



Terra Incognita –
A Navigation Aid for Energy Leaders



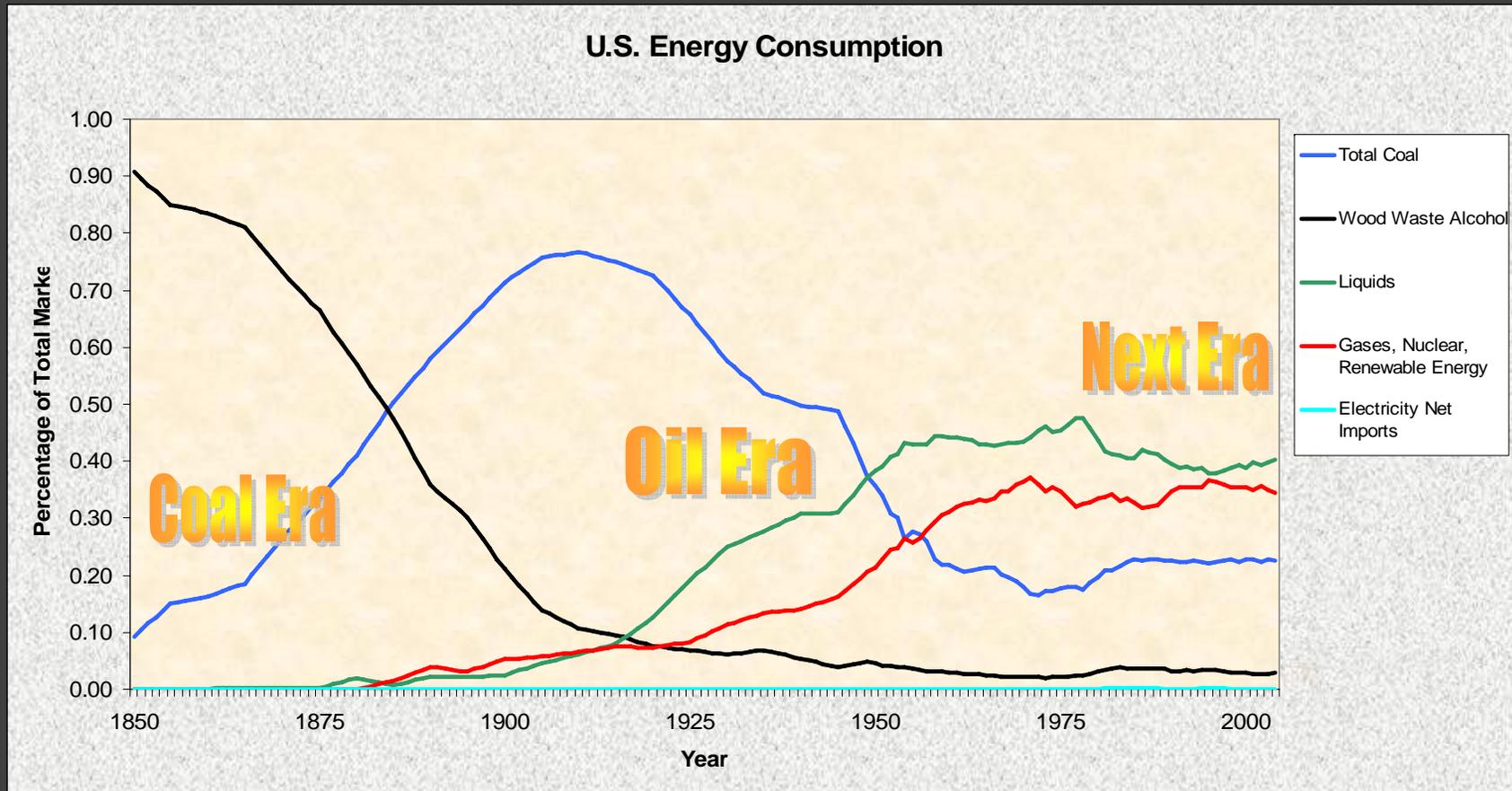
INTERNATIONAL

Presentation to UH-GEMI Refining Conference
November 2006

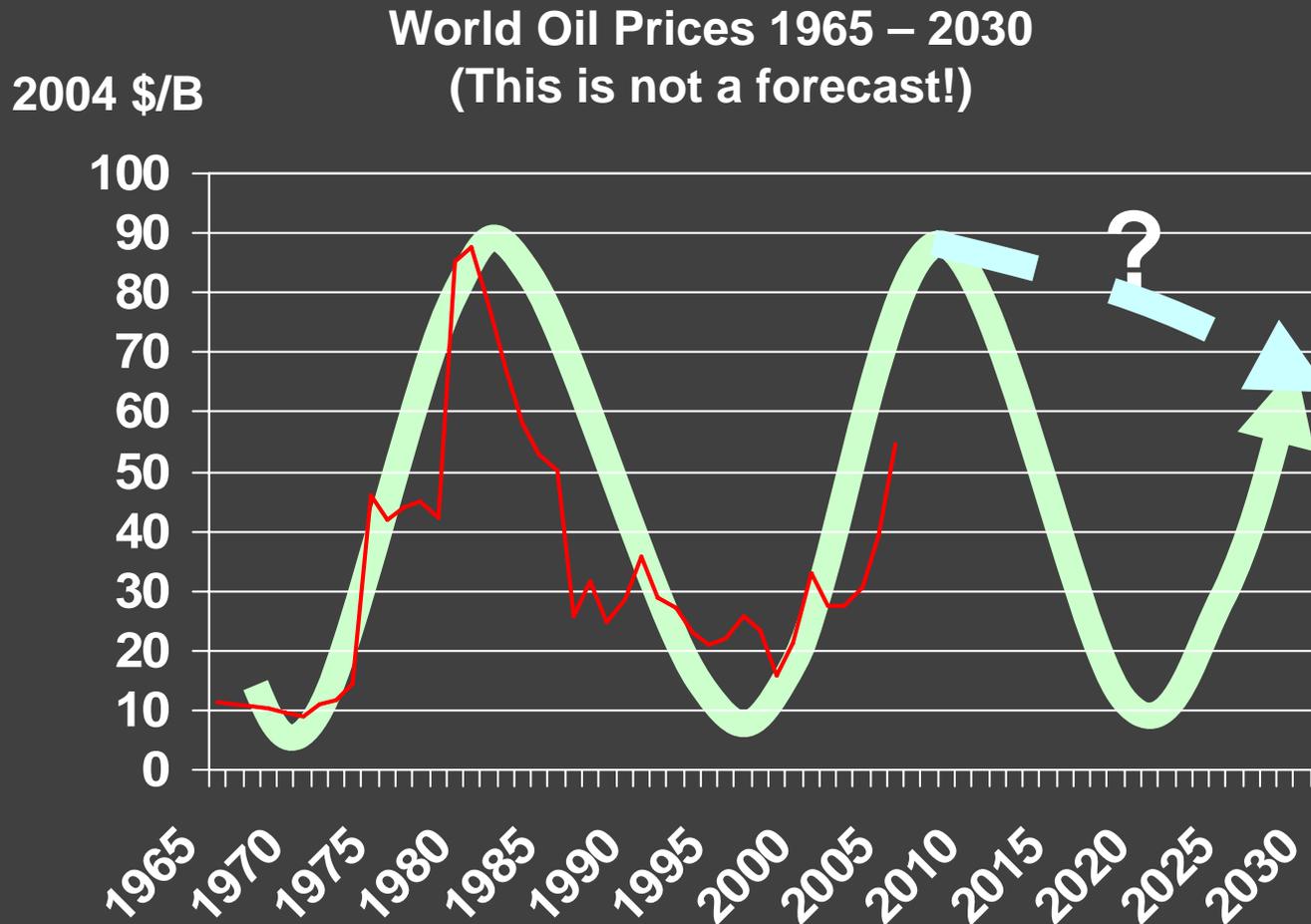
Terra Incognita – A Navigation Aid for Energy Leaders

