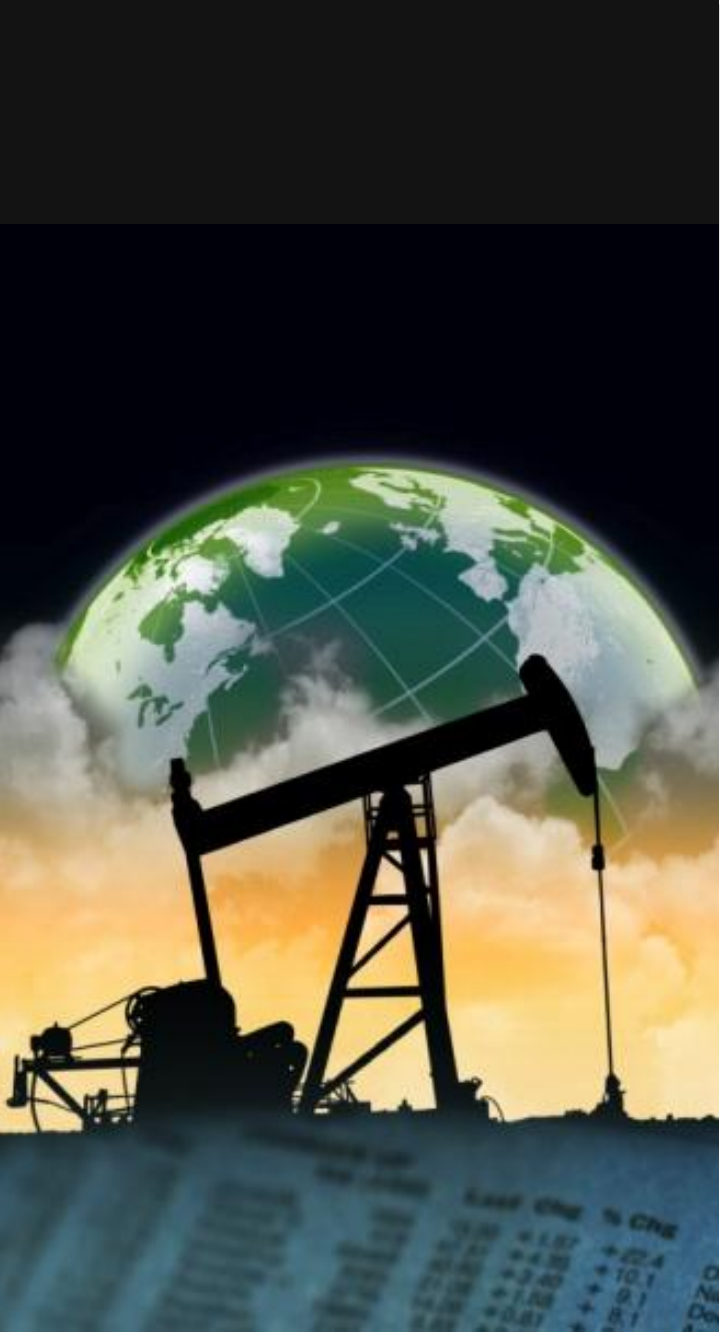




Discussion Slides: Alaska Senate Resource Committee

February 17-18,
2012

Tony Reinsch
Senior Director, Upstream & Gas
PFC Energy

Janak Mayer
Manager, Upstream & Gas
PFC Energy

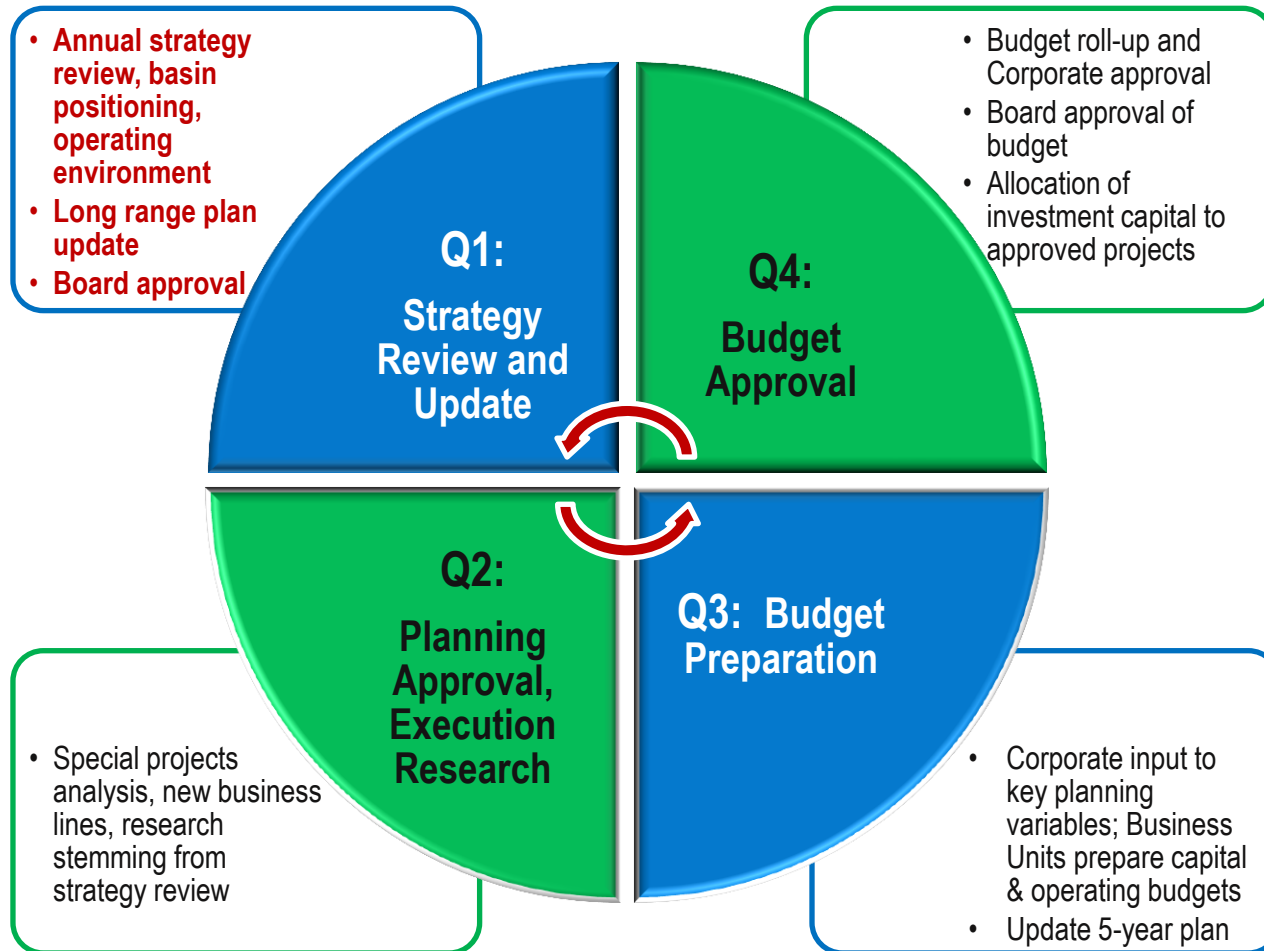
IOC Decision Making: Capital Allocation, Budget and Long-Range Planning

Points to Address: Discussion of Company Behaviors and Decision Making

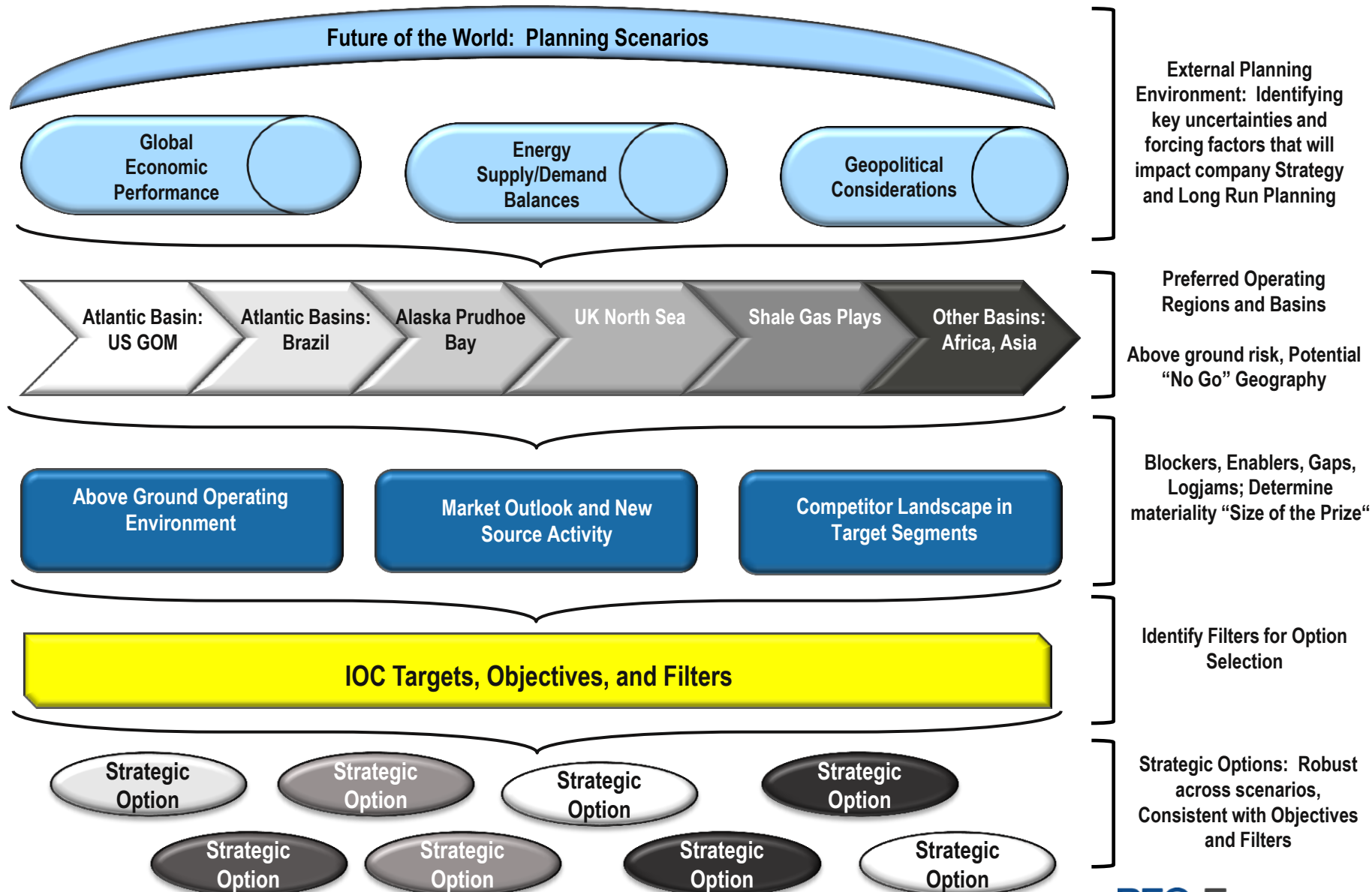
- **Key considerations for companies in making investment decisions, including decisions on whether to develop particular resources in the near term or postpone development**
- **Key metrics including ROCE, NPV, IRR, consideration of asset metrics versus portfolio metrics, and differences between integrated vs non-integrated companies**

Annual Planning Cycle

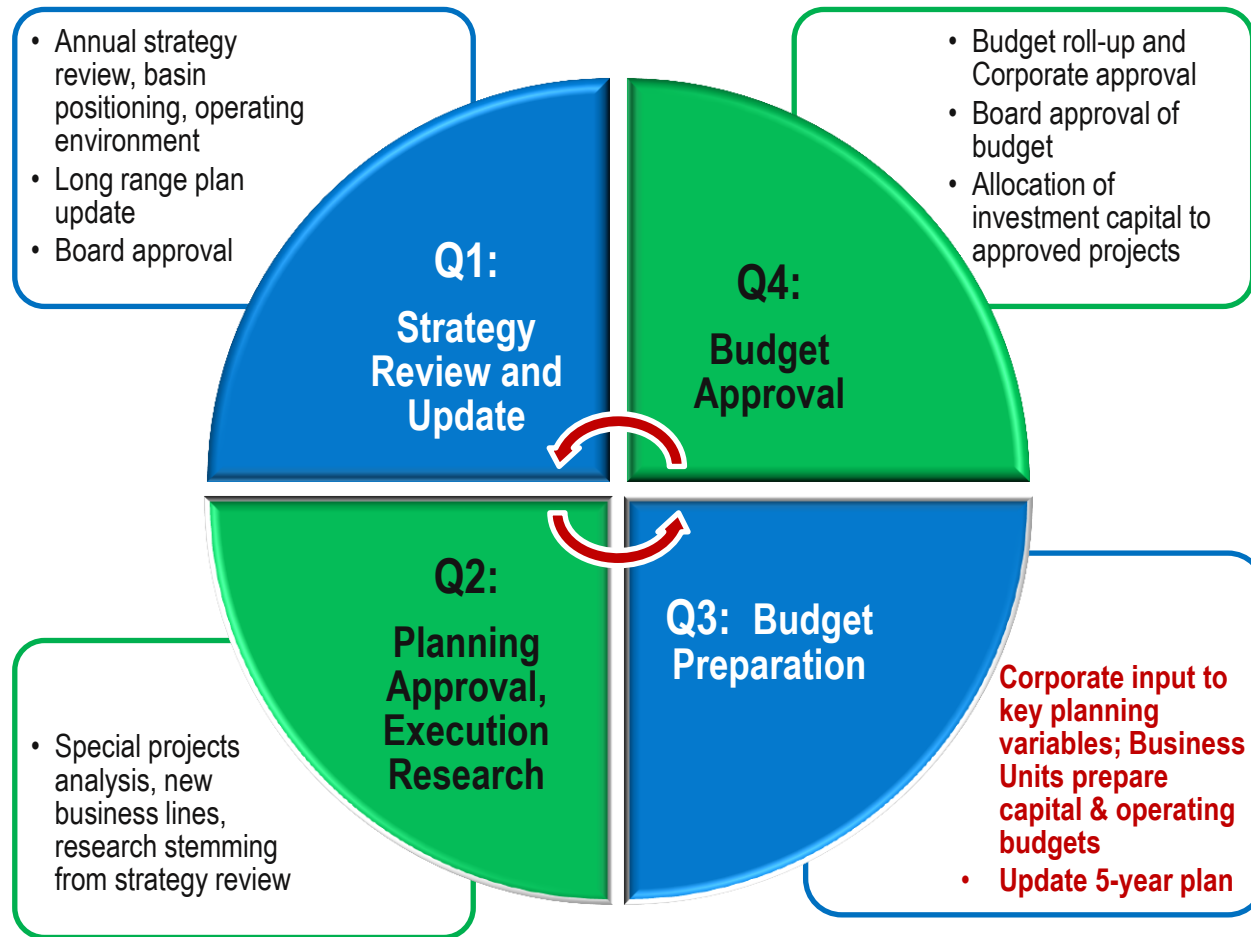
Oil and gas companies follow a standardized process linking the annual Budget cycle to the Long Range Plan and corporate Strategy



