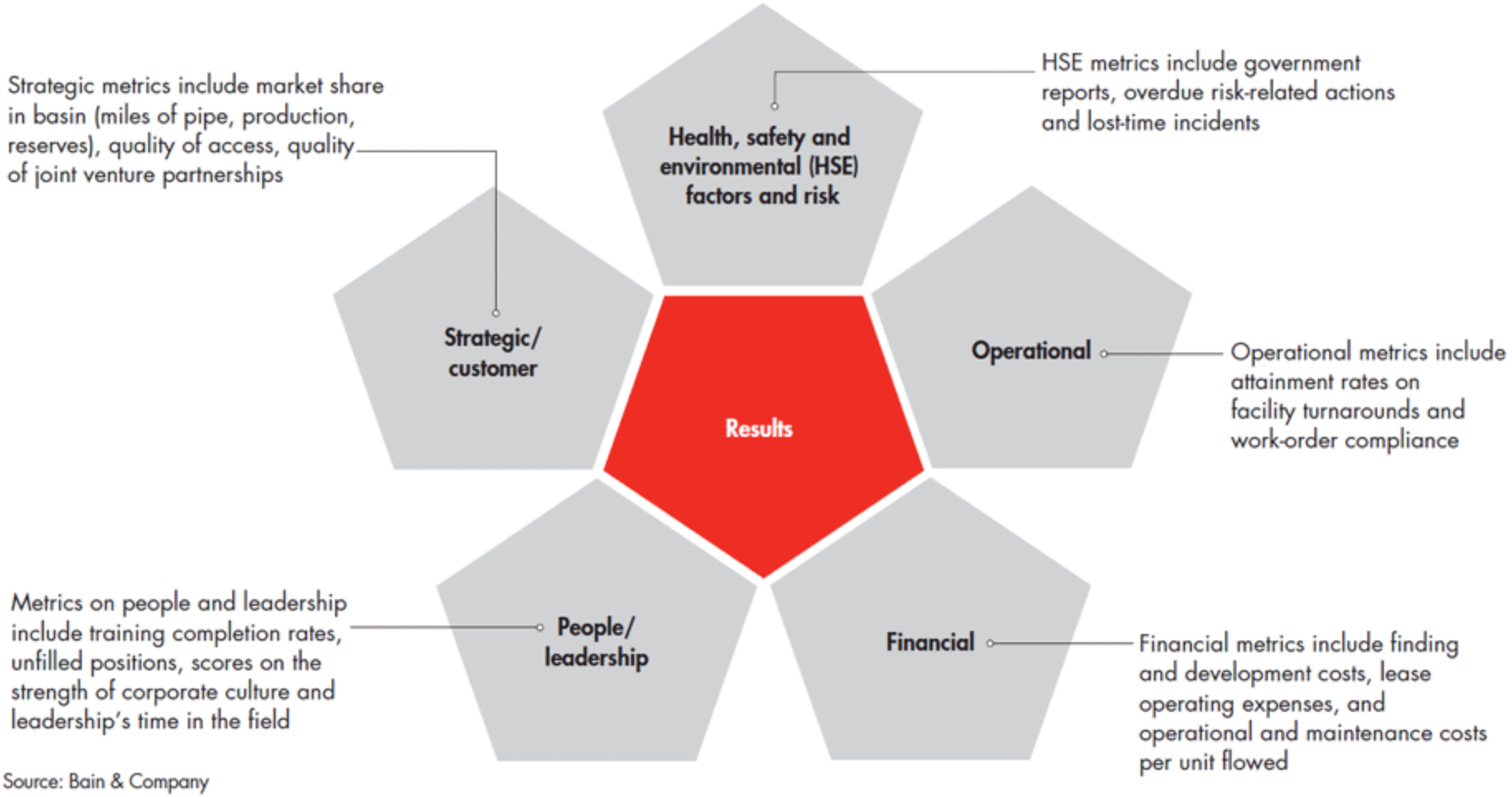
Key Questions for Company Management

- 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 responsibities

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.

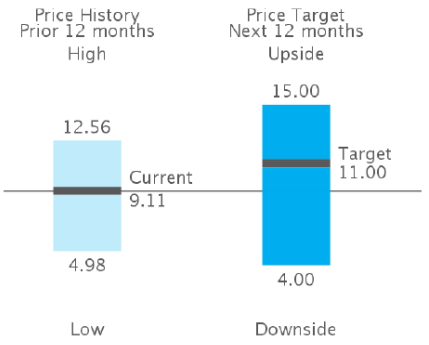
Upside case USD 15.00

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

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/discount.

Upside/Downside scenarios



Source: Company data, Barclays Research
Note: FY End Dec

Comparison with Peer Groups

Comparative multiples-based valuations

	P/E			EV/EBITDA		
	2016E	2017E	2018E	2016E	2017E	2018E
Russia and FSU						
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
Emerging markets						
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
Developed markets						
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