1. **Global energy complex is entering its third phase change**
2. **Demand trends are not sustainable - China and India rise to materiality changes everything**
3. **IOCs want to produce but have limited access; NOCs have access but want to conserve their resource**
4. **Society's ascent of the Maslow hierarchy increases expectations of energy companies – security and climate must be addressed**
5. **Previous shareholder value propositions are unpersuasive**
 - But IOC capex has barely increased from depressed 1990s levels
6. **Old strategies are threatened**
7. **The industry must reframe its purpose and boundaries**
8. **New business models will emerge and old ones will be discarded**
9. **This will require new strategies, execution and leadership**
 - And this will affect deeply the Gulf Coast Refining business
10. **The “phase change” demands a different approach to strategy development**

Global energy complex is entering its third phase change

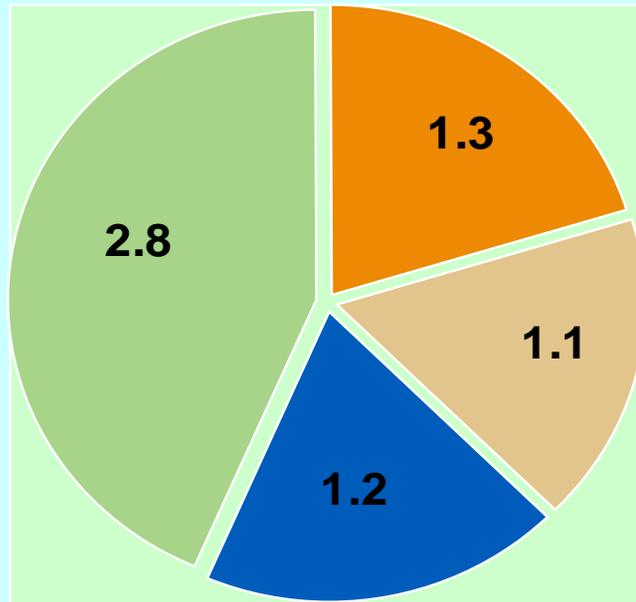


The conventional investment cycle may be overridden by the phase change



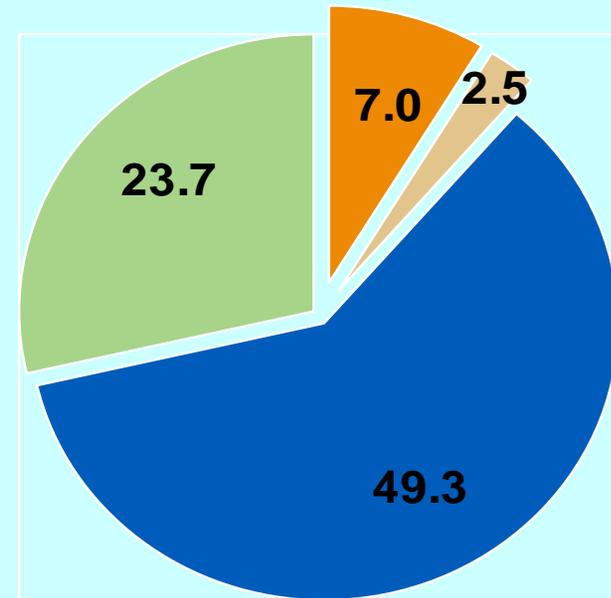
China and India rise to materiality changes everything