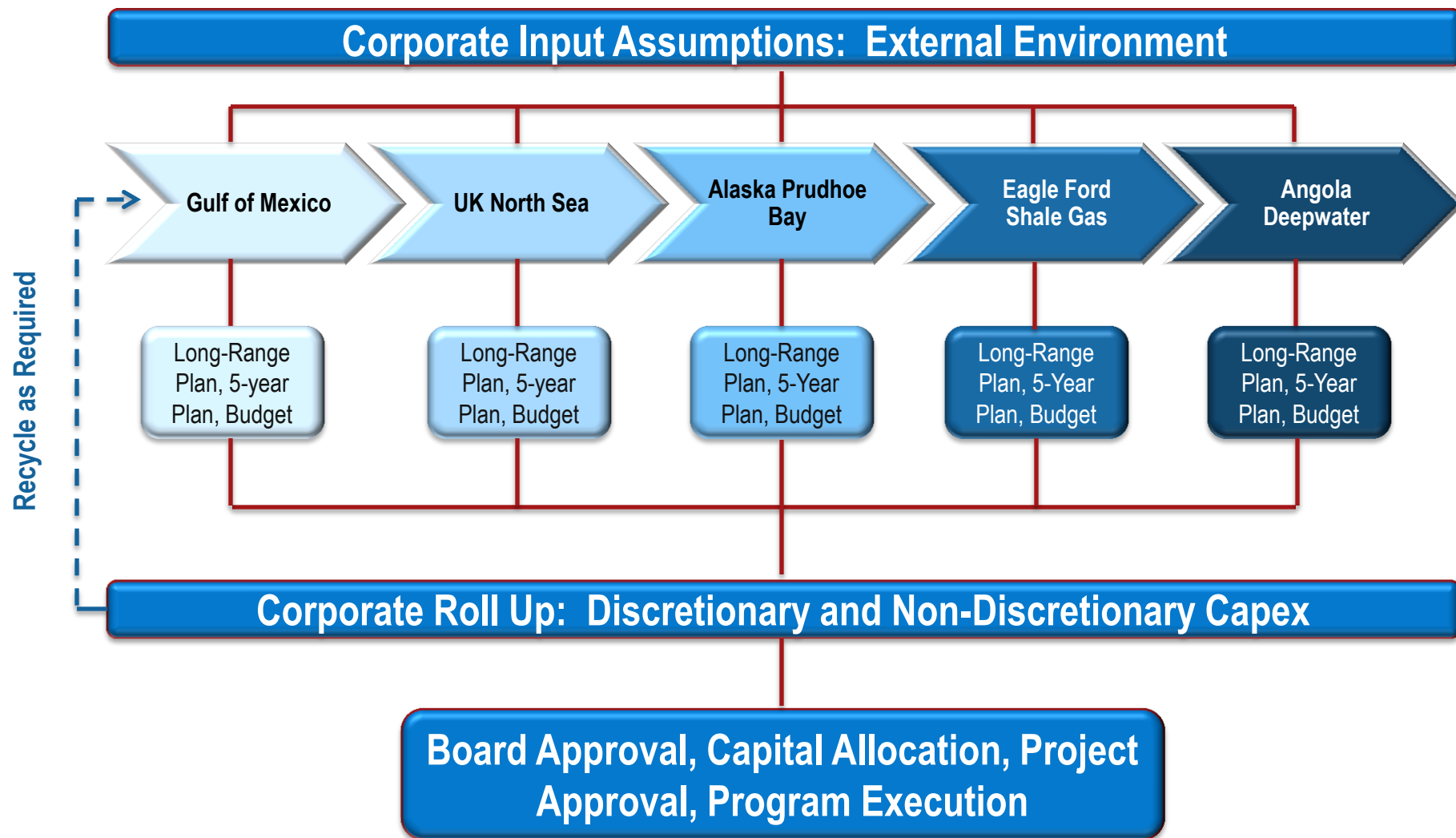
Strategy, Planning and Positioning



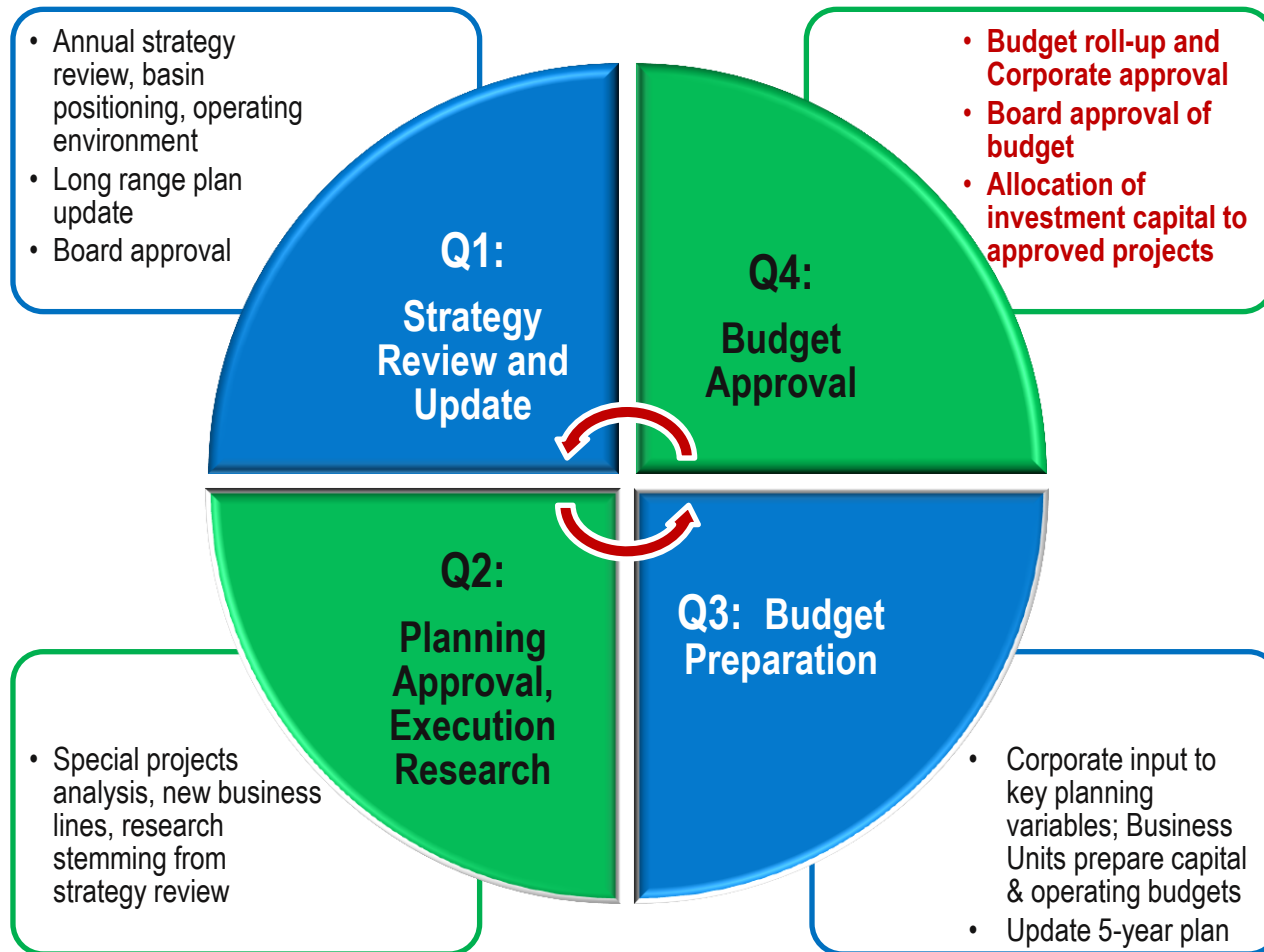
Annual Planning Cycle



Planning Cycle and Capital Allocation



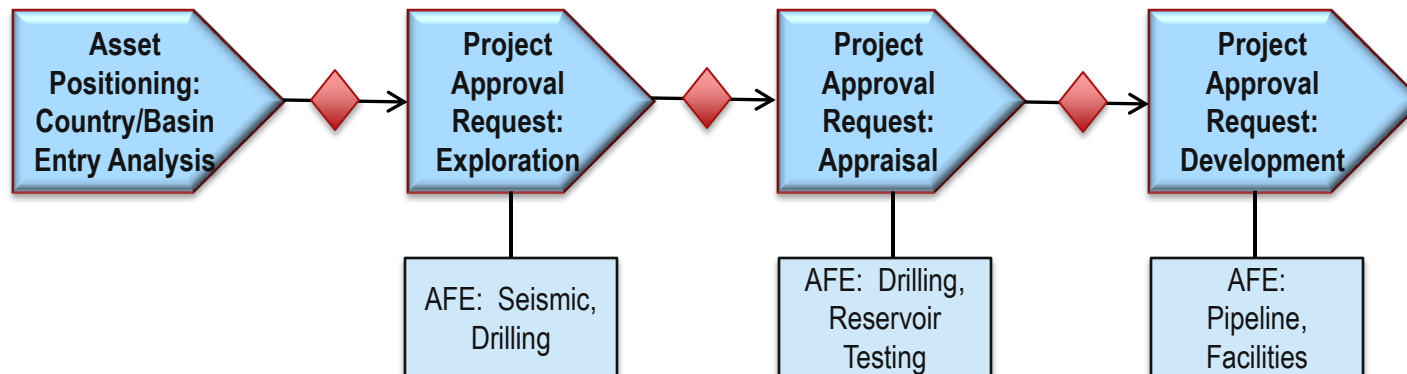
Annual Planning Cycle



Attracting Capital: The Project Approval Process

- Materiality, total capex exposure, full-cycle economics/metrics, are all considerations in determining whether an IOC will position, or continue to invest, in a particular asset, basin, country.
- Each project is disaggregated into “discrete investment decisions”, in the form of Project Approval Requests (PARs), creating a natural *stage-gate* for capital approval and allocation.
 - A PAR can extend beyond a single fiscal year budget, depending on scope of the work program. Represents *non-discretionary* capex at the start of the budget year
 - Each PAR has one or a series of associated AFEs for a specific activity or capex element
 - Sum of AFEs for a calendar year = *capital Budget*
- Each stage-gate creates an opportunity for the Company to continue, amend, suspend, or exit/divest

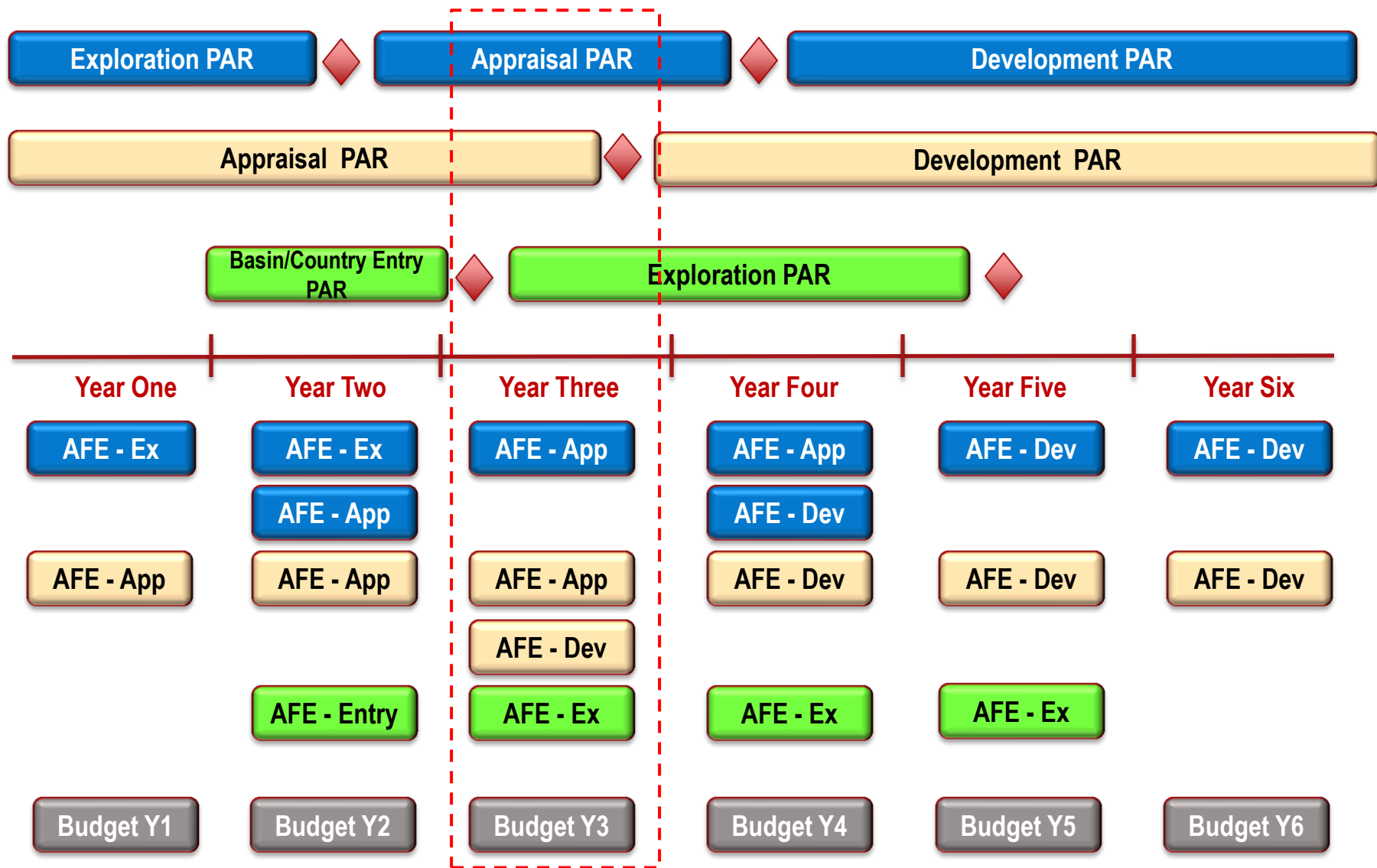
Asset Modelling and Decision Process: Materiality and Total Capex Exposure