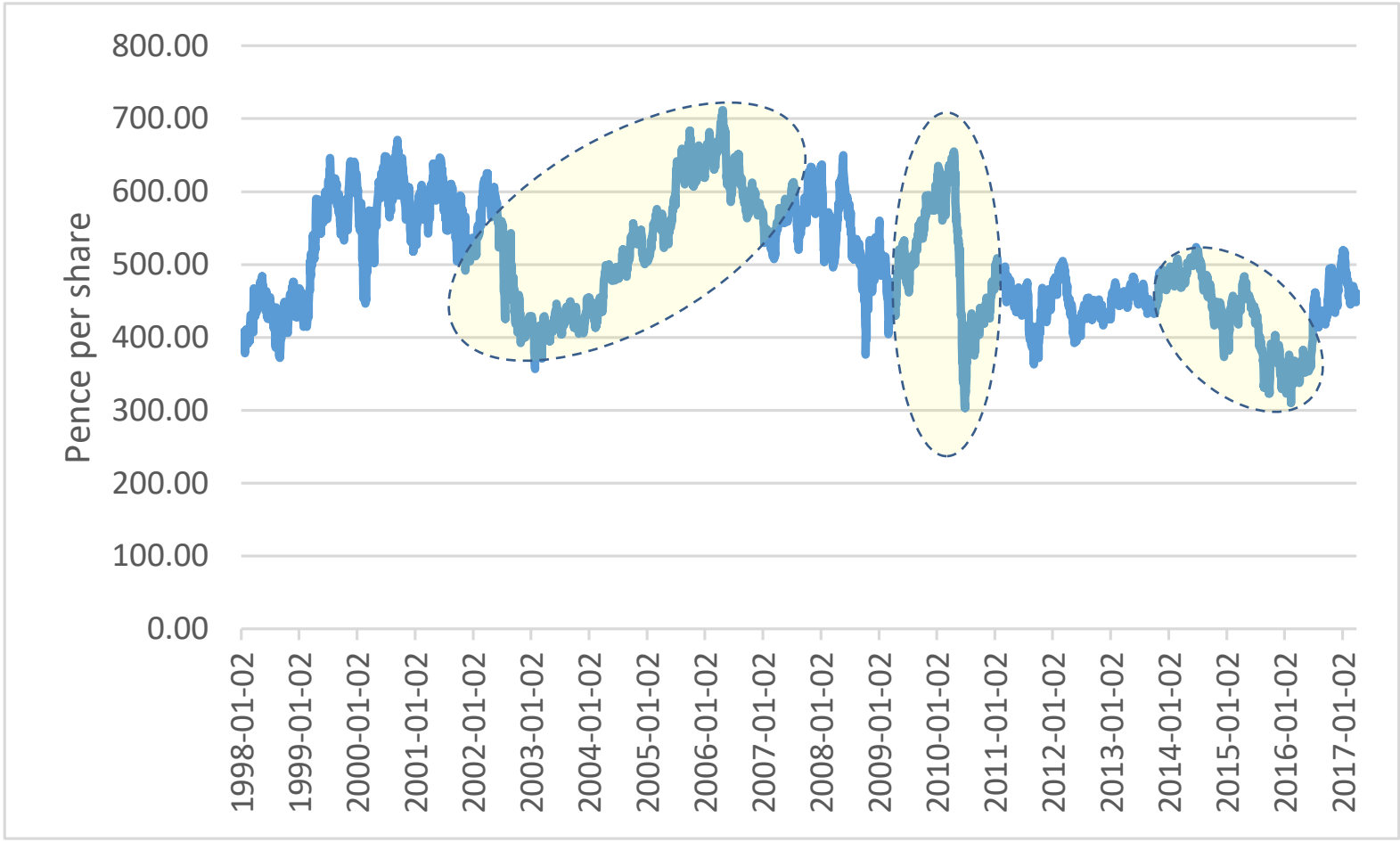
Two elements of investor returns – short and long term

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%

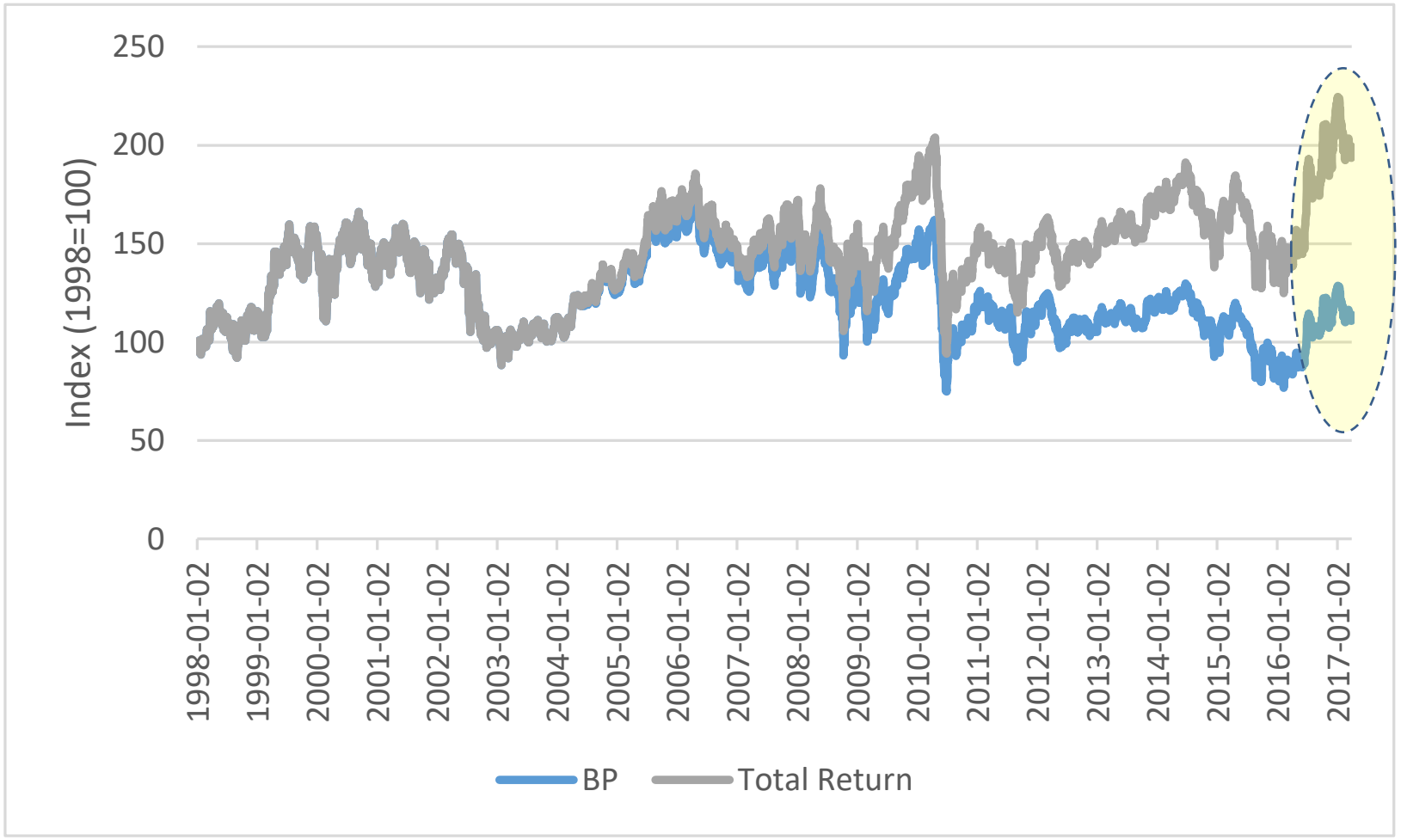
- Investors want a return on their investment
  - Share price growth, normally based on long-term prospects
  - Dividend pay-out on an annual basis, based on yearly cashflow and profits