**World Population
(Billion in 2005)**



China India
More Developed Less Developed

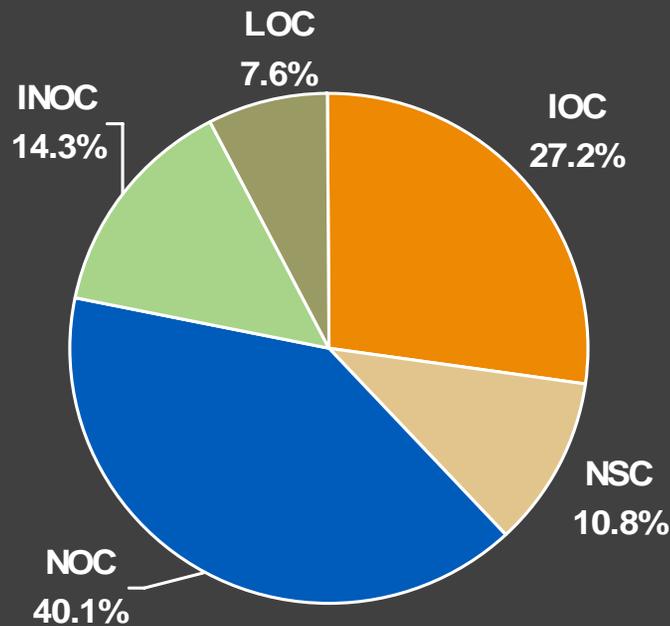
**Oil Consumption
(MMBD in 2005)**



China India
More Developed Less Developed

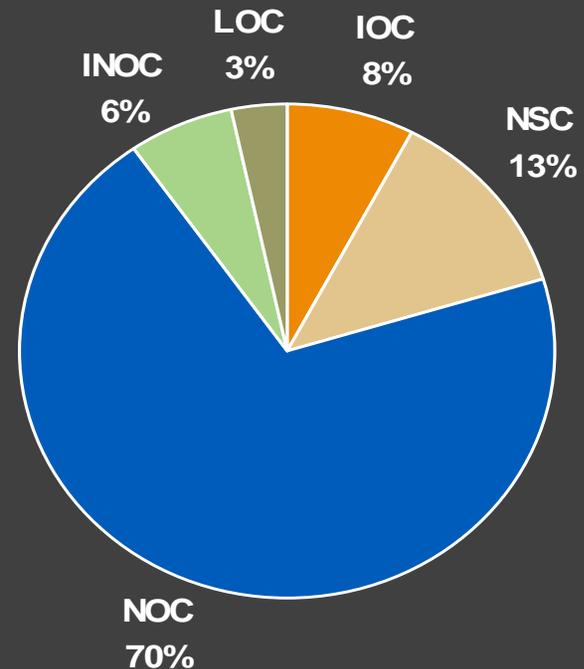
IOCs want to produce but have limited access; NOCs have access but want to conserve their resource

Liquids Output



Top 50 Share of Global Total = 79%

Liquids Reserves



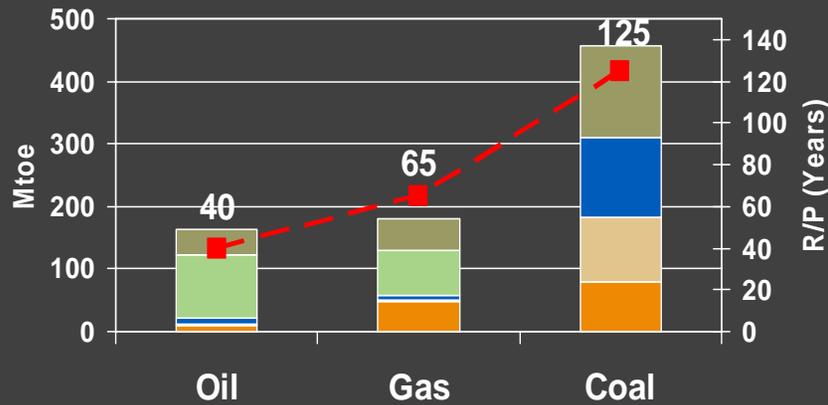
Top 50 Share of Global Total = 84%

Source: PIW's Top 50: How the Firms Stack Up (www.energyintel.com)

Society requires attention to two big externalities

Security!

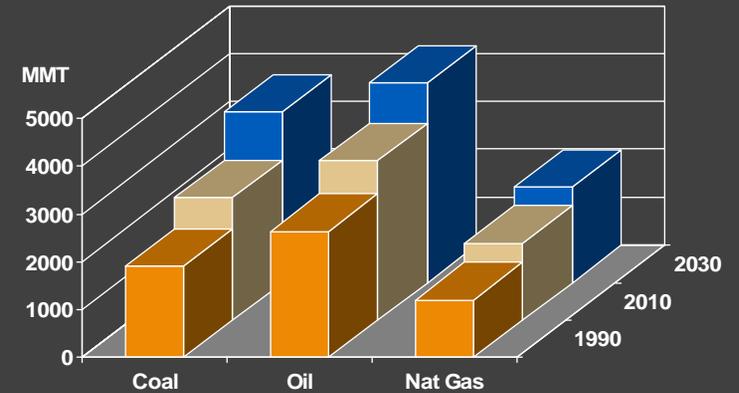
Global Hydrocarbon Reserves



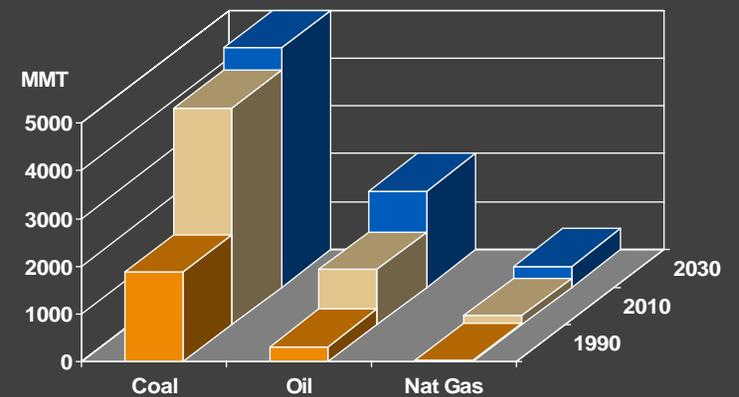
- 61% oil reserves in Middle East
- 67% natural gas reserves in Middle East and Russia
- 50% of coal reserves in North America, China and India

Climate!