Request for capital budget allocation; decision to continue, amend, suspend, or divest

Business Control Architecture:

PAR => AFE => Budget



Upstream Financial Metrics: Measuring Performance

- **Growth** .. Ability to manage the “top line.”
 - CAGR in Production and Reserves relative to target
 - Quality of growth .. Where, how, consistent or not
 - Plowback Rate. .. To show relative growth intentions between different regions
- **Profitability** .. Ability to manage the “bottom line.”
 - Upstream Cash flows
 - Upstream Net Income
 - Upstream Production Costs

Absolute and “per boe” basis
- **Efficiency** .. Ability to manage capital.
 - Upstream ROCE
 - Finding costs, F&D costs, Replacement Costs
- **Cash Flow** .. Ability to manage investment/re-investment in the portfolio.
 - Financial Strategy (debt targets, debt/capital ratio, dividend requirements)
 - Self-financing nature of portfolio (free cash flow versus capex: regional and global)
- **Risk** .. Ability to manage a diversified portfolio.
 - Financial Risk: Debt-to-Capital ratio, financial flexibility
 - New Source Risk: thinner margin barrels dominating new source volumes

Project Selection and Decision Metrics

Energy companies employ a variety of Benchmarks or Metrics to rank investment opportunities and to allocate financial capital. Some of the more common include:

- Pay-out period; length of time required to recoup financial capital being placed at risk. Simplest selection metric, important to firms with scarce capital resources. No reference to project value after pay-out
- Internal Rate of Return; discount rate at which PV of costs = PV of revenues
- Net Present Value; PV of costs less PV of revenue flows (using discount rate reflecting cost of capital, cost of borrowing, or other);
 - NPV/boe; incorporates concept of investment efficiency
 - NPV/Investment; incorporates assessment of return to the investment dollar. Also referred to as **PVPI**
- Recycle Ratio: Netback or profit per boe divided by F&D cost per boe. A measure of project or corporate profitability
- Discounted and Undiscounted Net Cash Flow Profiles; measure of availability of free cash flow for follow on or alternative investments
- Maximum Negative Cash Flow Exposure; useful in situations where access to financial capital is an issue. What is the maximum exposure being undertaken by the firm
- Net Booked Reserves; contribution of the projects to corporate value (based on bookable reserves, amongst other measures)
- Capex/boe; cost per barrel of production capacity. Burdens the projects by the cost of infrastructure, facilities, etc. Tends to favor less complex, more mature capex alternatives

Project Metrics: Net Present Value

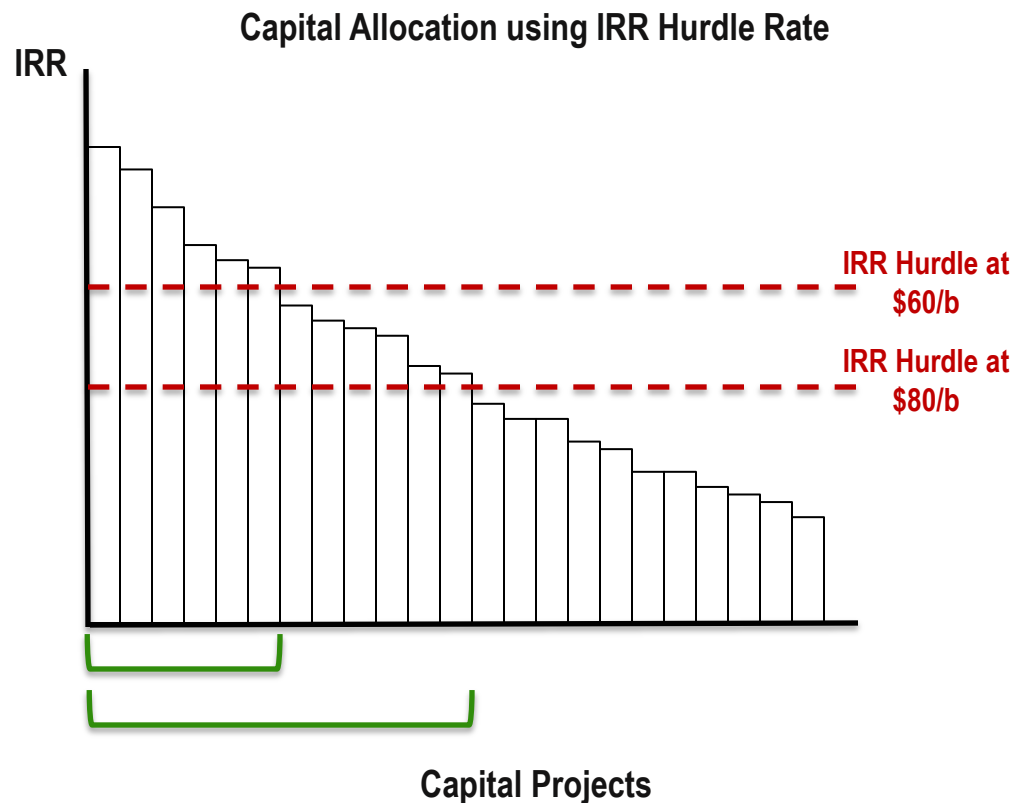
- **Net Present Value (NPV):** The estimated value of a project when all future net cash flows are discounted to the present at an appropriate rate (the “discount factor”). If $NPV > 0$, then the project is expected to deliver a return greater than the cost of development, including a return on capital invested (accounted for in the discount rate).
- Advantages:
 - Time value at corporate rate included
 - Can be calculated exactly
 - Can accommodate risk
 - NOTE: Above ground risk incorporated through discounting of costs and/or revenue flows, **NOT** through use of alternative discount rates
 - Useful for valuing properties
 - Discount rate reflects corporate preference for opportunity cost of investment capital (e.g., market interest rate, cost of equity capital, weighted average cost of capital (debt and equity))
- Disadvantages:
 - Difficult to rank projects. Significantly different capital and expenditure profiles can deliver the same NPV, due to the effect of discounting.
 - E.g., very large cash flows in a future time period can have the same “present value” as small cash flows in forward years. This may not, however, have the same impact and value for the company treasury

Project Decision Variables: Internal Rate of Return

- **Internal Rate of Return (IRR)**: The discount rate that equates all future cash inflows to outflows at a point in time (usually the present)
- Advantages:
 - Easy to understand.
 - Incorporates time value
 - Can be compared to a required minimum (or hurdle rate)
 - Independent of magnitude of cash flows.
- Disadvantages:
 - Multiple rates of return are possible in cases of material cash flow volatility (e.g., large positive and negative swings over project life); uncomfortable for decision makers looking for unique decision criteria
 - Doesn't measure absolute worth of the project
 - Not useful for ranking discrete projects
 - Implicit assumption that interim cash flow is invested at calculated IRR (issue for high return projects) => overstates the true project value

Capital Allocation: IRR Hurdle Rate

- Eligible projects ranked by IRR:
 - Eligibility based on series of discrete project metrics within each PAR
 - Metrics change at each stage of the project cycle, as risks are addressed and estimates become more certain
 - Examples:
 - $NPV_{10} > 0$
 - $PVPI > 1.3$
 - Payback < 3 years
- Corporate establishes a “hurdle” IRR number. Projects with IRR’s in excess of the hurdle rate attract budget capital, while those below the hurdle rate are not funded
- Issues with IRR Hurdle Rate:
 - Increase in free cash flow (due to, say, rise in energy prices) => increased capital budget => lower Hurdle rate in order to undertake additional projects => reduce overall portfolio quality and lower efficiency of capital employed. Evidenced in *cycles of value destruction* within the industry
 - Gaming the system: Project managers have an incentive to overstate the “size of the prize” or understate costs, in order to attract investment capital to proposed projects
 - IRR ranking does not speak to *materiality* => equivalent IRR’s can have substantially different capex and revenue profiles

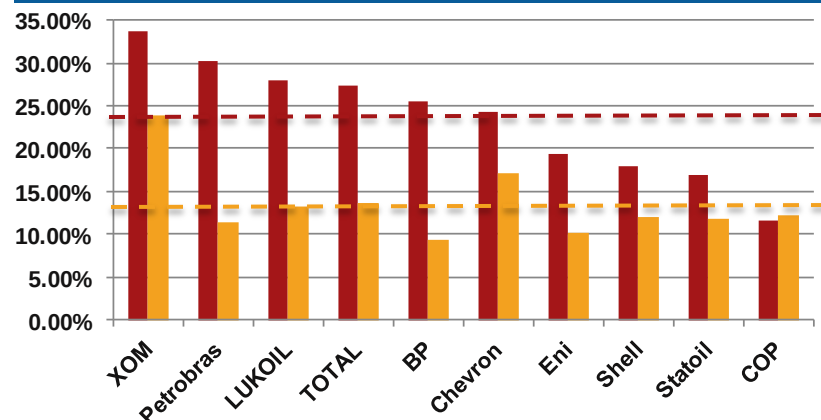


Portfolio Efficiency: Return on Capital Employed (ROCE)

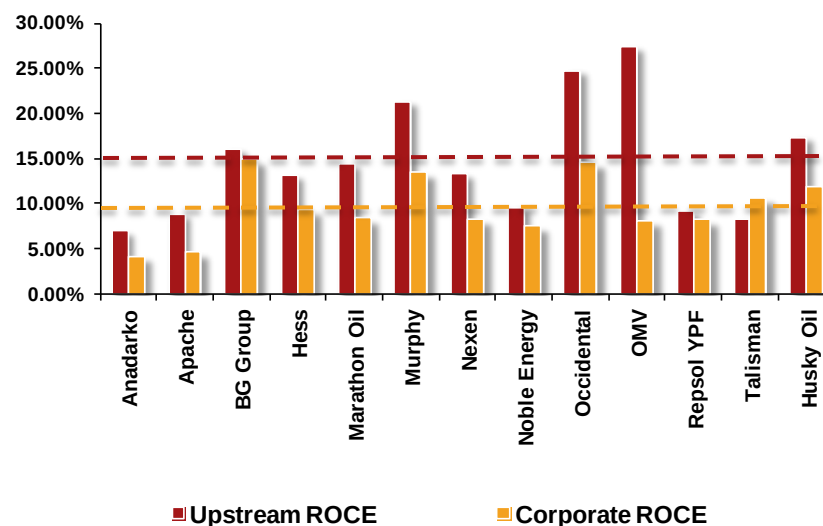
- **Return on Capital Employed:**

- $ROCE = \frac{[(\text{Net profit before interest and taxes}) / (\text{Gross Capital employed})] \times 100}{}$
- Where:
 - Gross capital employed = Fixed assets + Investments + Current assets OR
 - Gross capital employed = Share Capital + General & Capital Reserves + Long term loans
 - (+) Correlation with production, commodity prices
 - (-) Correlation with upstream spending
- Indicates how well management has used the investment made by owners and creditors into the business. The higher the return on capital employed, the more efficient the firm is in using its funds. Time series analysis will reveal whether the profitability of the company is improving or eroding

Global Players Peer Group: ROCE
(3-year roll, 2008-2010)



International Players Peer Group: ROCE
(3-year roll, 2008-2010)

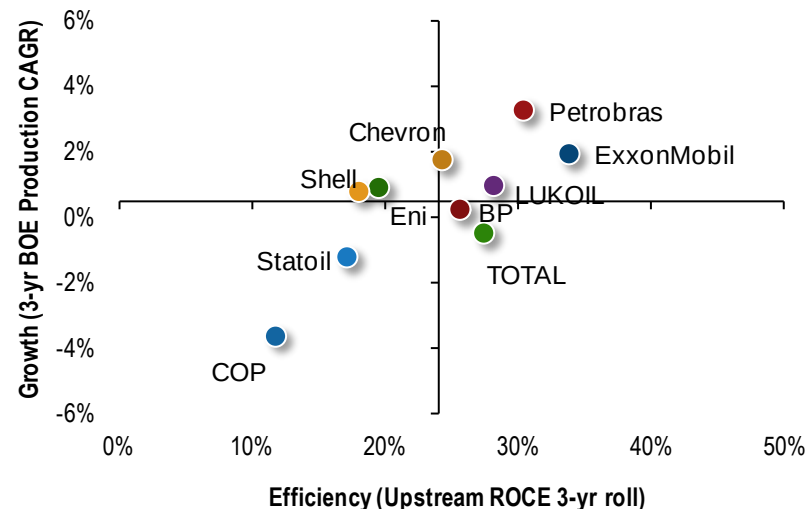


Portfolio Efficiency: Return on Capital Employed (ROCE)