Key Management Driver = The Share Price



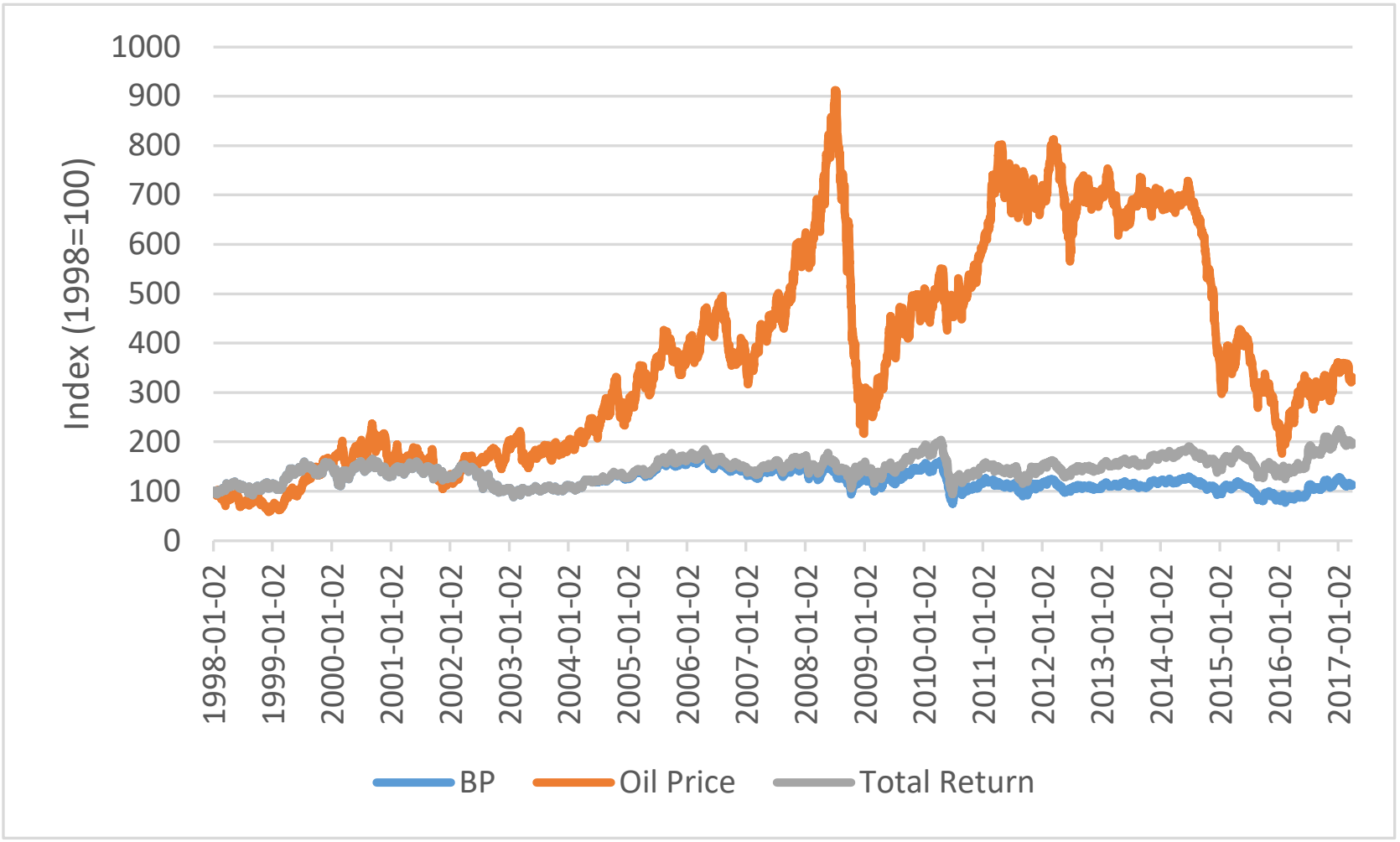
- Management incentives often driven by the share price as one key objective