CO2 Emissions - North America

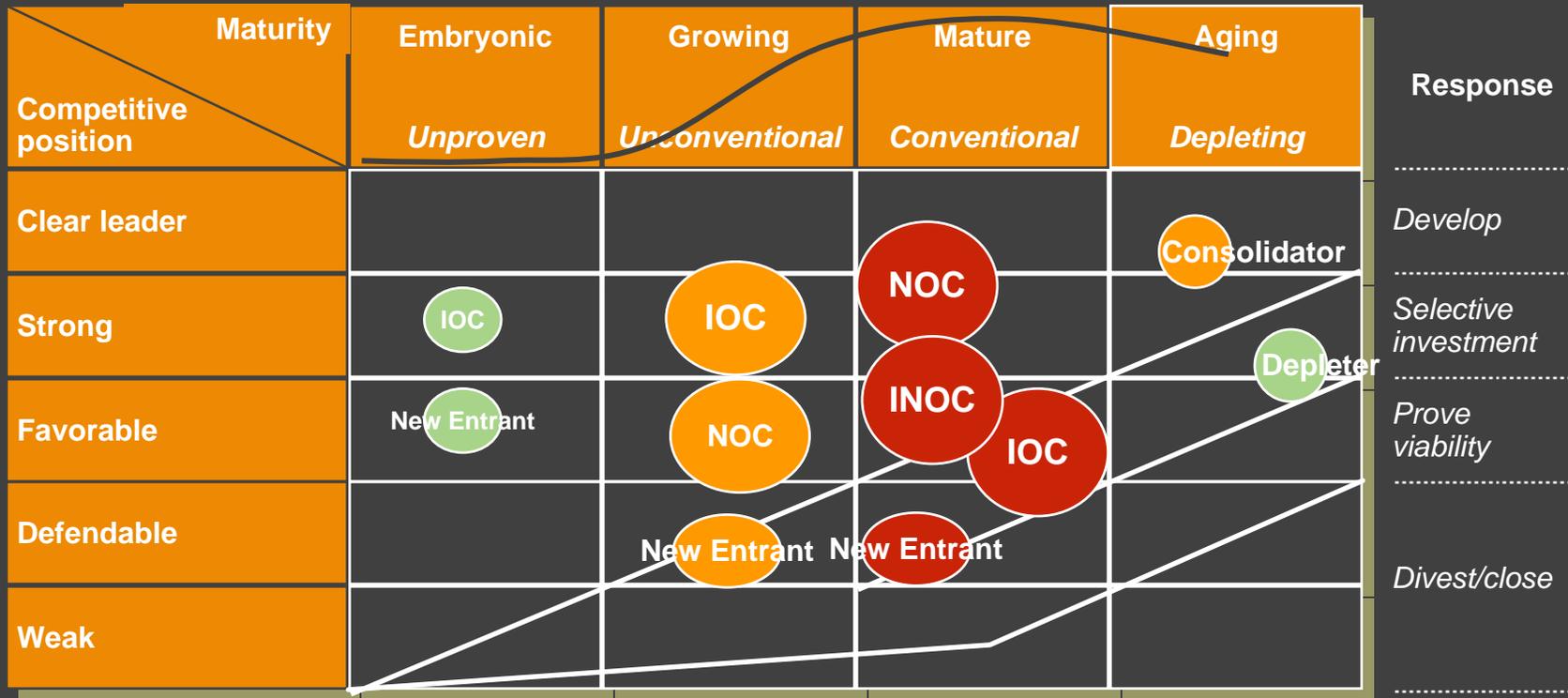


CO2 Emissions - China



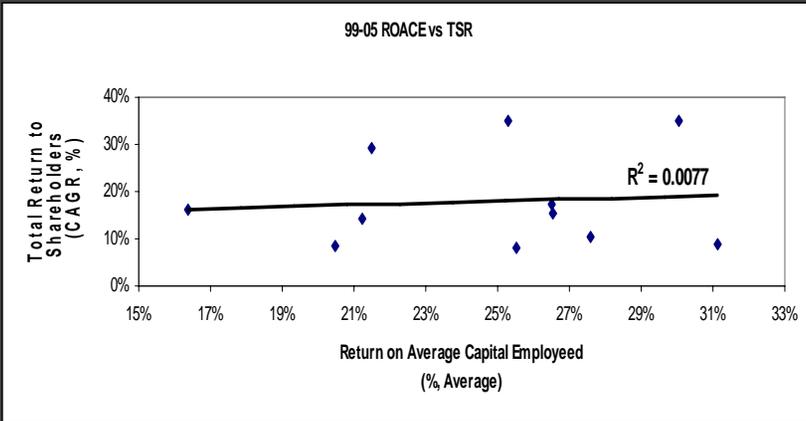
Old strategies are threatened

IOCs have lost competitive position to INOCs and NOCs for mature conventional resources in traditional places