- **Issues with ROCE:**

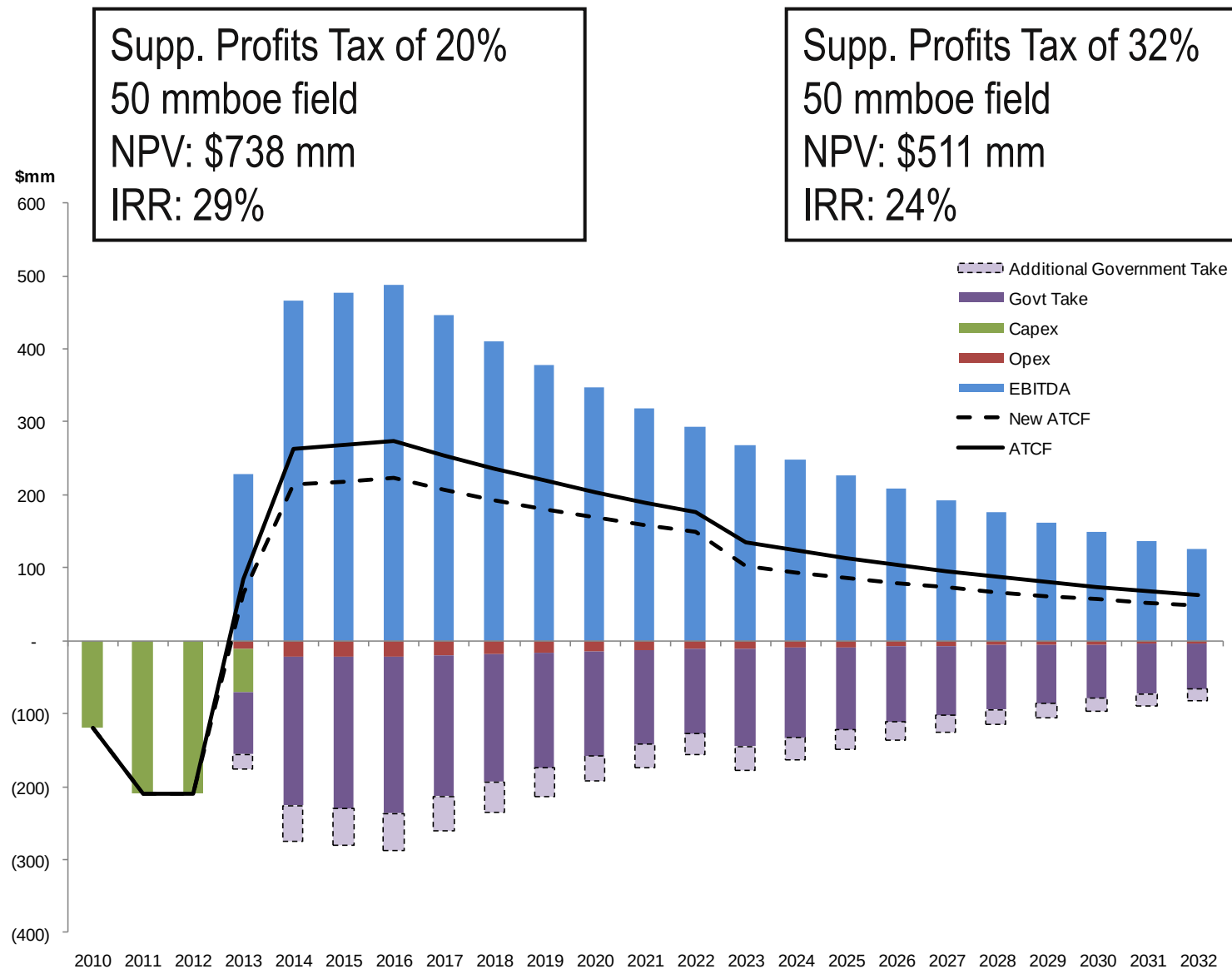
- Major capital project investments increase the denominator in advance of revenue (profit) impacts in the numerator => *penalizes the IOC for major capital investment undertakings*
 - Explains in part why it is unusual to find companies with high ROCE and growth metrics
- Once in place, the scale of major capital project investments tend to deliver superior ROCE performance => *bias toward large asset portfolios*
 - Exception is deepwater developments, where high, short plateaus and steep production declines can result in highly volatile ROCE outcomes
- Depreciation creates bias in favor of mature portfolio: More mature the asset base, the lower the denominator and the higher the ROCE (all else being equal)

Global Players Peer Group: Growth v Efficiency



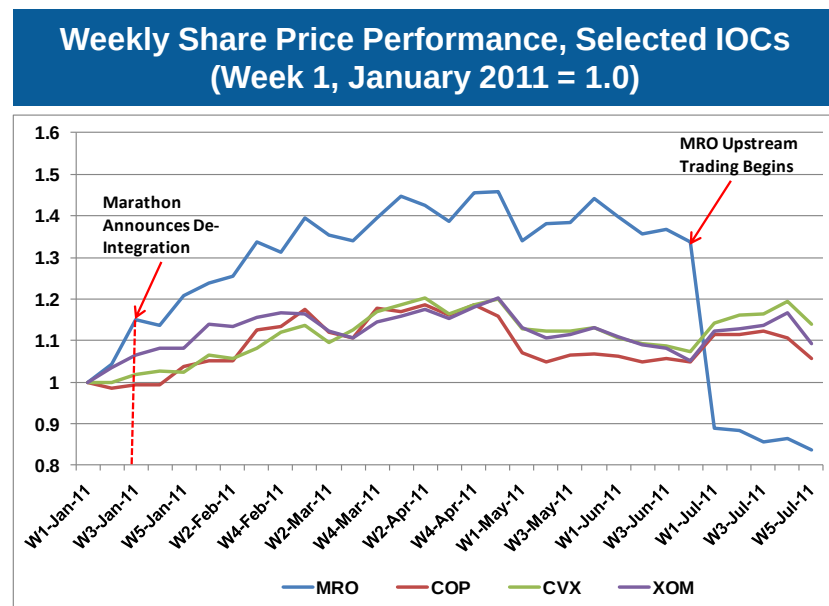
Fiscal Changes Impact Project Economics

Example: Increase In UK Supplementary Ring Fence Charge



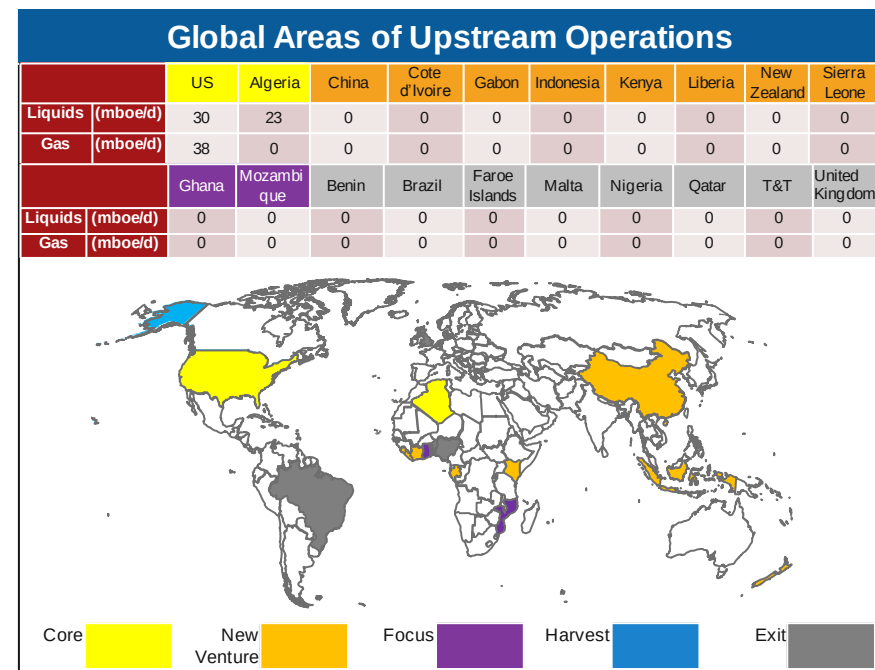
Issue: Integration, Project Economics, and Decision Making

- *Share appreciation* appears the Number One driver for de-integration. Marathon and ConocoPhillips have both concluded that integration hides value that can otherwise be secured through greater management focus, transparency, and more appropriate strategy and execution within the de-integrated entities
- *Market development arguments* for a Downstream presence have largely ended
 - BP, TOTAL, Shell all divesting from Africa in favor of “pure play” refiners and marketers
 - No remaining examples where downstream presence is key to upstream success.
- Improvements in internal decision processes and external regulation have eroded any value that could be secured through *cross-subsidization or barriers to competitor entry*
 - Rate of return regulation in midstream operations, open-access provisions, increased sophistication in both project and portfolio analysis => few opportunities remaining for active market manipulation
- There are *technical drivers* for integration, related to specific crude types and processing challenges (e.g., Canadian oil sands, Brazil waxy heavy crude, Venezuela ultra-heavy, Chad acidic crudes). However, these benefits can be secured through contracts and JV or partnering agreements with third party refiners

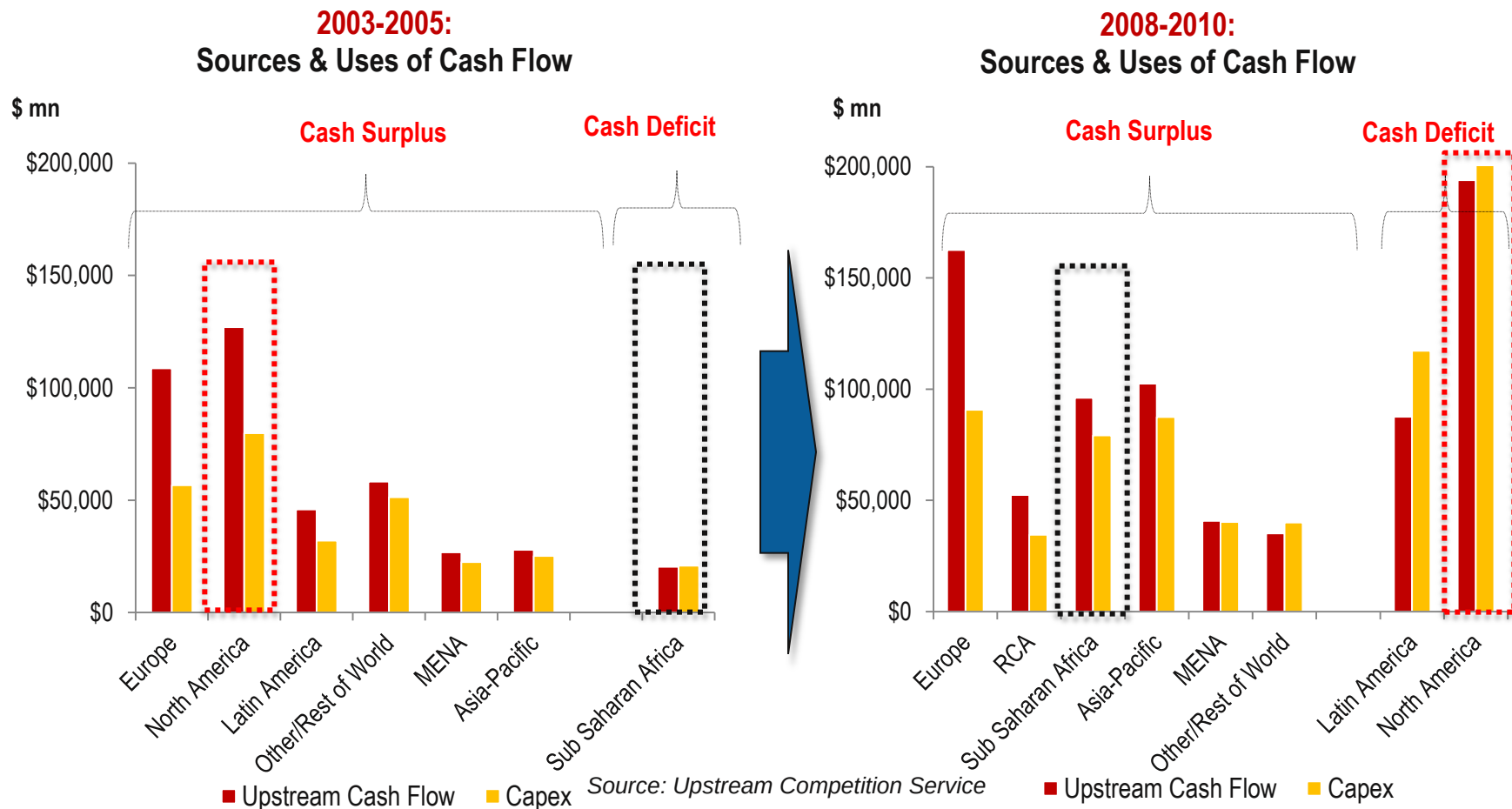


Issue: Basin Allocation and Free Cash Flow Distribution

- **“Core Area”**: Produces a stable stream of net cash flows, irrespective of commodity price variations and production replacement capabilities, and is material to the company. Can contribute to investment activity in other regions, but requires more than replacement level investment in order to maintain core area status. Tends to correspond to a company’s legacy assets.
- **“Focus Area”**: Significant contributor to projected new source production and reserves growth in the medium- to long-term. Typically a net consumer of free cash flow until significant production levels are achieved.
- **“New Venture”**: Areas new to the company—may be unexplored to fairly mature. Company has few, if any, assets and investment inflows can be modest (positions are usually characterized by exploration activity).
- **“Harvest Area”**: Produces positive net cash flow, with investment activity typically at/below replacement level. Limits to growth from lack of geological potential, competitor landscape, limited “room to run”, etc.
- **“Sit & Hold”**: Substantial resource base but investment delayed due to unattractive fiscal terms or significant above ground risks. Company may hold large projects in this area but is holding back the pace of investment.
- **“Exit/Potential Exit”**: For reasons including lack of materiality, limits to future growth, change in strategy, the company has/is expected to make a decision to exit (asset sales, asset swaps, relinquishment of acreage).