Total return to shareholders



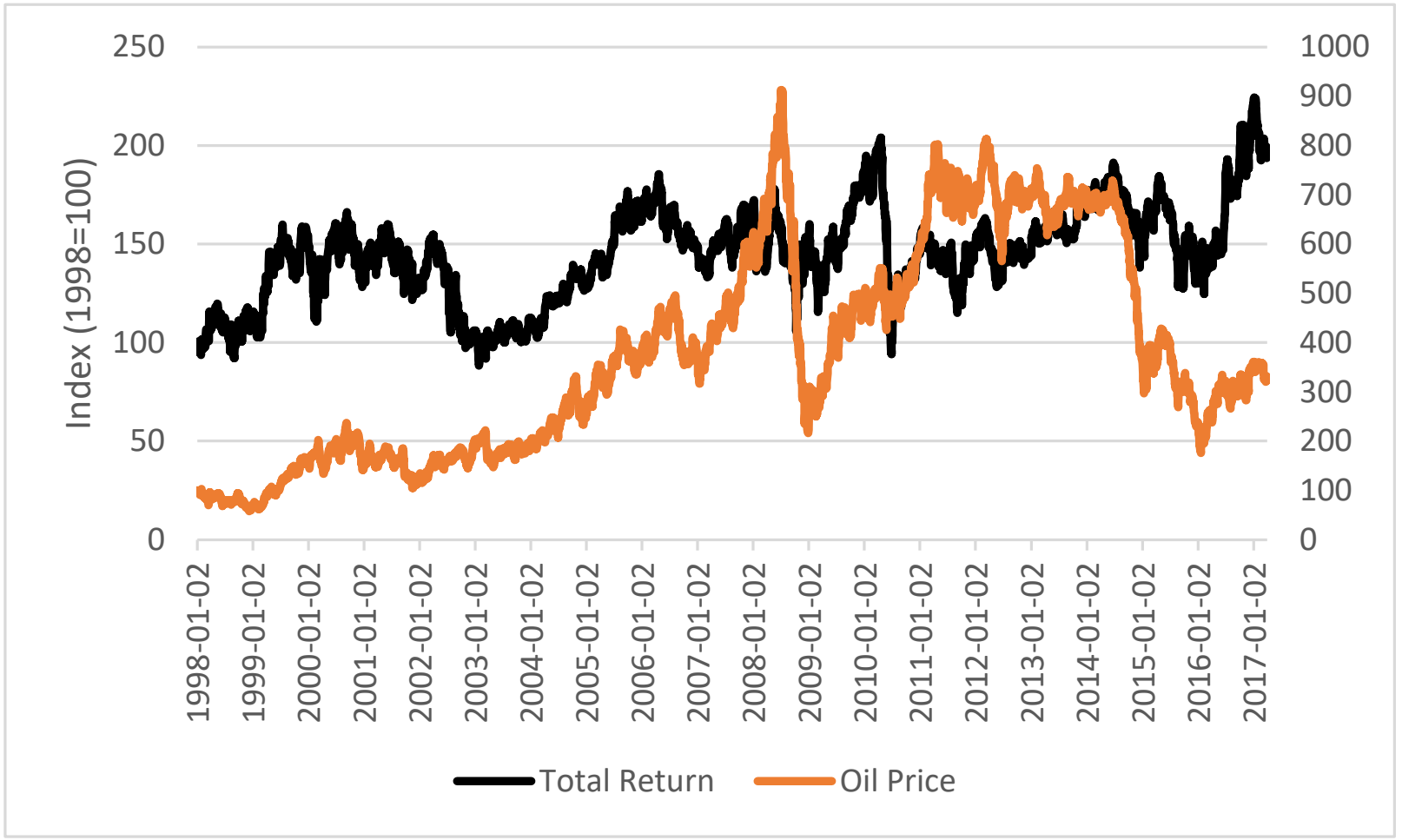
- Almost no gain in share price terms over almost 20 years
- Shareholders doubled their money when dividends and other incentives are included

Performance relative to oil price



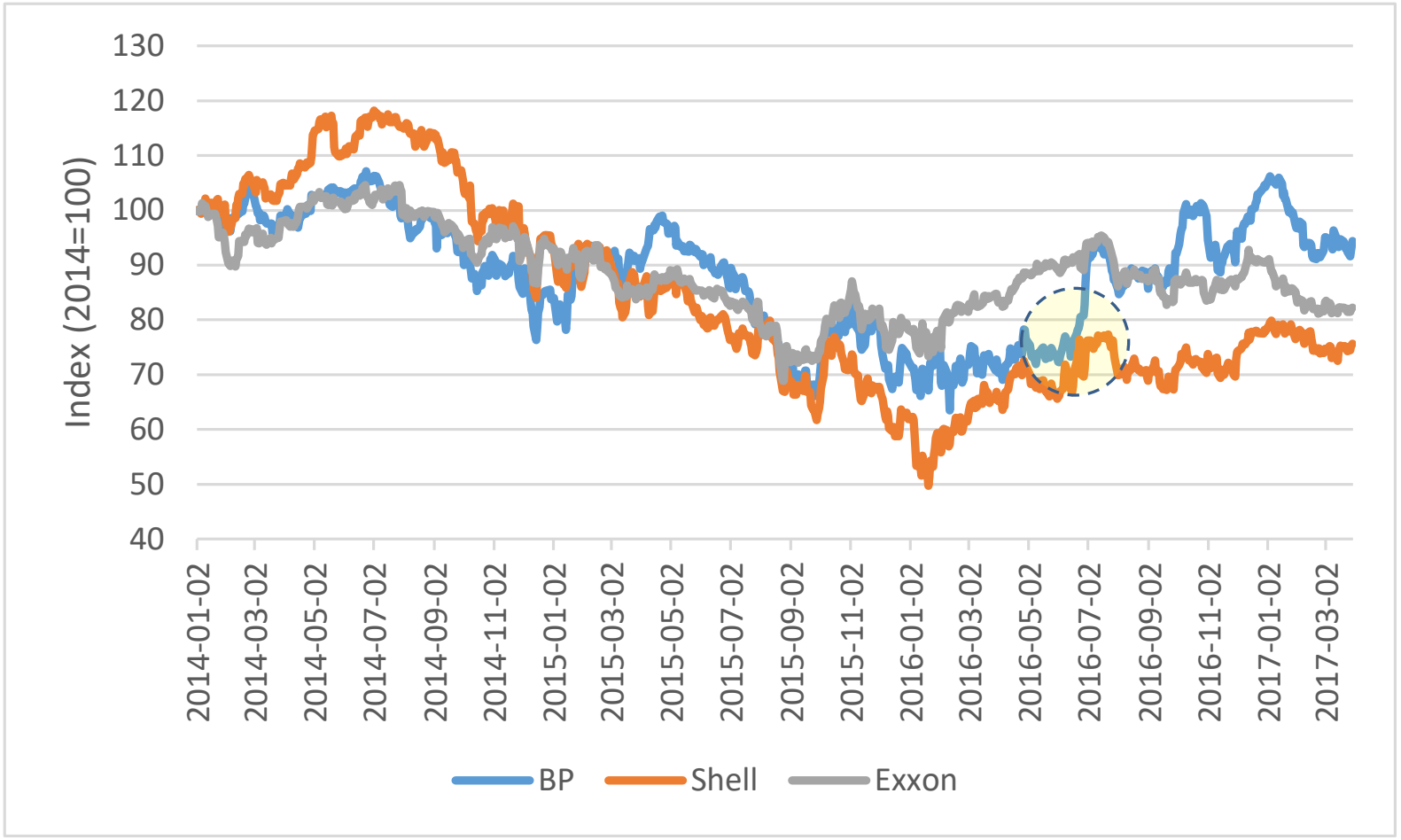
- Not as close as you might expect
- The benefits (or otherwise) of vertical integration