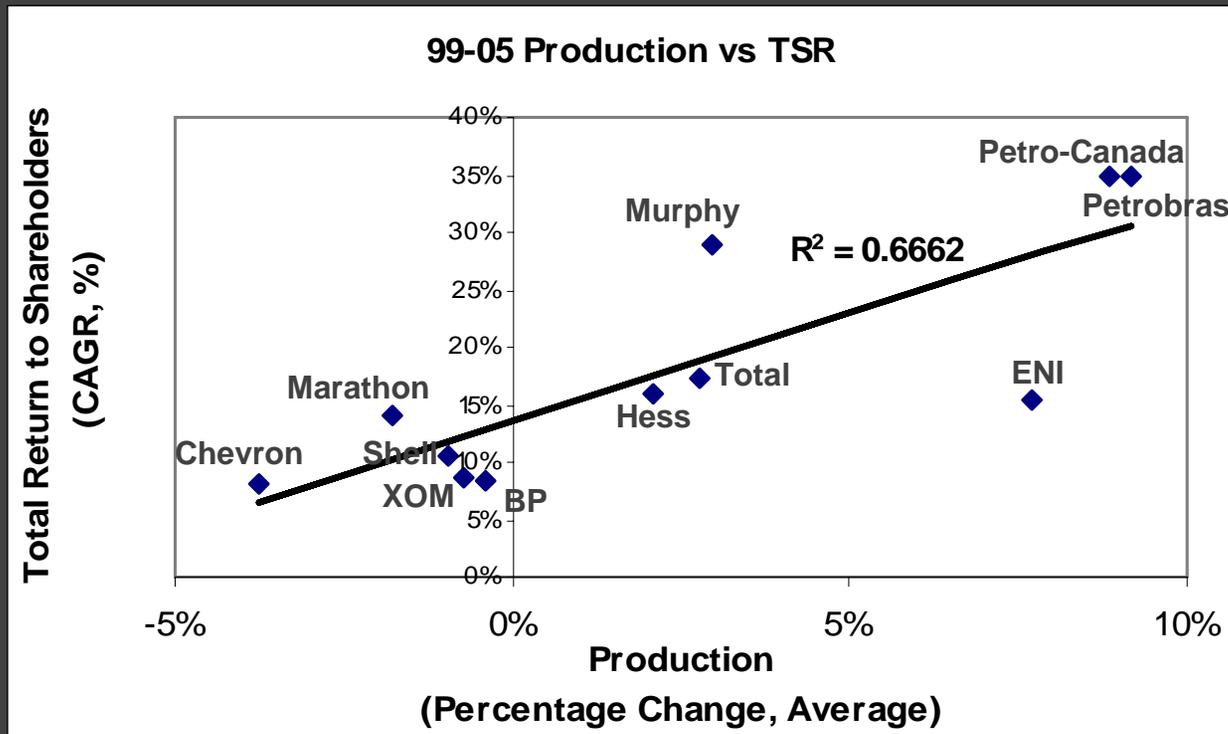


Competitive intensity: High: ● Medium: ● Low: ●

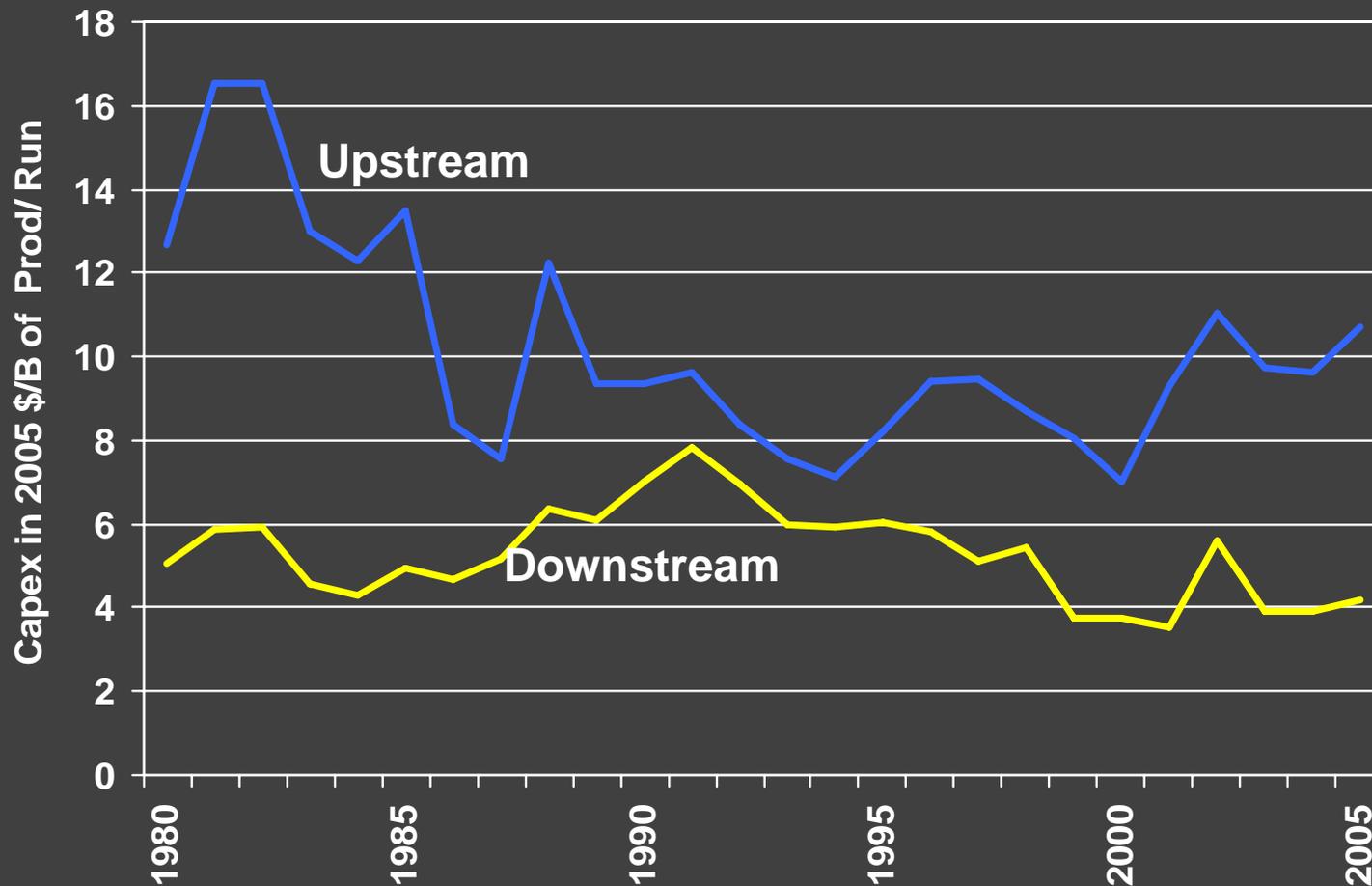
Prior shareholder value propositions are unpersuasive