Basin Success Delivers Transition in Free Cash Flow Allocation

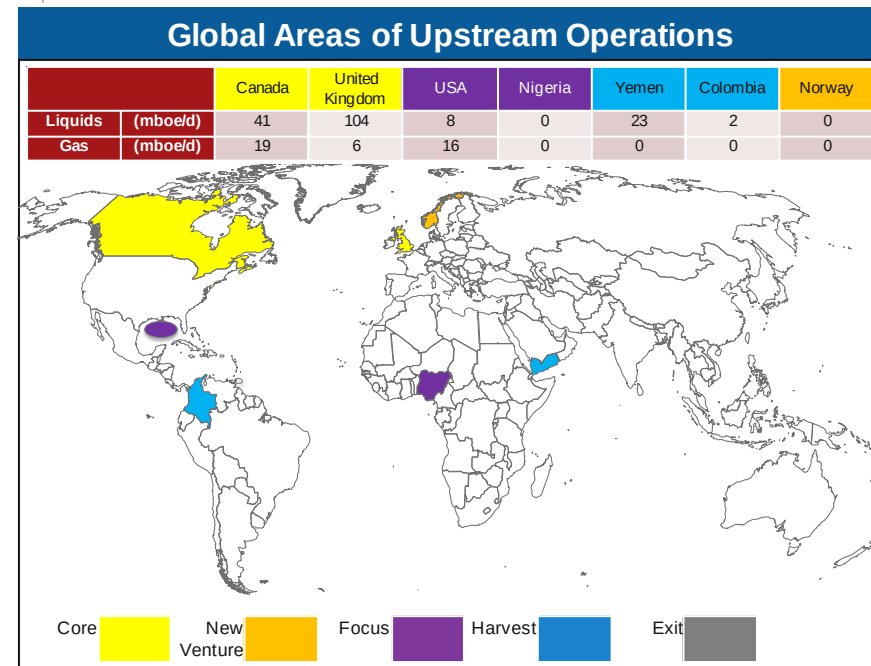
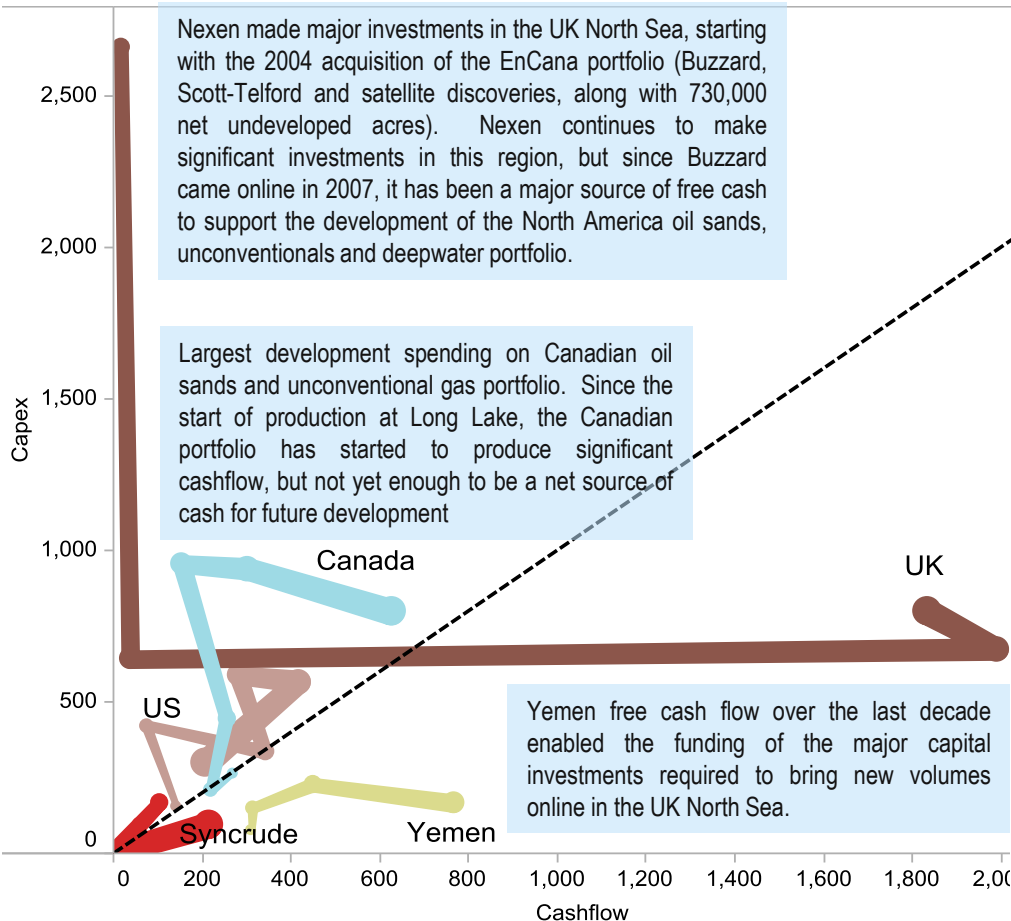


Along with Europe, Sub-Saharan Africa is now a key cash generating region for the IOCs—with surplus cash flow now supporting growth in North America

* Includes data from the following companies: Anadarko, Apache, BG, BHP, BP, CNRL, Chevron, ConocoPhillips, Devon, EnCana, Eni, ExxonMobil, Hess, Husky Oil, Marathon, Murphy, Nexen, Noble Energy, Oxy, Petrobras, Repsol YPF, Santos, Shell, Statoil, Suncor, Talisman, TOTAL, Woodside

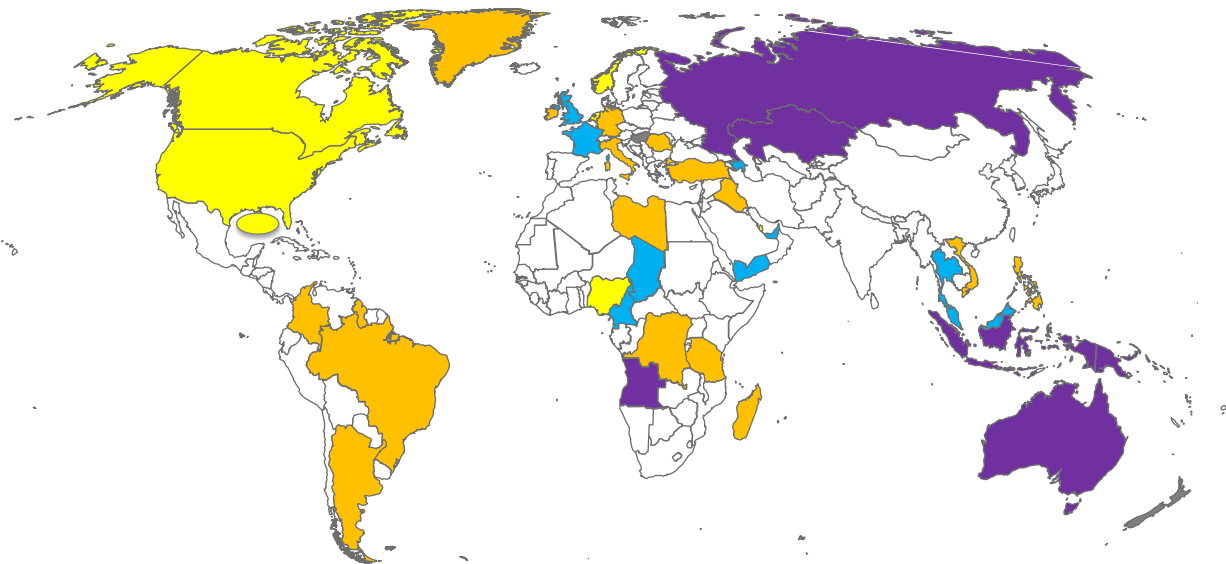
Example: Nexen Inc.

- Free cash flow from Yemen/Masila block directed to North Sea assets; then from North Sea to Canadian oil sands and shale gas assets.
- Currently in Exit process in Yemen and shifting to Harvest in the UK



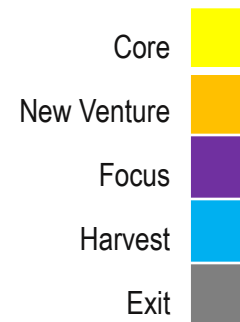
Example: ExxonMobil Global Areas of Upstream Operations

Country	Liquids (mboe/d)	Gas (mboe/d)
Qatar	232	644
USA	408	433
Nigeria	391	2
Norway	246	117
Netherlands	0	340
Canada	242	86
UAE	246	0
United Kingdom	80	92
Kazakhstan	127	24
Angola	141	0
Malaysia	48	86
Australia	51	55
Germany	0	91
Equatorial Guinea	53	0
Russia	43	8
Indonesia	13	36
Chad	43	0
Azerbaijan	21	0
Argentina	0	9
Papua New Guinea	7	0
Thailand	0	4



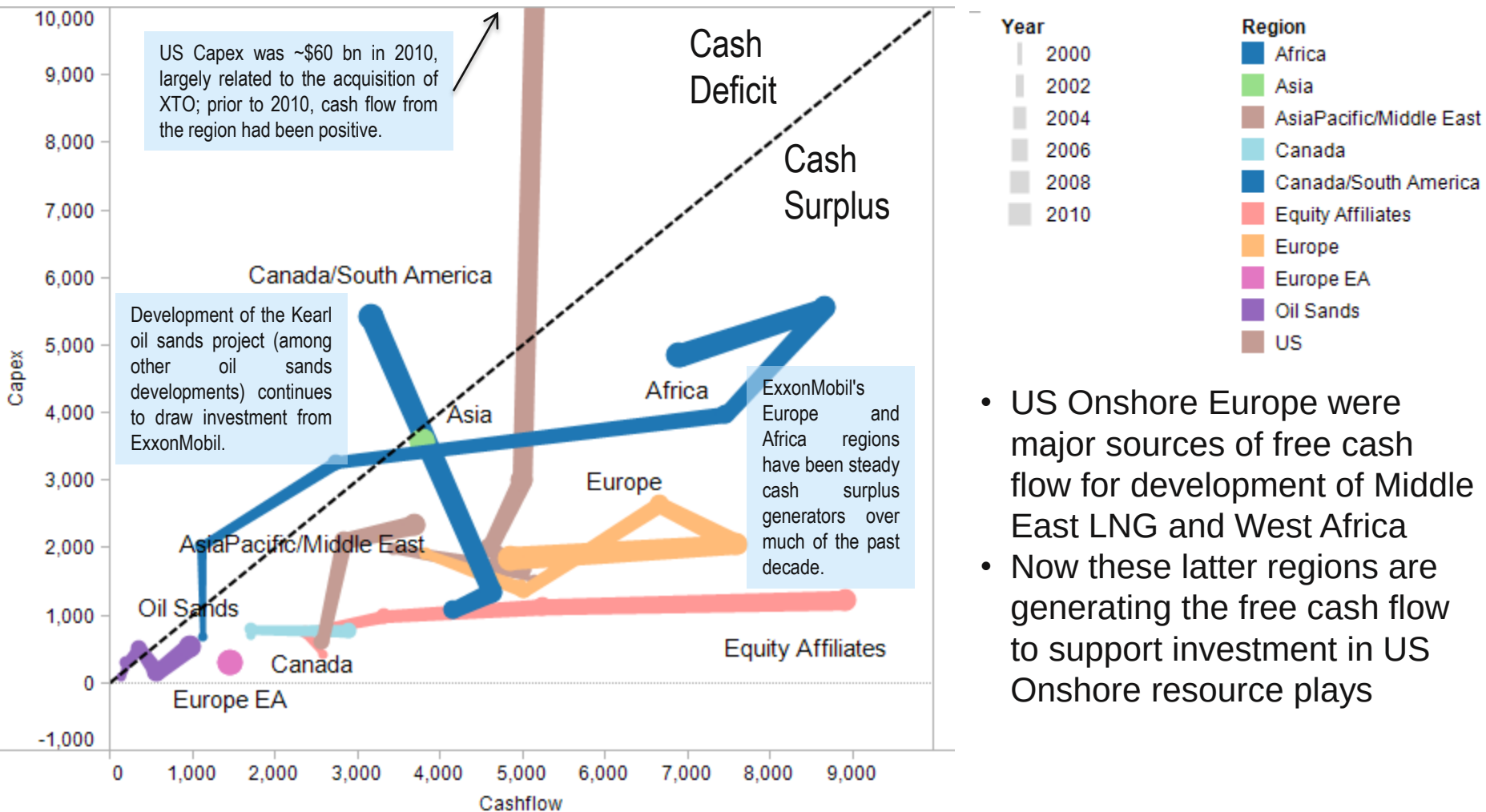
Country	Liquids (mboe/d)	Gas (mboe/d)
Brazil	0	0
Cameroon	0	0
Colombia	0	0
Congo	0	0
Greenland	0	0
Guyana	0	0
Hungary	0	0
Iraq	0	0
Ireland	0	0
Italy	0	0
Libya	0	0

Country	Liquids (mboe/d)	Gas (mboe/d)
Madagascar	0	0
New Zealand	0	0
Philippines	0	0
Poland	0	0
Romania	0	0
Tanzania	0	0
Turkey	0	0
Vietnam	0	0
Yemen	0	0



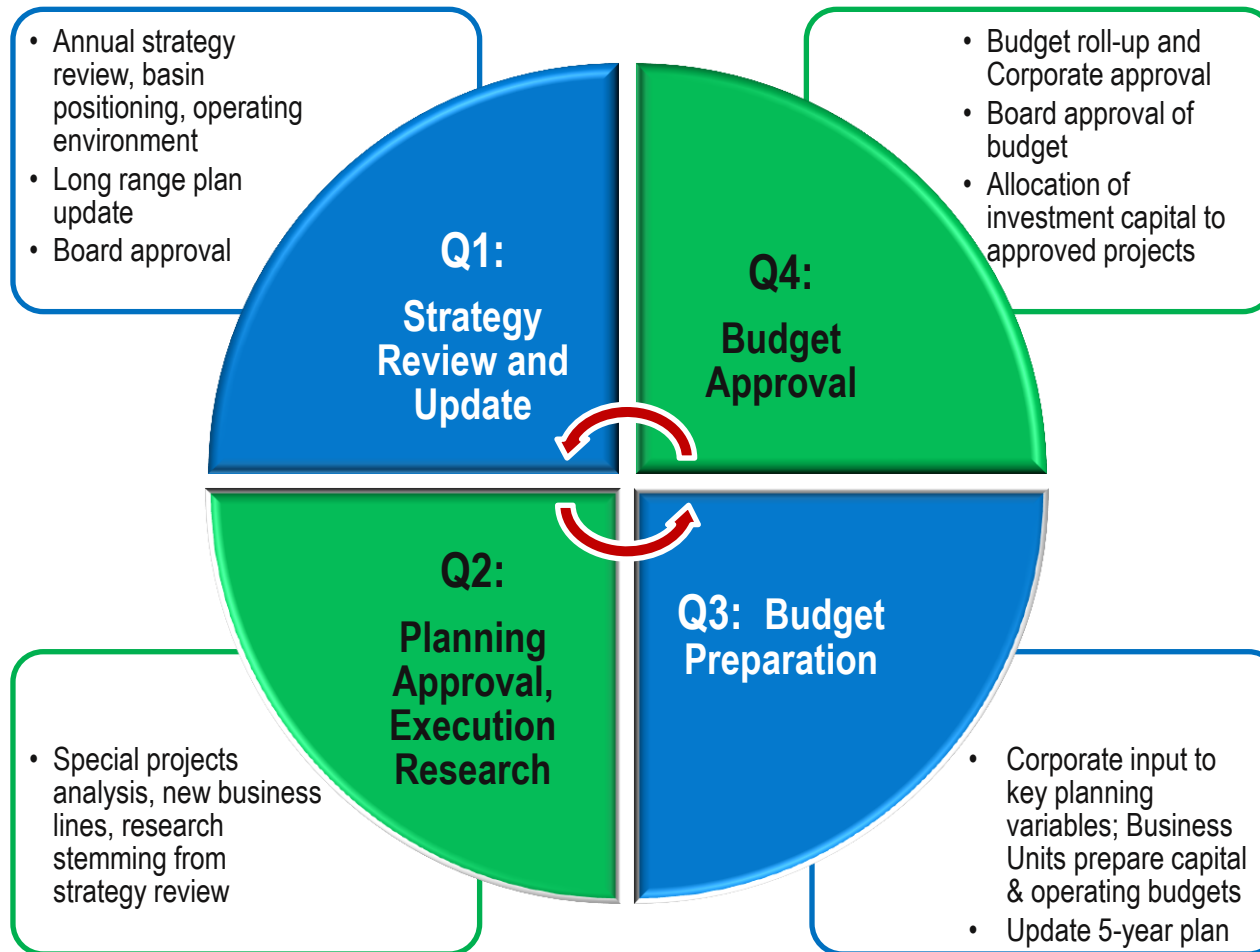
Example: ExxonMobil

How the Portfolio is Financed



- US Onshore Europe were major sources of free cash flow for development of Middle East LNG and West Africa
- Now these latter regions are generating the free cash flow to support investment in US Onshore resource plays