An alternative view



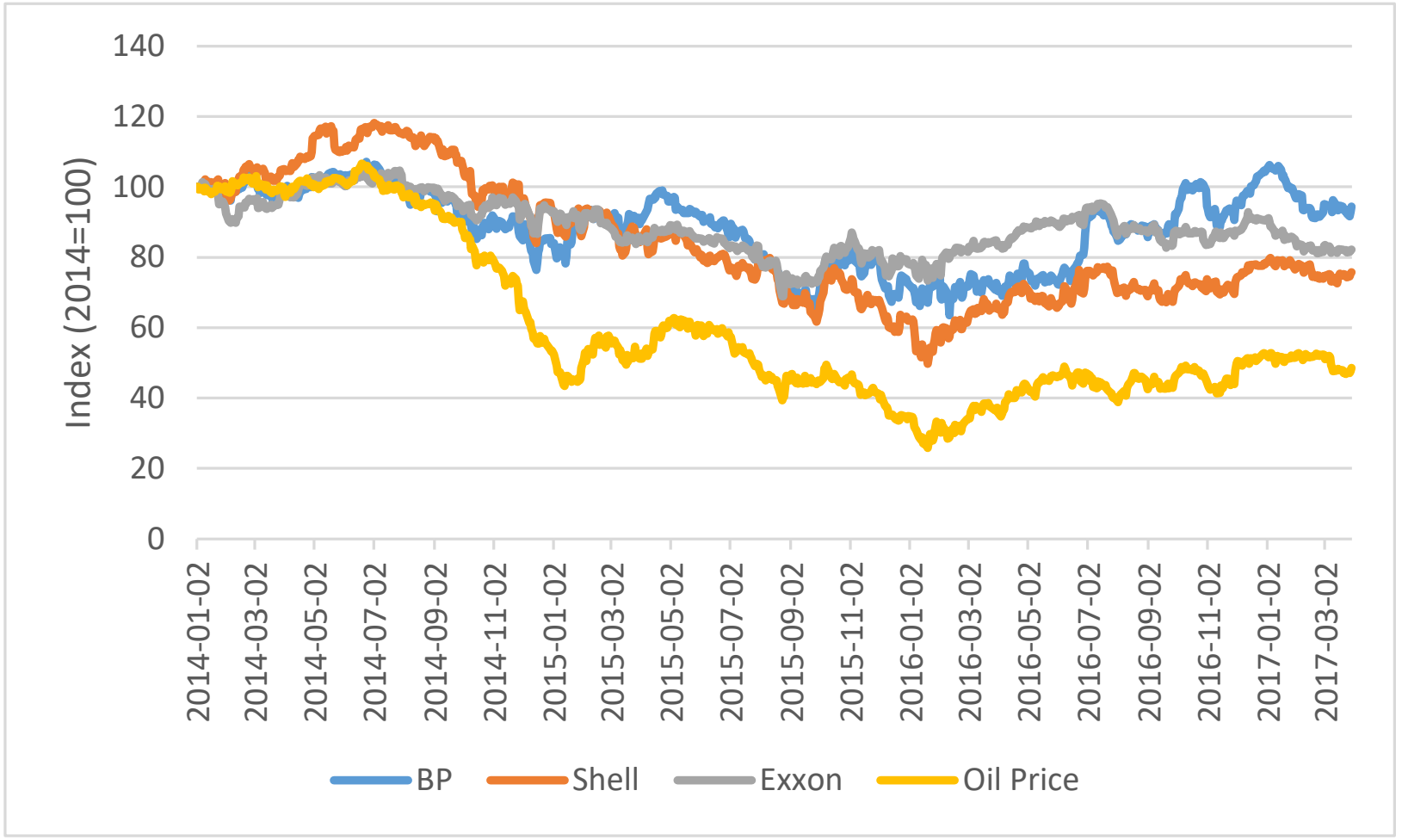
If you don't like the view, change the axis!