Production growth has replaced ROACE as a predictor of shareholder returns



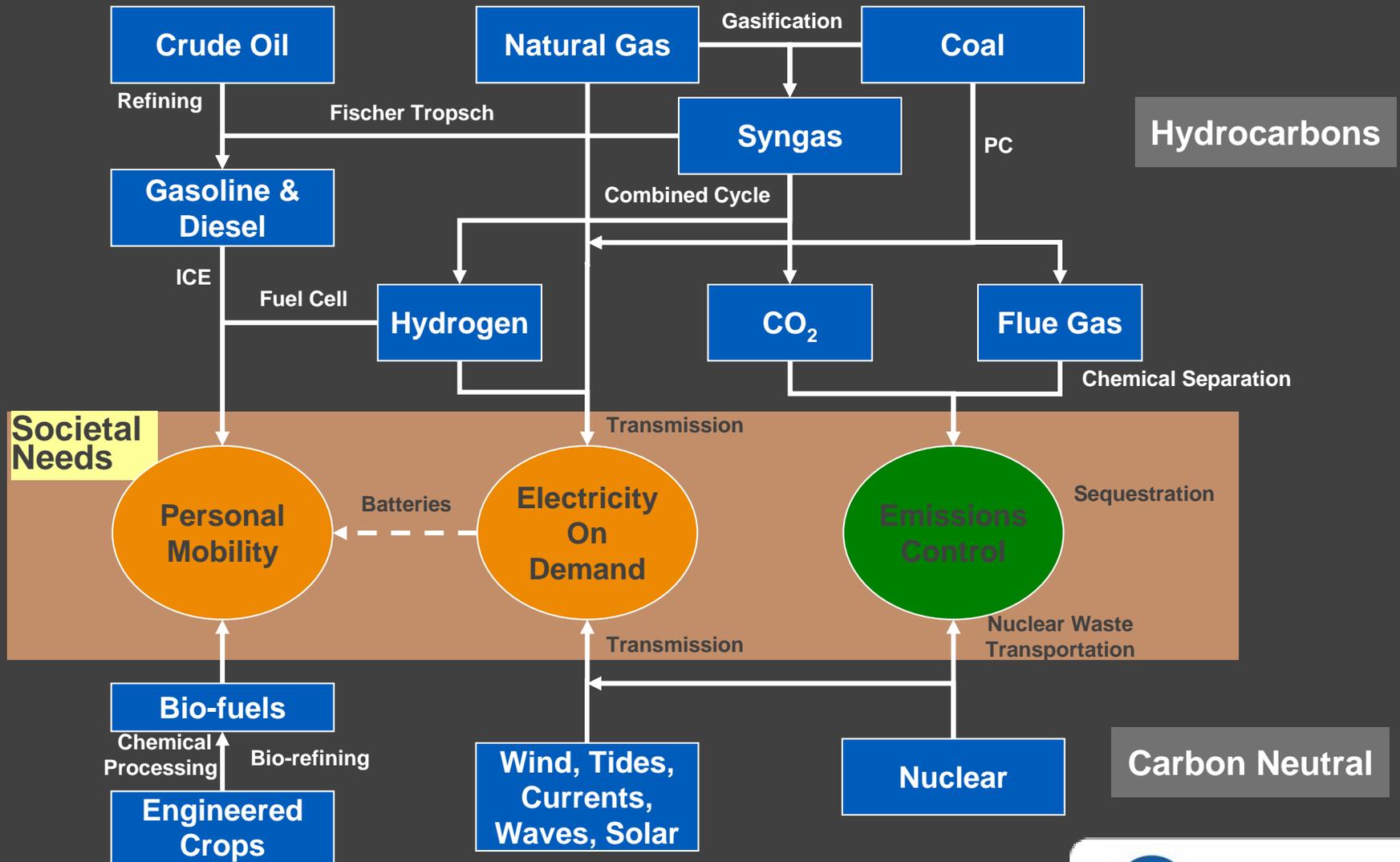
IOC Capex has barely moved from depressed 1990s levels



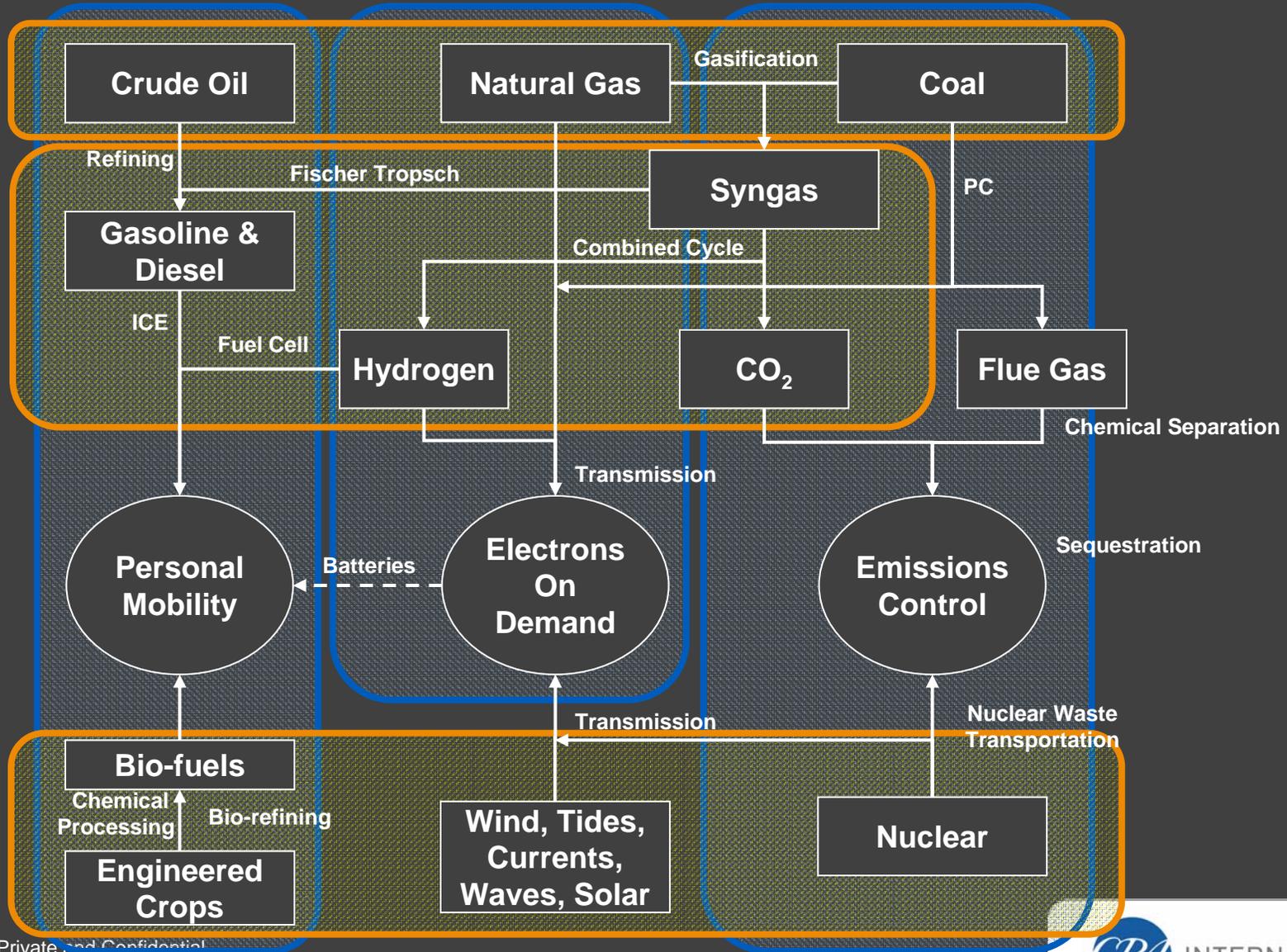
Real Capex per barrel of production or refinery runs for XOM, BP, Shell and Chevron

“If a problem cannot be solved, enlarge it.”
Dwight D. Eisenhower

The industry must reframe its purpose and boundaries...