Questions and Discussion



Principles of Fiscal Regime Design

Points to Address: Conceptual Overview of Progressivity

- **Progressive vs. regressive fiscal regimes**
- **Rationale for a progressive fiscal regime**
- **How the concept of progressivity works in a range of other hydrocarbon jurisdictions**
- **Problems in the application of progressivity**

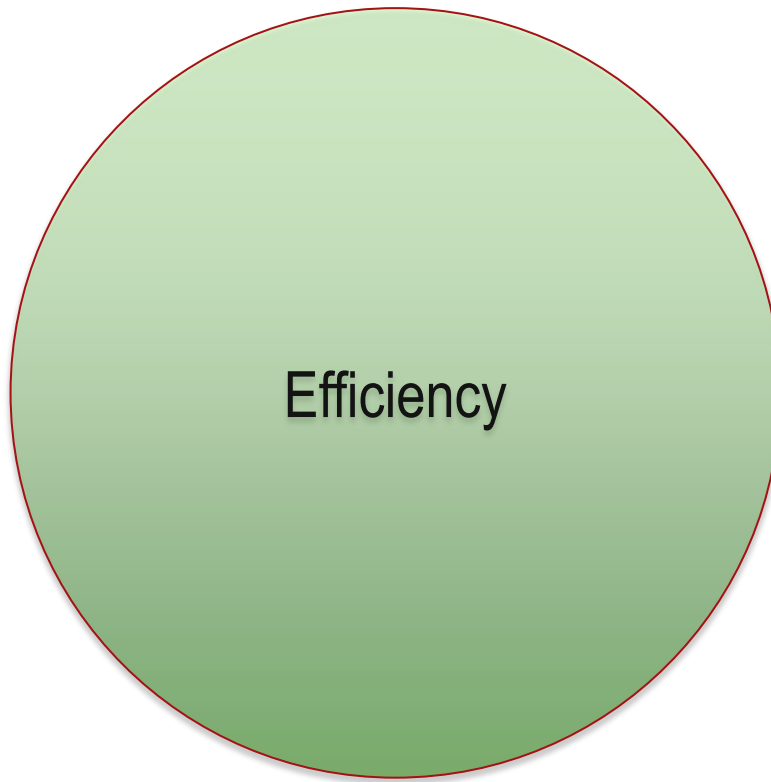
The Art of Taxation

“The art of taxation consists in so plucking the goose as to get the most feathers with the least hissing.”

Jean Baptiste Colbert - Economist and Minister of Finance under King Louis XIV of France, 1619

...or, in more contemporary terms

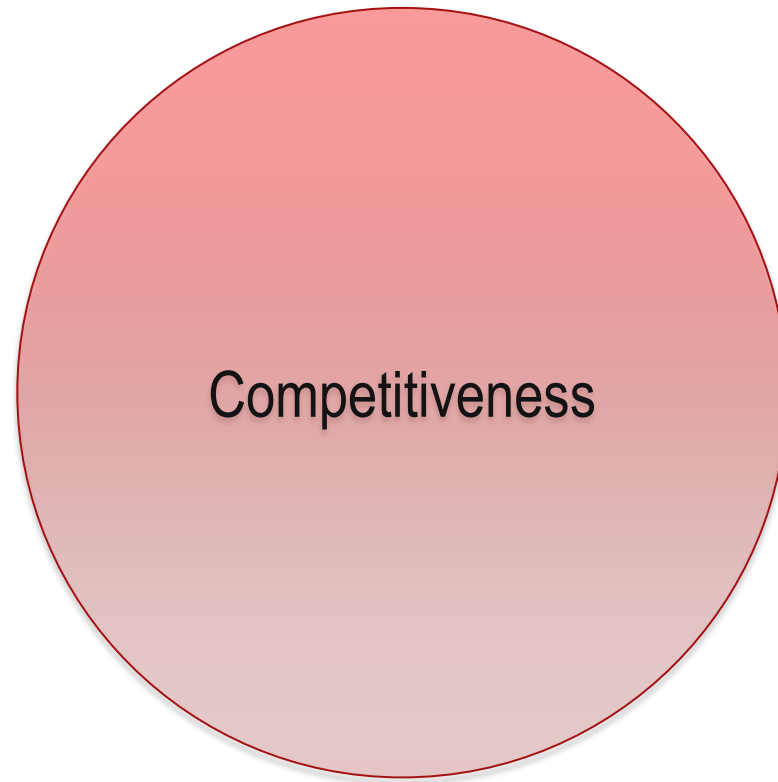
- The art of taxation consists in maximizing revenues, subject to two important constraints
 - **Efficiency:** Not distorting investment choices, or preventing marginal investments that would otherwise have been made from occurring
 - **Competitiveness:** Ensuring that in the real world, which is characterized by limited capital with competing uses



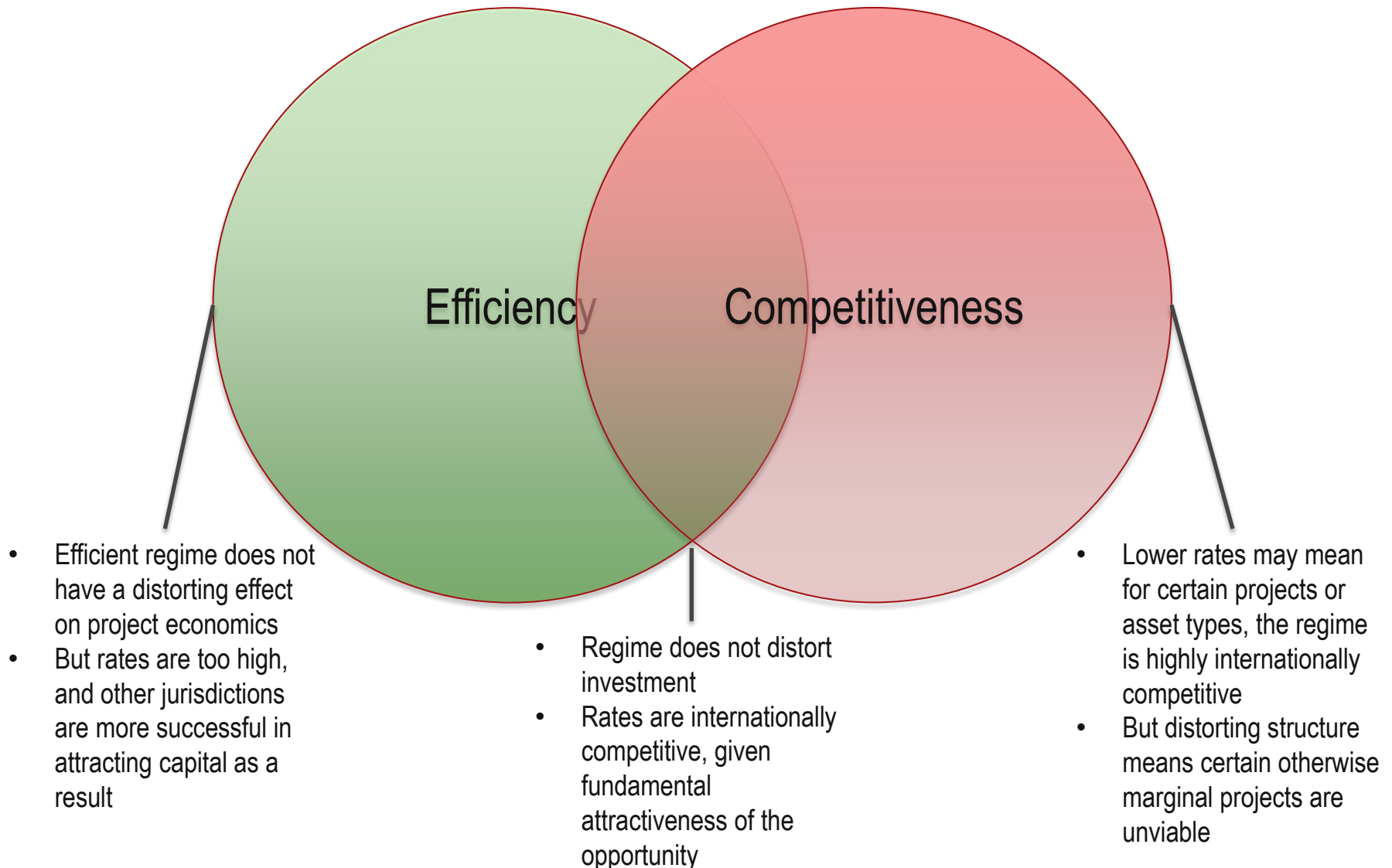
- Efficiency is an absolute concept – the degree of distortion in a taxation regime is something we can assess solely in relation to ourselves
 - Need to examine the incidence of the tax under different price and cost levels
 - Understand what components of the underlying economic activity are being taxed

Competitiveness

- Competitiveness is a relative concept – it requires us to examine our attractiveness in comparison to others
 - Need to understand what other jurisdictions we are competing with for capital
 - Need to understand whose capital we are competing for
 - Need to understand how rates of return for projects compare to what our target investors can achieve in other jurisdictions

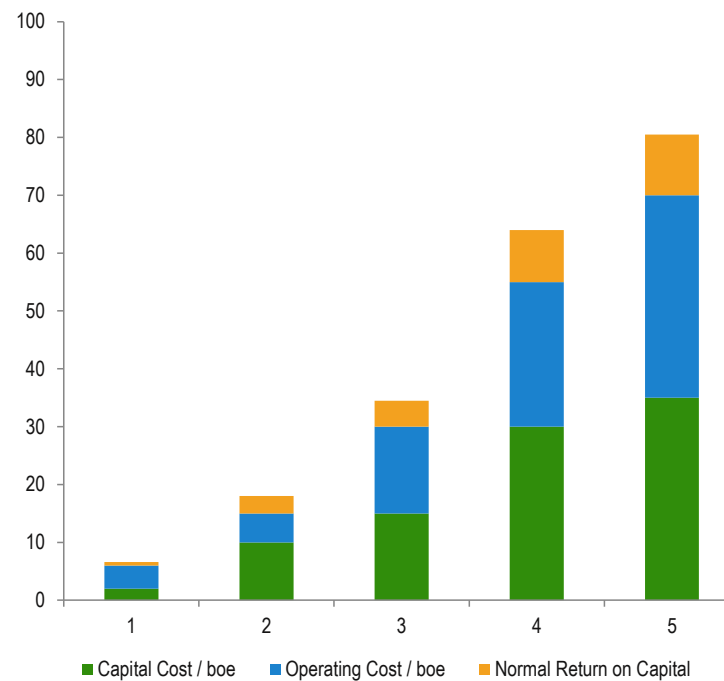
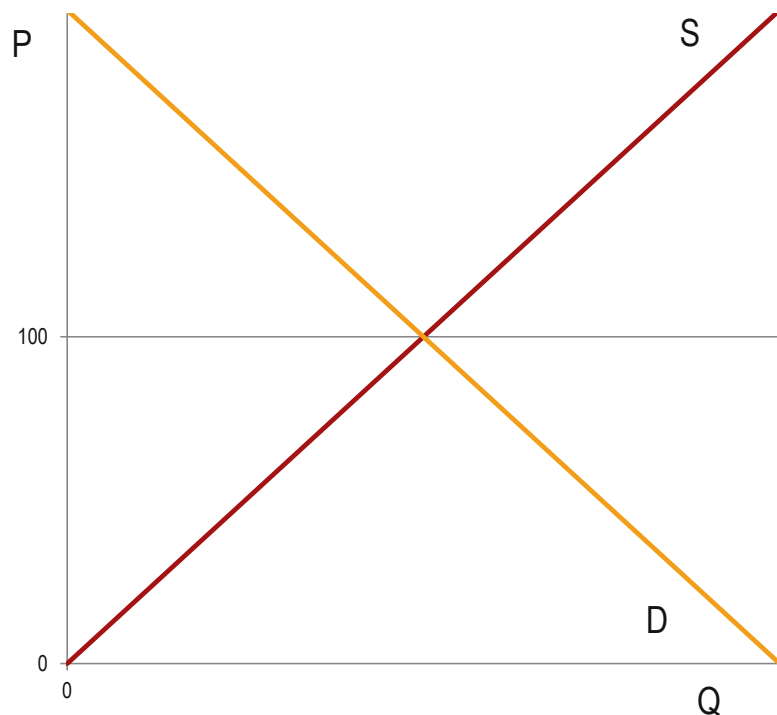