Share price relative to Peer Group



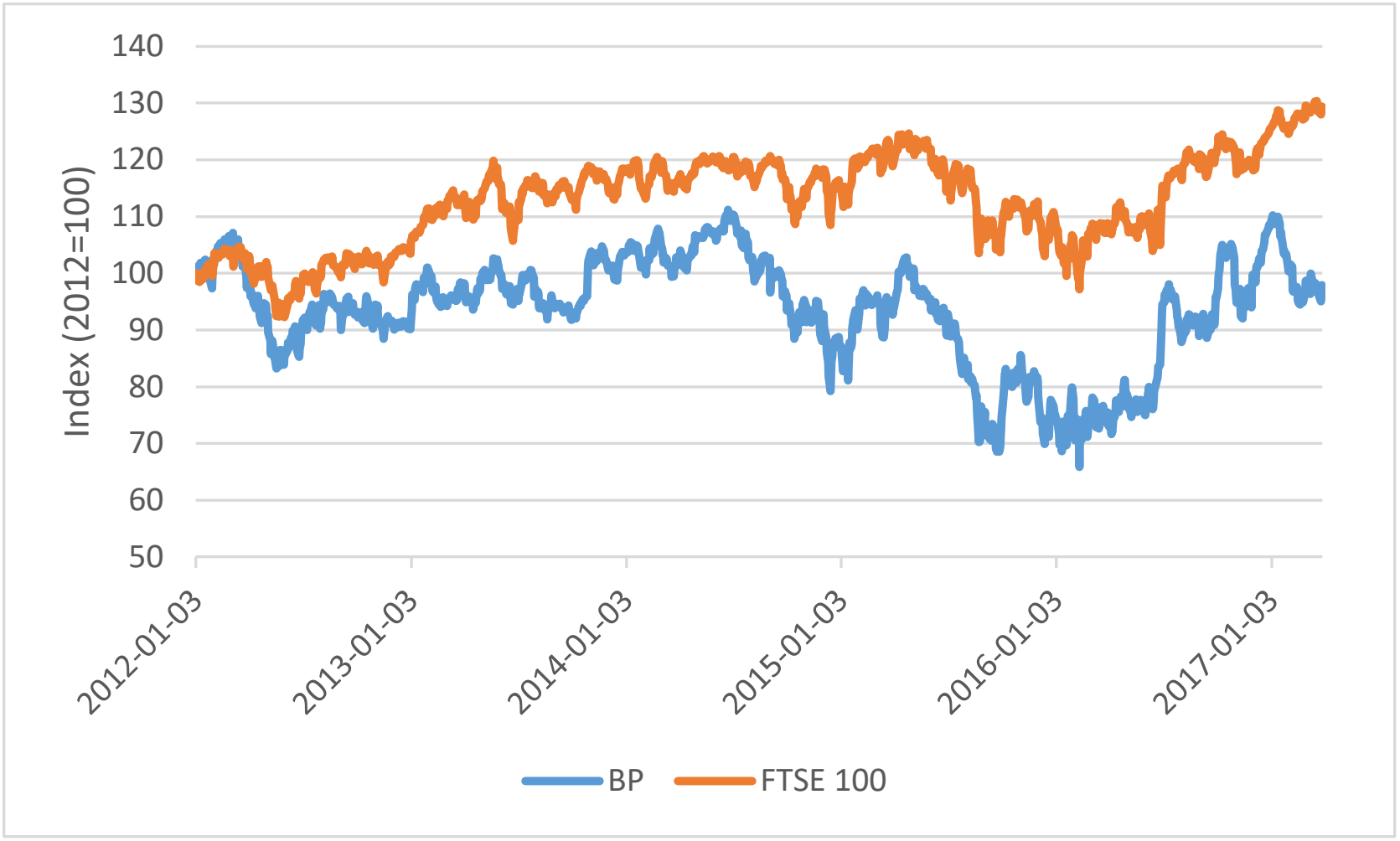
- In the shorter term, BP has outperformed its major European and US competitors
- BP has been in recovery mode, but the final settlement of US court action has provided a boost

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

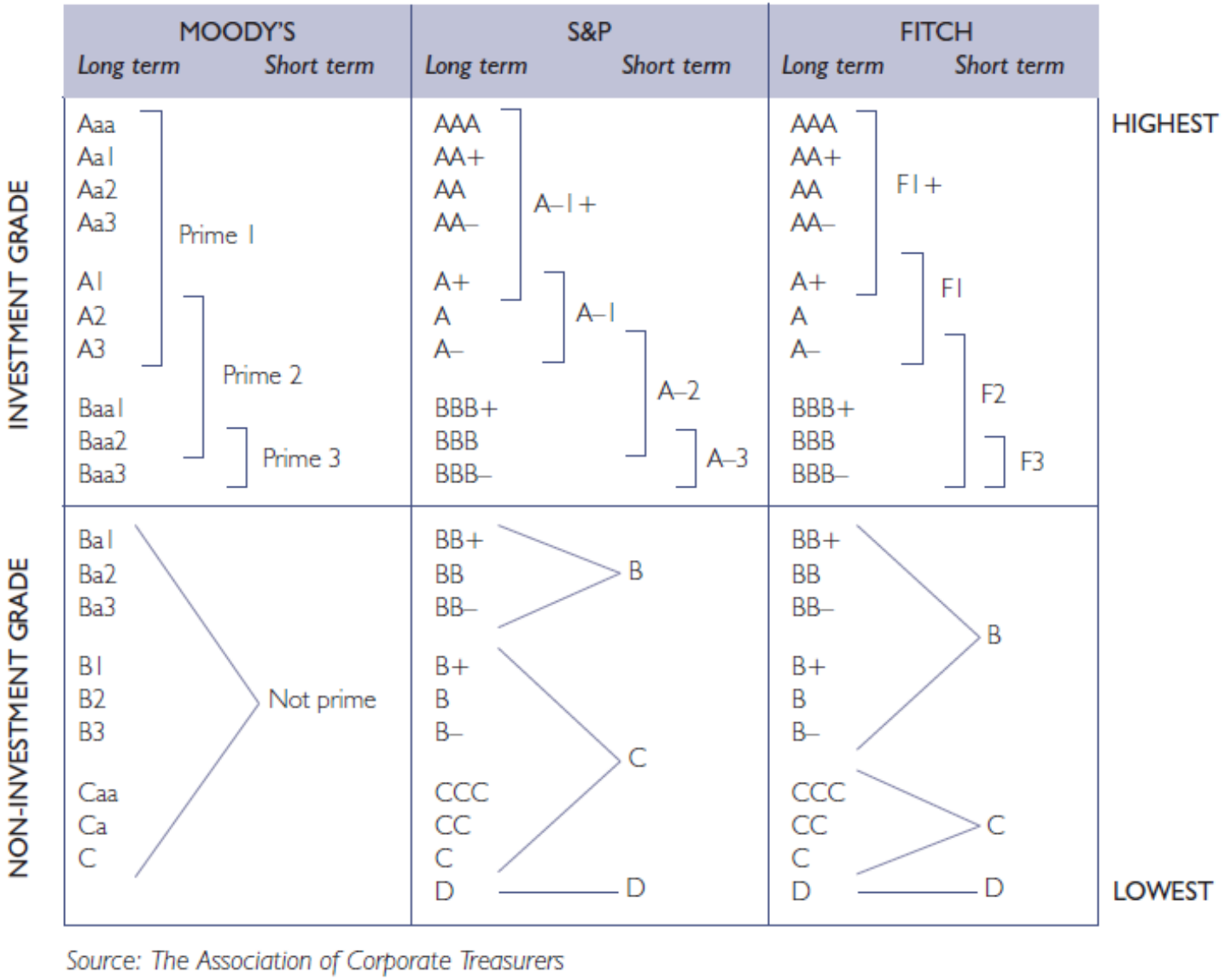
Bankers and Credit Agencies think about financial solvency