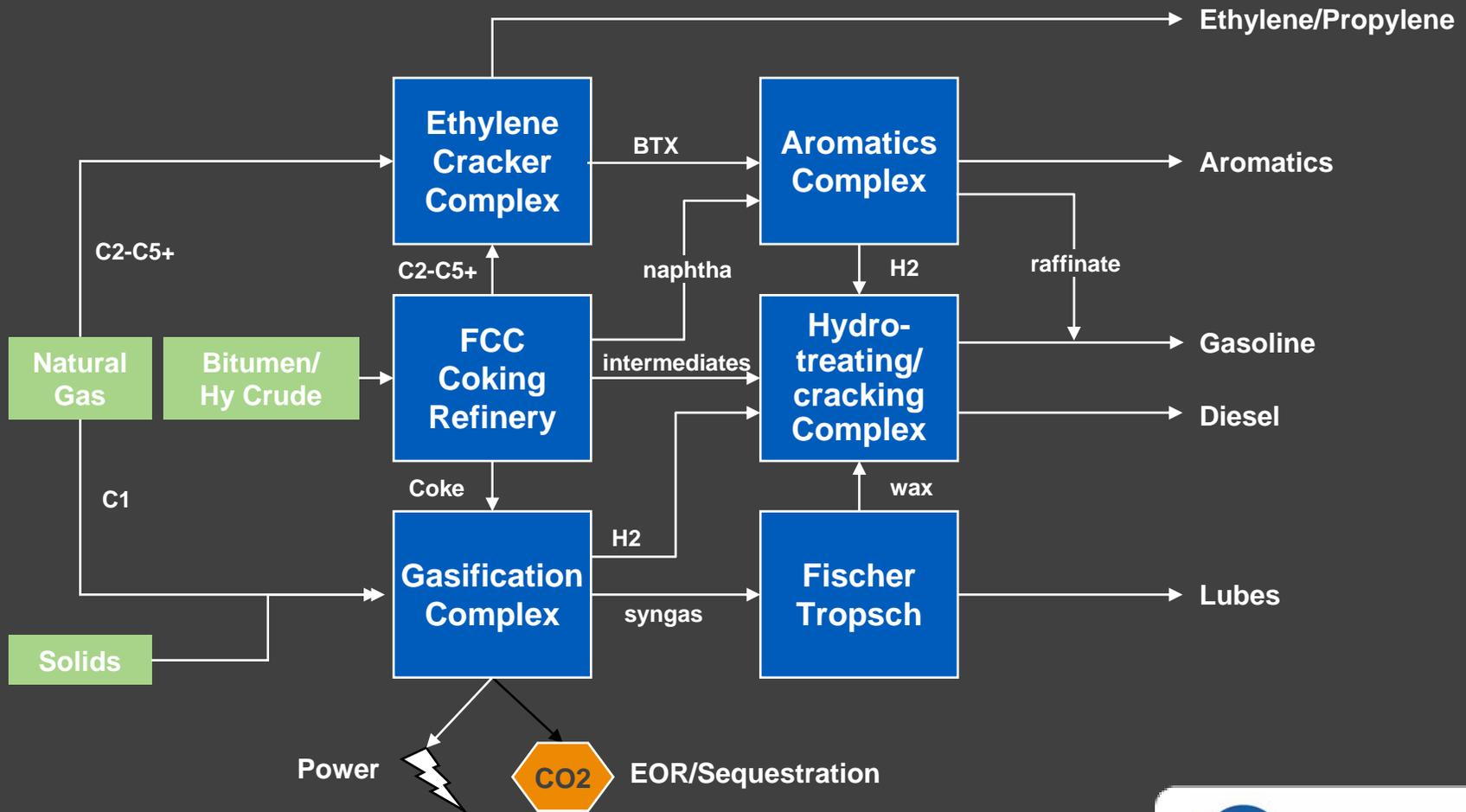


The new map opens up new business model possibilities



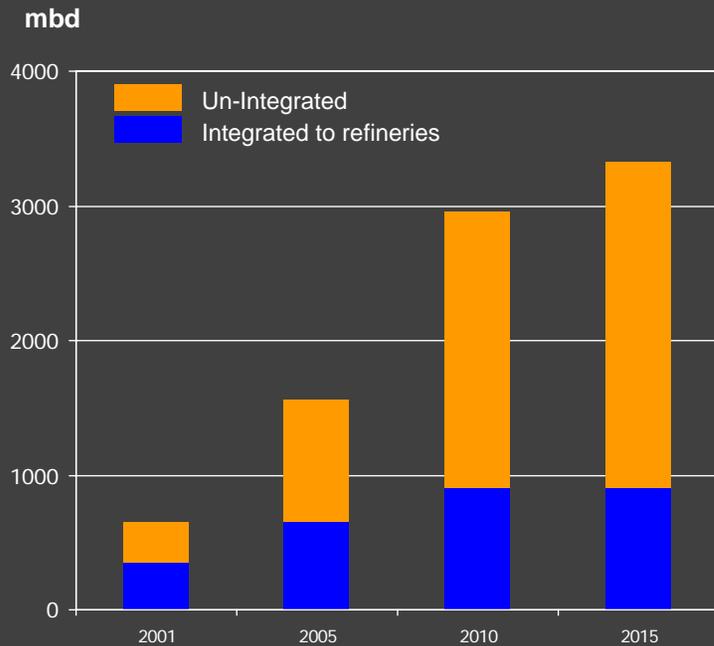
The refinery of the future will be more flexible to achieve lowest variable costs