Finding the Intersection



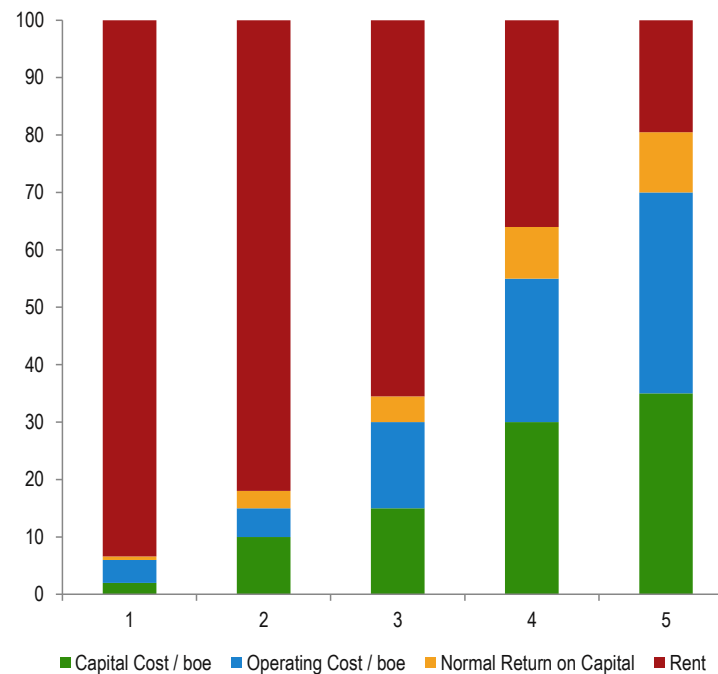
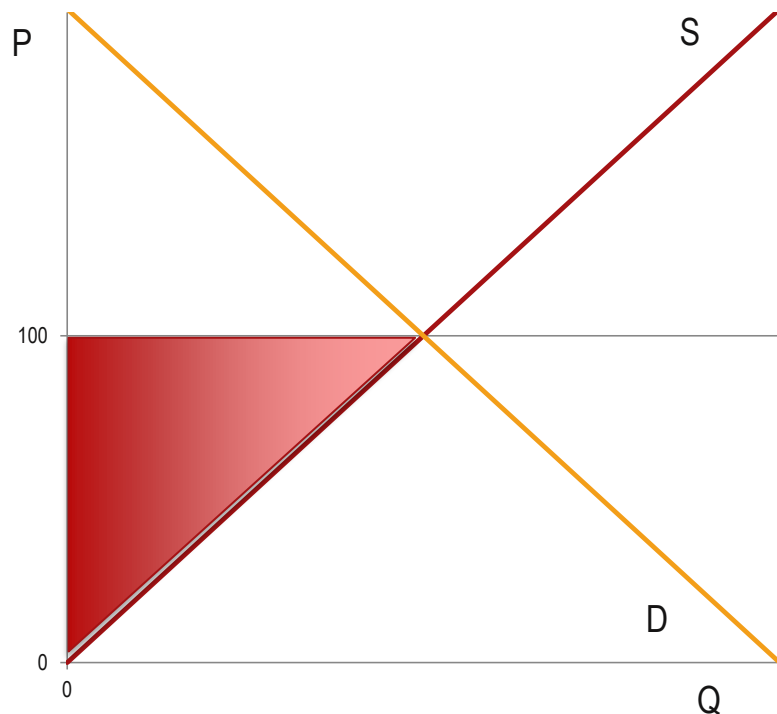
Efficiency: Supply, Demand & Price

Upward Sloping Supply Curve



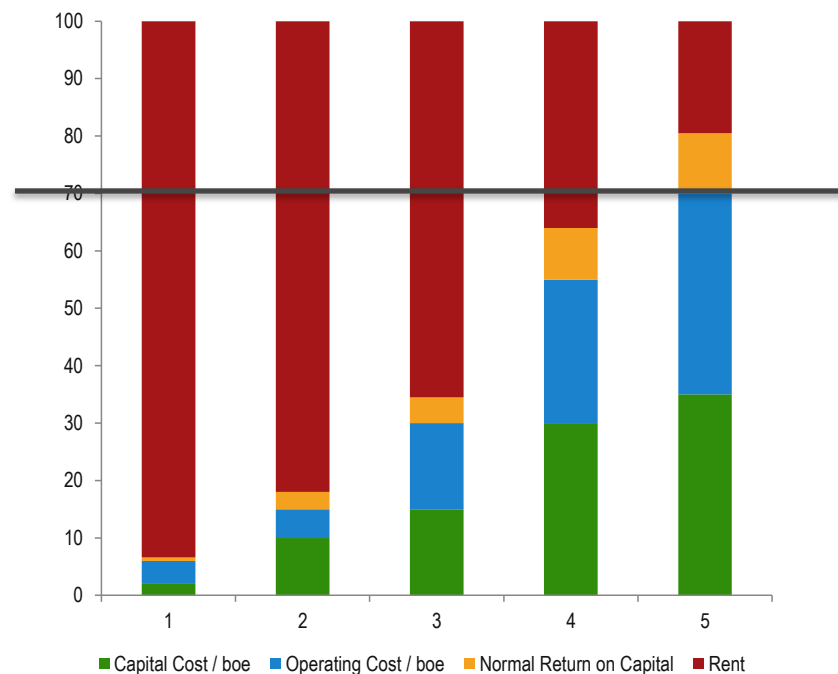
Efficiency: Economic Rent

Upward Sloping Supply Curve



Impact of a 30% Royalty

- The royalty successfully captures 30% of Gross Revenues from projects 1-4 for the Government
- The tax, however is highly distorting: Project 5 no longer earns a normal return on capital; if it were a prospective investment, it would now have negative NPV and would be cancelled
- If the oil price were to fall, the 30% royalty would make further projects non-economic



Relative Government Take (Definition)

$$\text{Relative Government Take} = \frac{\text{Government Take}}{\text{Divisible Income}}$$

Divisible Income equals Gross Revenues less costs, including capex and transportation costs.

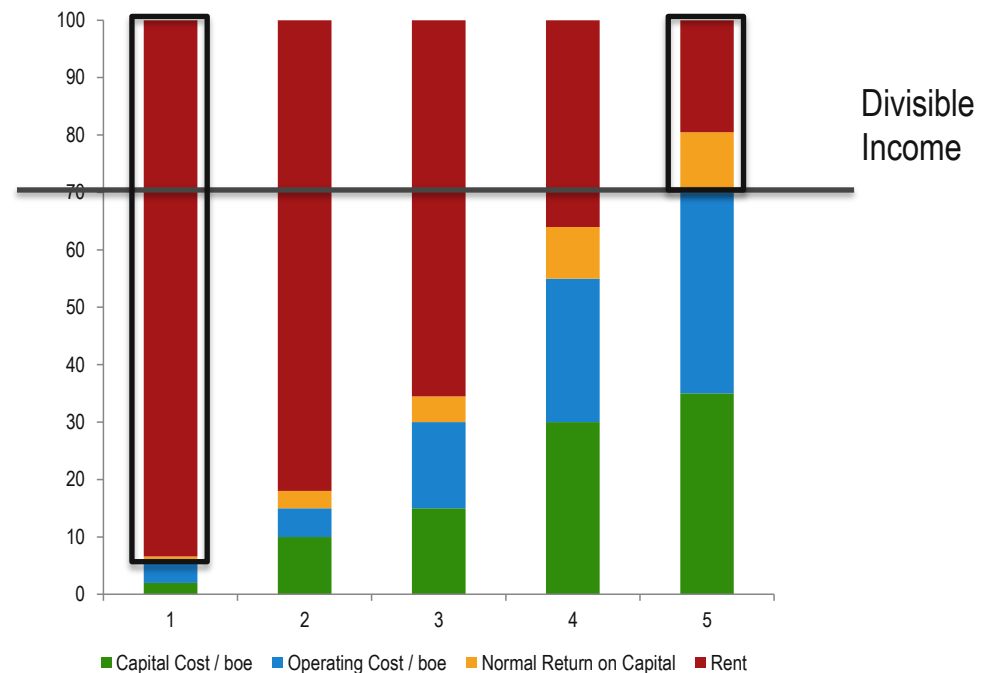
Government Take includes all payments the government mandates in its function as a sovereign:

- Royalties
- Land rental fees, property taxes
- Production taxes
- Income taxes

Government Take does not include amounts the government earns in an entrepreneurial function.

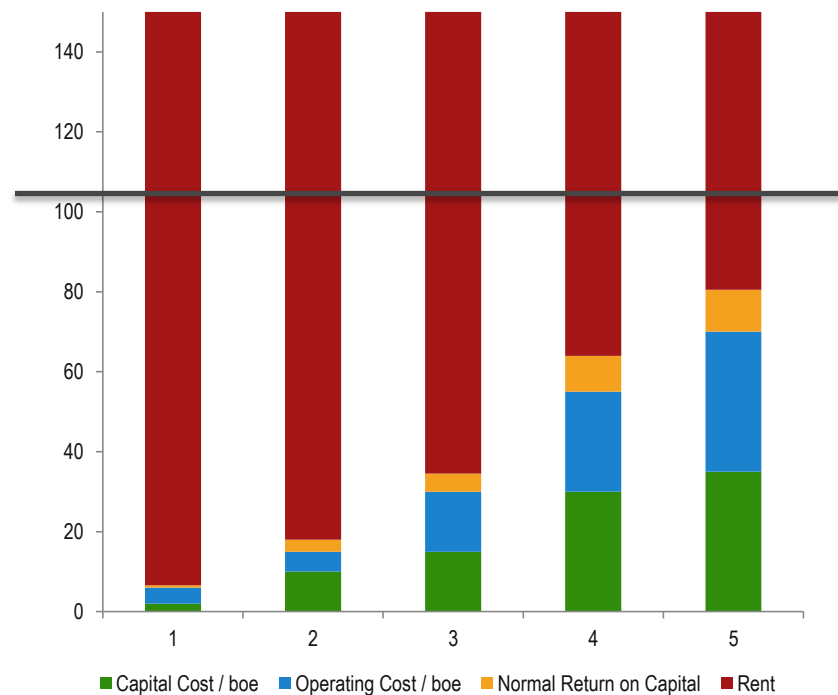
Relative Government Take Impact of a 30% Royalty

- The impact of the Royalty on Relative Government Take is also very different across different projects
 - For project 5, it is 100%
 - For project 1 it is less than 30%
- So a fixed percentage royalty is highly regressive with regard to costs – as costs increase, so does Relative Government Take



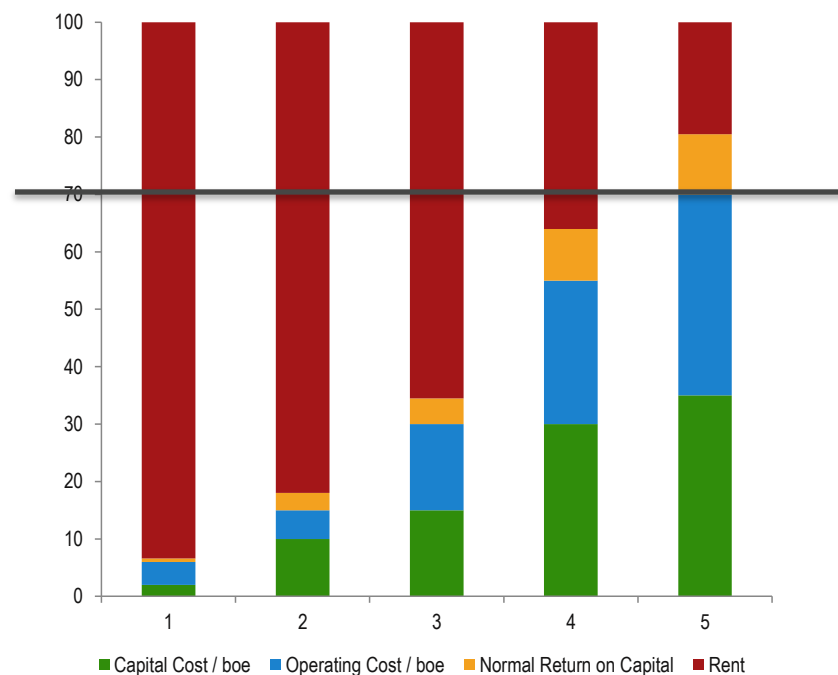
Impact of an Oil Price Increase

- If the oil price rises to \$150/bbl, all projects are once again economic – but Relative Government Take has fallen dramatically, particularly for the more expensive projects
- For Project 5 it has fallen from 100% to 56%
- For Project 4 it has fallen from 66% to 47%



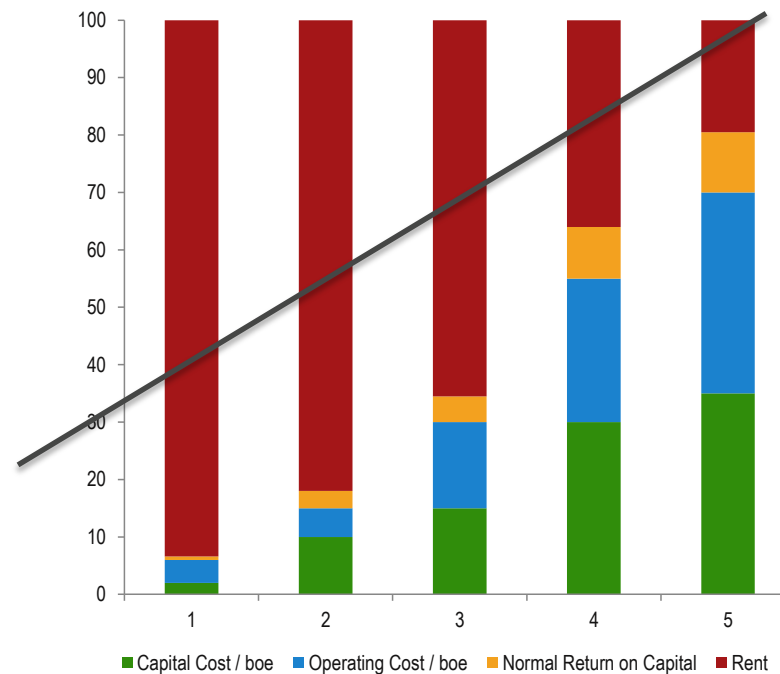
Efficiency: Conclusions on a Fixed Percentage Royalty

- The fixed royalty is **inefficient** because it distorts investment, making previously marginal projects uneconomic at a given price
- It is highly **regressive** with regard to both price and cost, because Relative Government Take falls as prices rise, and as costs fall
- This also increases **sovereign risk** – since when prices rise, governments will be tempted to set a new rate, even though investments have been made on the basis of the current one
- It has only one major strength – it is very **simple to administer**, requiring knowledge of only 2 variables - production and price



Efficiency: Targeting Economic Rent

- What we would like to do instead is to tax the red bars – the Economic Rent – directly
- That way, we could *pluck more feathers*, with less *hissing*
- What are the different ways, over time, that governments have attempted to do this?