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 it's 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



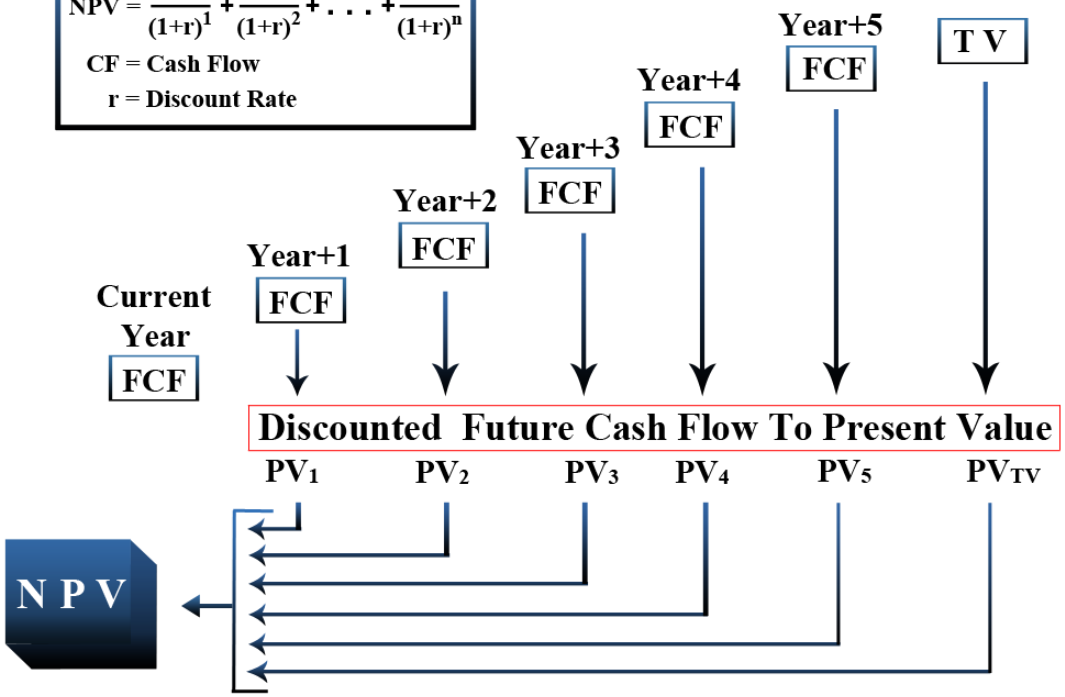
Source: The Association of Corporate Treasurers

The DCF Calculation as a foundation

$$NPV = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \ldots + \frac{CF_n}{(1+r)^n}$$

CF = Cash Flow

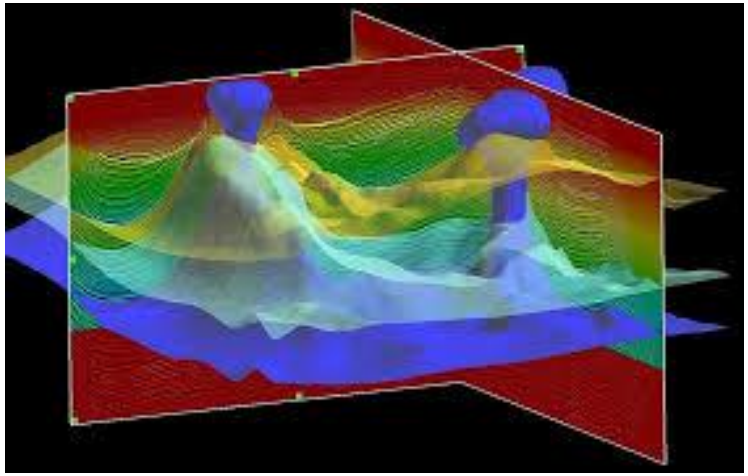
r = Discount Rate



- 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

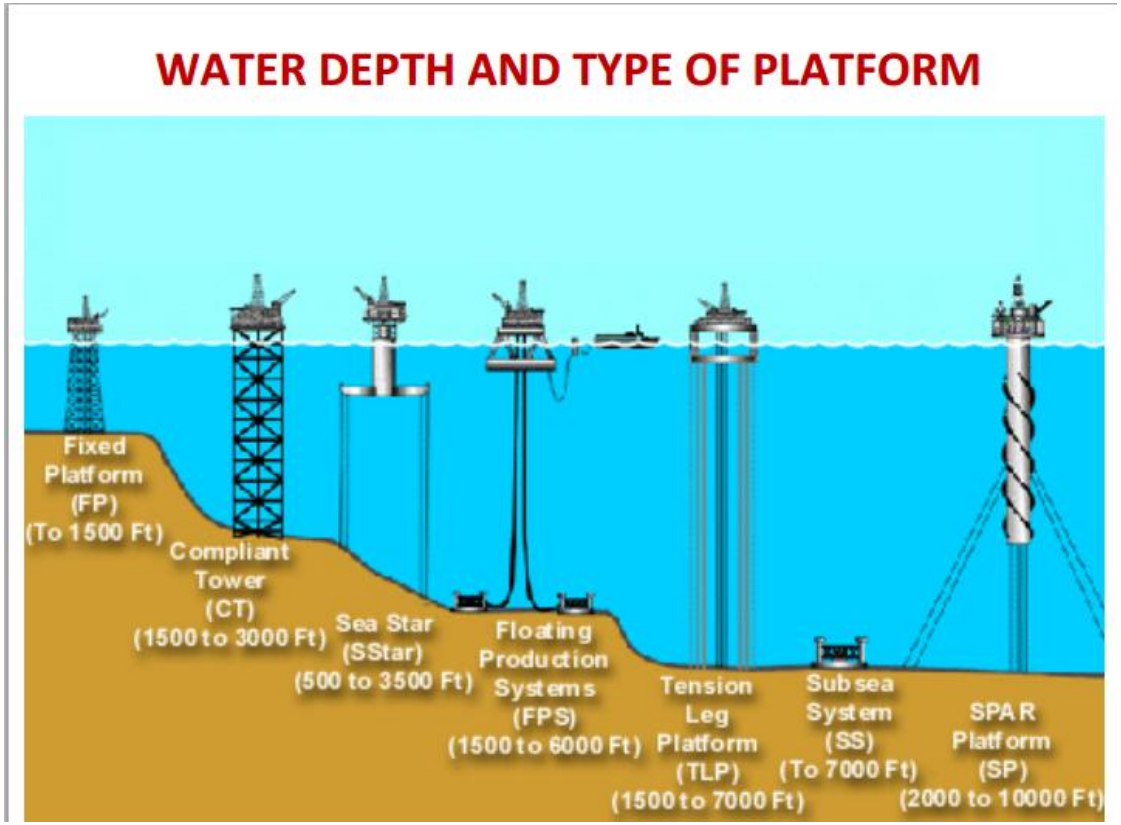
- Current state of company portfolio
- Past experience in the region
- Geology
- Geography
- Risk of success
- Cost
- Source of funding
- Possible economic outcome
- Partner companies
- Commercial environment
- Political environment