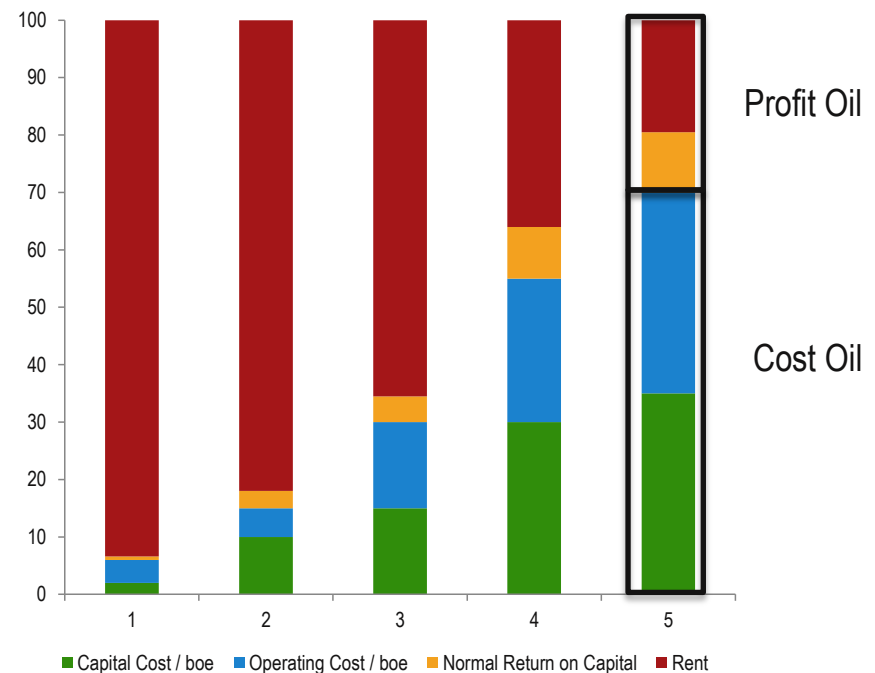


A Brief History of Production Sharing Contracts

- ACES is in many ways a reflection of a recent trend we have seen in tax/royalty regimes around the world that have endeavored to capture a greater share of rent, by replicating many aspects of the economics of a Production Sharing Contract system (PSC). What is a PSC, and how did these evolve?
- Until the 1960s and 1970s, the global oil industry was dominated by tax/royalty type “concessions” for oil and gas production
- These were very simple to administer, and made sense so long as prices were reasonably low, and reasonably stable, and oil was easy to produce
- In many cases, relatively generous terms for oil companies reflected the colonial-era world in which the concessions had been set
- Rising nationalism in oil producing countries saw the first moves away from this system
 - OPEC formed in 1960
 - Indonesia introduced first “Contracts of Work” in mid 1960s, with terminology and mechanics very similar to later PSCs
- The 1973 Arab Oil Embargo sent oil prices from \$3 to \$12/bbl, dramatically eroding government take under tax/royalty systems, as International Oil Company profits surged
- Resulted in the widespread rescission of existing concessions in major oil producing nations, and introduction of Production Sharing Contracts

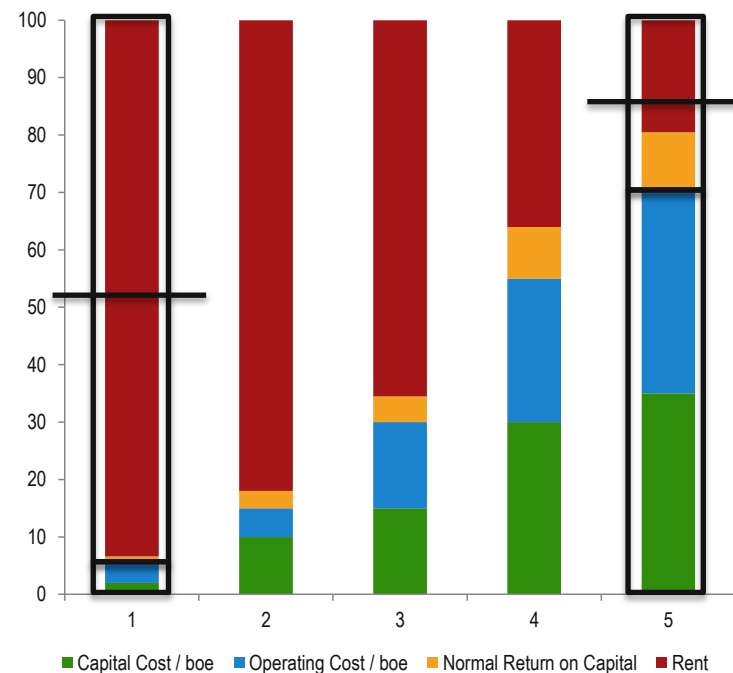
Structure of a Simple PSC

- Core to the PSC concept is the differentiation between “Cost Oil” and “Profit Oil”
- Cost Oil represents barrels of production required to recover (undiscounted) operating and capital costs
 - Under a PSC, an International Oil Company (IOC) is generally entitled to all available barrels required to recover costs
 - This would make Government Take backloaded, since governments could only receive barrels after IOC costs have been fully recovered
 - Governments that wish to front-load their payments often place a limit on the percentage of barrels in any given year than can be used for cost recovery
- The remainder of production (net of royalties, etc) is deemed Profit Oil
 - Profit Oil is split between the government and the IOC



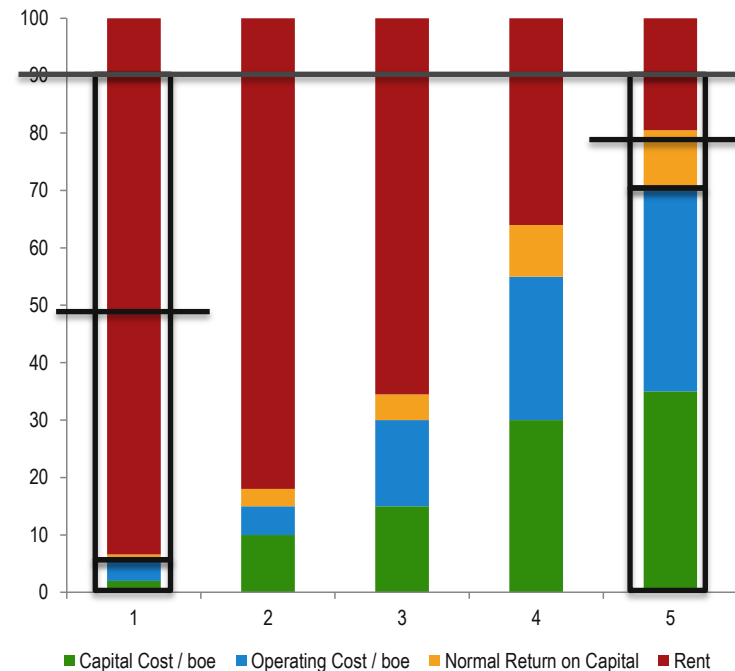
Malaysia-Thailand Joint-Development Area: A Very Simple PSC

- The Malaysia Thailand Joint Development Area (MTJDA) has one of the simplest PSC structures anywhere
 - Cost Oil Limit: 50% of available gross revenues in any year
 - Profit Oil Split: 50% to IOC contractors, 50% to MTJDA Authority
 - 20% Corporate Income Tax (reduced in early years of production)
- Unlike the Royalty system we looked at, this is not regressive with regard to either price or cost – it is neutral with regard to both
 - If we simplify and ignore the impact of Corporate Income Tax, we can see that regardless of cost or price levels, Government Take will always be 50%
- Because it includes the normal return on capital in the “tax” base, it is regressive with regard to economic rent
 - Higher cost projects have a higher normal return on capital, and so the 50% split captures a higher share of the rent



Many PSC-type regimes include progressive and regressive elements

- Many such systems (including PSC-replicating tax royalty systems) incorporate regressive elements like fixed-percentage royalties
 - Without progressive elements to counter these, these will no longer achieve the neutral Relative Government Take
 - In this example with a 10% royalty, Relative Government Take is higher in the high cost case, or in low price environments
- Some regimes, therefore add progressivity to their profit-focused components to compensate for regressive elements of the regime, to achieve a more neutral outcome
- Often, however, application of progressivity has been taken further, to focus on limiting the share of rent received by IOCs in high price environments, and maximizing Relative Government Take in these cases



Progressivity may be focused on any of a range of metrics

- Tomorrow we will look at how progressivity works in a number of different regimes, both tax/royalties and PSCs around the world
- We will see that progressivity in different regimes is focused on a range of different metrics, including
 - Production levels
 - Price levels
 - Extent of cost recovery (ie, “R-Factor”)
 - Rates of return (ie IRR)
- We will talk about what these may mean from an efficiency standpoint, but also what they may mean from a competitiveness standpoint – and why these may be quite different
- We will examine progressivity under ACES, including
 - How progressivity affects “upside” for oil companies, and what that means for project value, and thus ability to attract capital
 - What Government Take would look like (state and total, absolute and relative) under ACES in a range of different modification scenarios

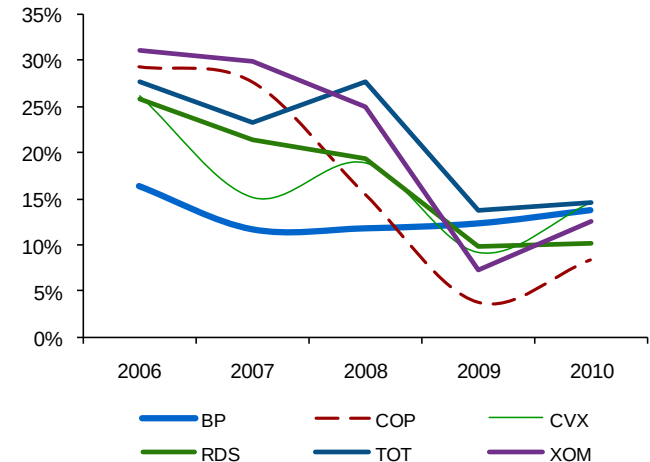
Appendix: Additional Slides on Integrated v Non Integrated Oil Companies

Issue: Integration, Project Economics, and Decision Making

Arguments For Integration

- Superior market/financial management over commodity cycle
 - Counter: Collapse in Downstream profitability has seen a rise in successful “pure play” refining companies
- Integration is important for molecule management; ensures sophisticated refining capacity is in place for particular crudes
 - Counter: Independent IOCs are not hitting roadblocks in this regard; independent refiners are responsive to requirements.
- Integration is relevant for specific oil developments (e.g., Canadian oil sands, Venezuela heavy, high wax or acid content)
- Integration is a technical differentiator amongst IOCs => enhance ability to secure projects
 - Counter: The ability to build a refinery—which few IOCs have actually done recently—has little in common with the ability to execute efficiently on complicated upstream projects
- Integration allows participation in the Downstream Non-OECD growth story
 - Counter: The rapid petroleum product demand growth regions (China, Middle East, India) are dominated by NOCs or quasi-NOCs; choose partners based on what they bring to the table

Downstream ROCE – Selected Integrated IOCs (3-year roll)

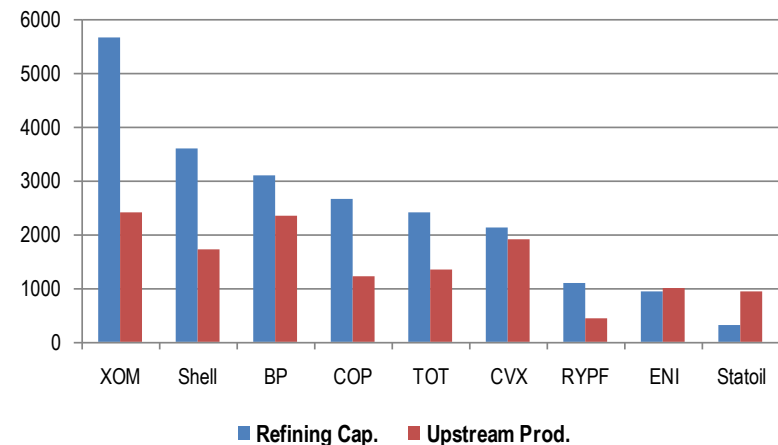


Issue: Integration, Project Economics, and Decision Making

Arguments Against Integration

- Capital markets value integrated IOCs below the sum of their parts
 - Counter: Expensive to split a company => if there is any identifiable value, should remain integrated (e.g., refining-petchems)
- Strategic focus: In many integrated companies, the Downstream sector is neglected strategically at the expense of Upstream positioning and growth—particularly in the current climate of narrow refining margins and sustained, high oil prices.
 - Counter: Unless the integrated IOC is certain that refining margins and economics will never recover, there is merit to retaining this mechanism for optimal capital allocation between sectors
- Materiality: There are few materially, physically integrated IOCs remaining
 - ExxonMobil and TOTAL have pursued integration between refining and petrochemicals, and there are strong arguments to continue this form of integration
 - Statoil, Eni, and Repsol are integrated on the basis of past roles as quasi-NOCs, and would likely face considerable government opposition to de-integration
- The world has evolved: more flexible and liquid trading markets and improved market & industry regulation have eroded whatever market management or cross subsidization benefits integrated IOCs derived from Downstream presence/dominance over the first 70+ years of their existence.

Refining Capacity versus Upstream Oil Production
Selected Integrated IOCs, 2010 (mboe/d)



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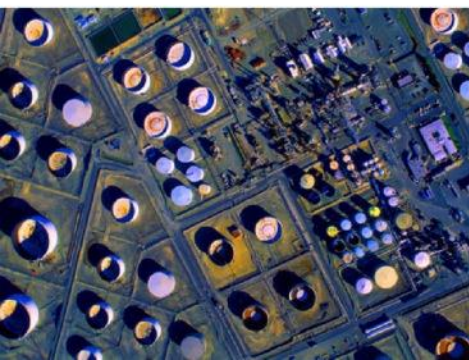
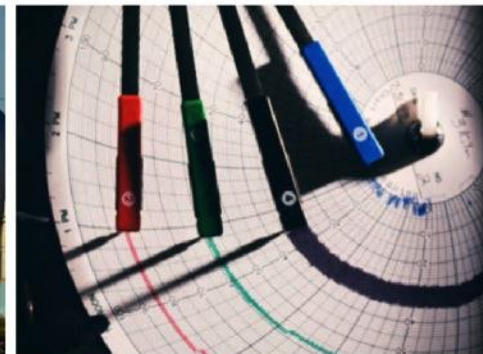
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