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



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

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

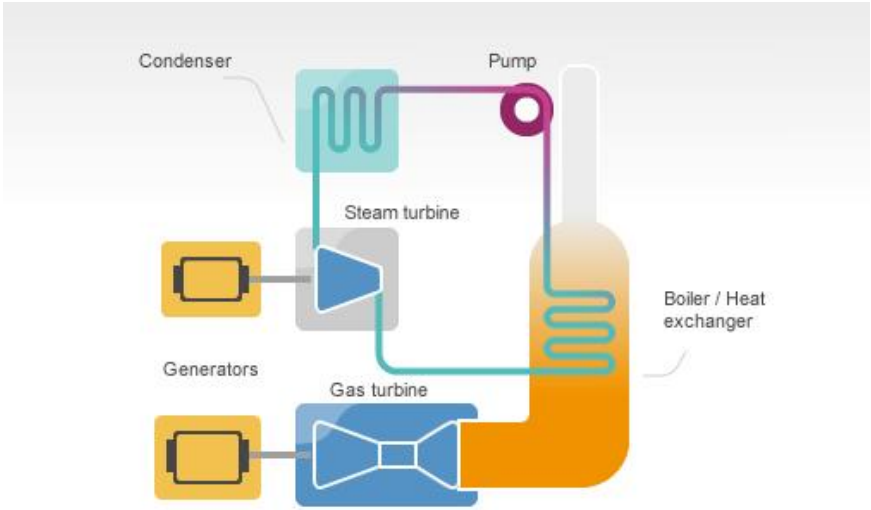
- Access to market
- Export technology
- Total cost
- Outlook for medium and long-term gas demand
- Outlook for coal demand and price
- Competing sources of gas supply
- Breakeven gas price
- Associated liquids
- Length of sales contract available
- Price formation mechanism
- Securing finance
- HSE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

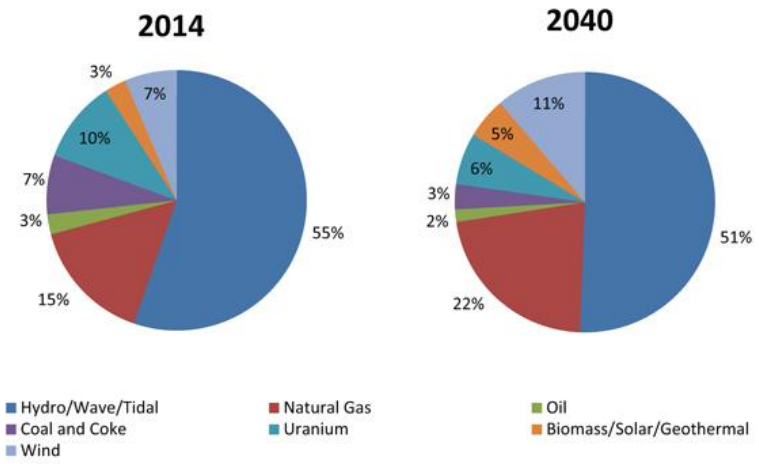
Topics of interest

- 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?

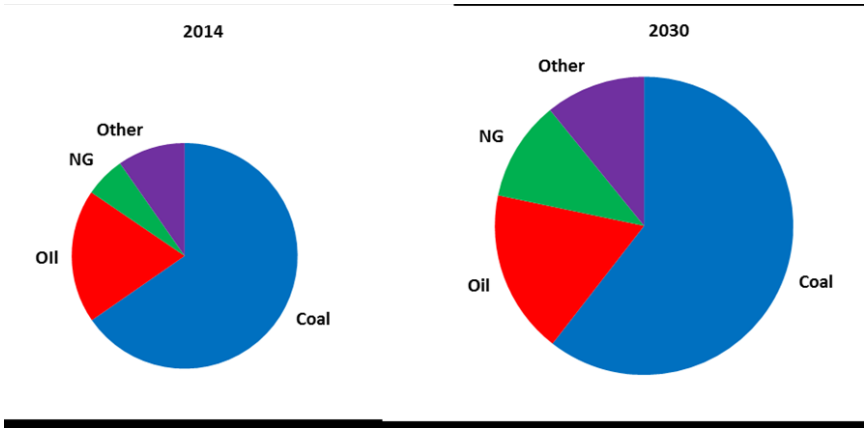
What is the management thought process?

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 fro 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 is 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

What is the management thought process?

Construction or maintenance of a gas pipeline

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

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