The New Refinery Extends its Product Markets into Chemicals and Power



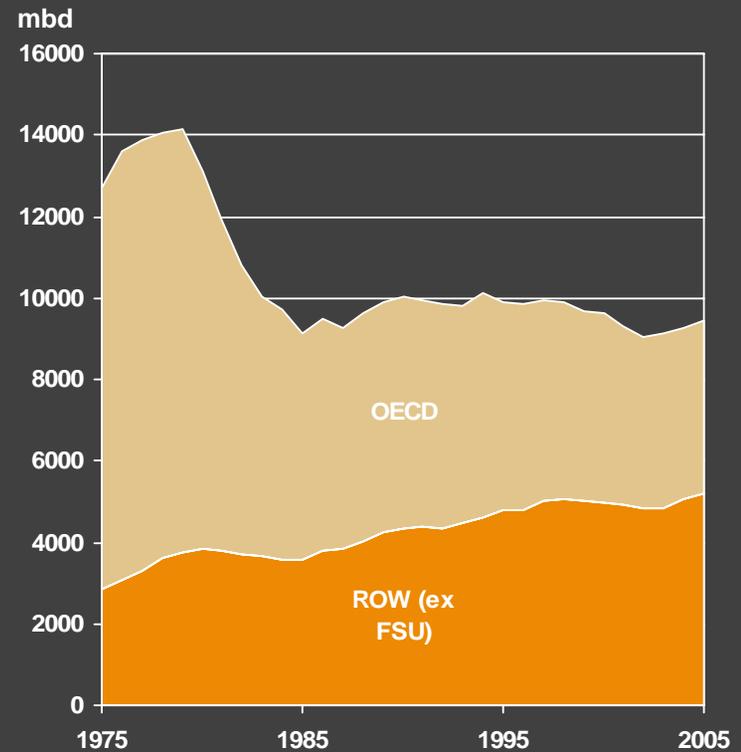
Global refining must be retooled to accommodate oil sands and convert more resid to transportation fuels

Projected Canadian Bitumen Production



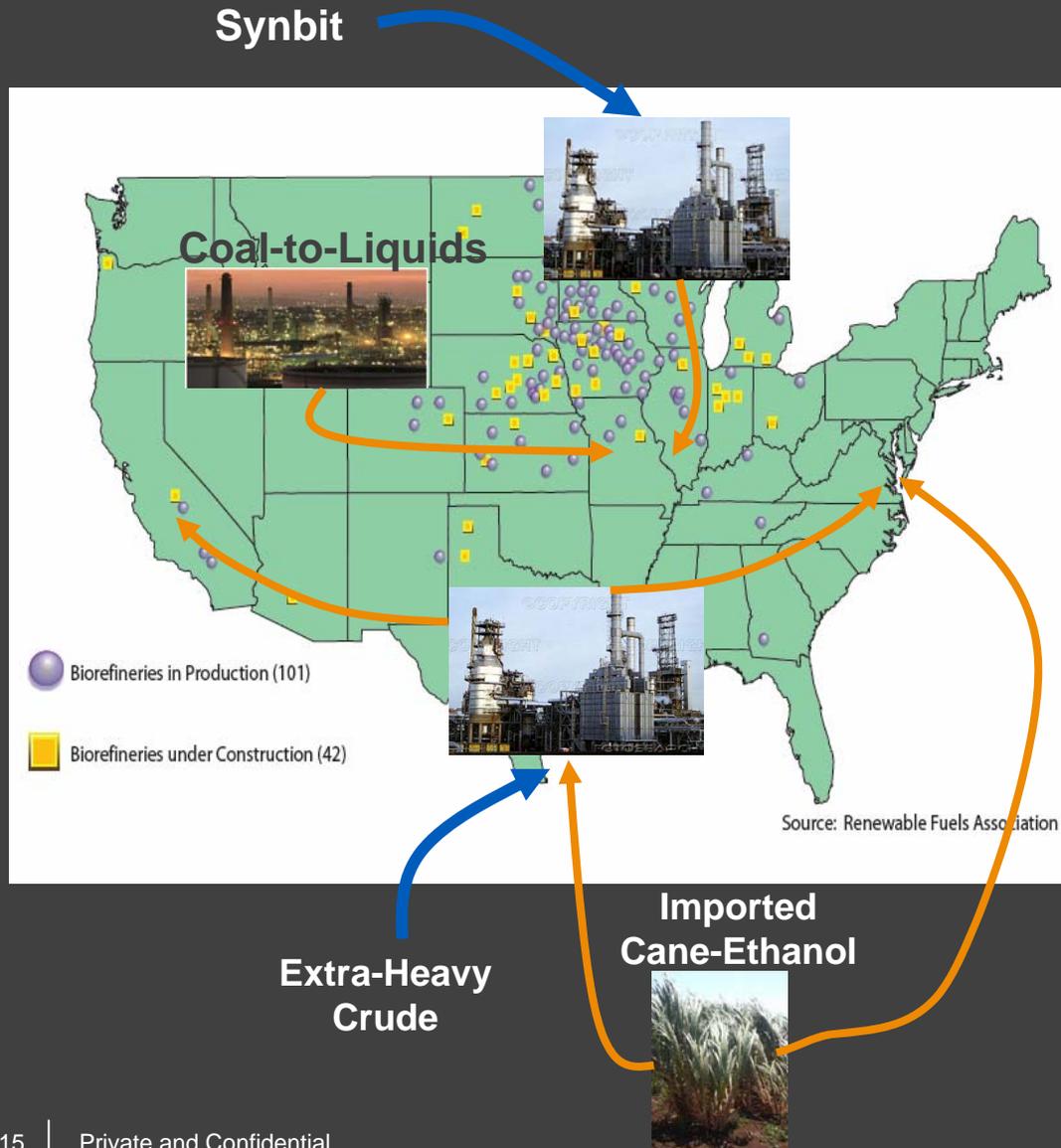
The JV between ConocoPhillips and EnCana is the first announced to integrate previously un-integrated players

Residual Fuel Oil Consumption



High oil prices will cause residual fuel oil demand destruction

Distributed manufacturing will challenge commodity refiners

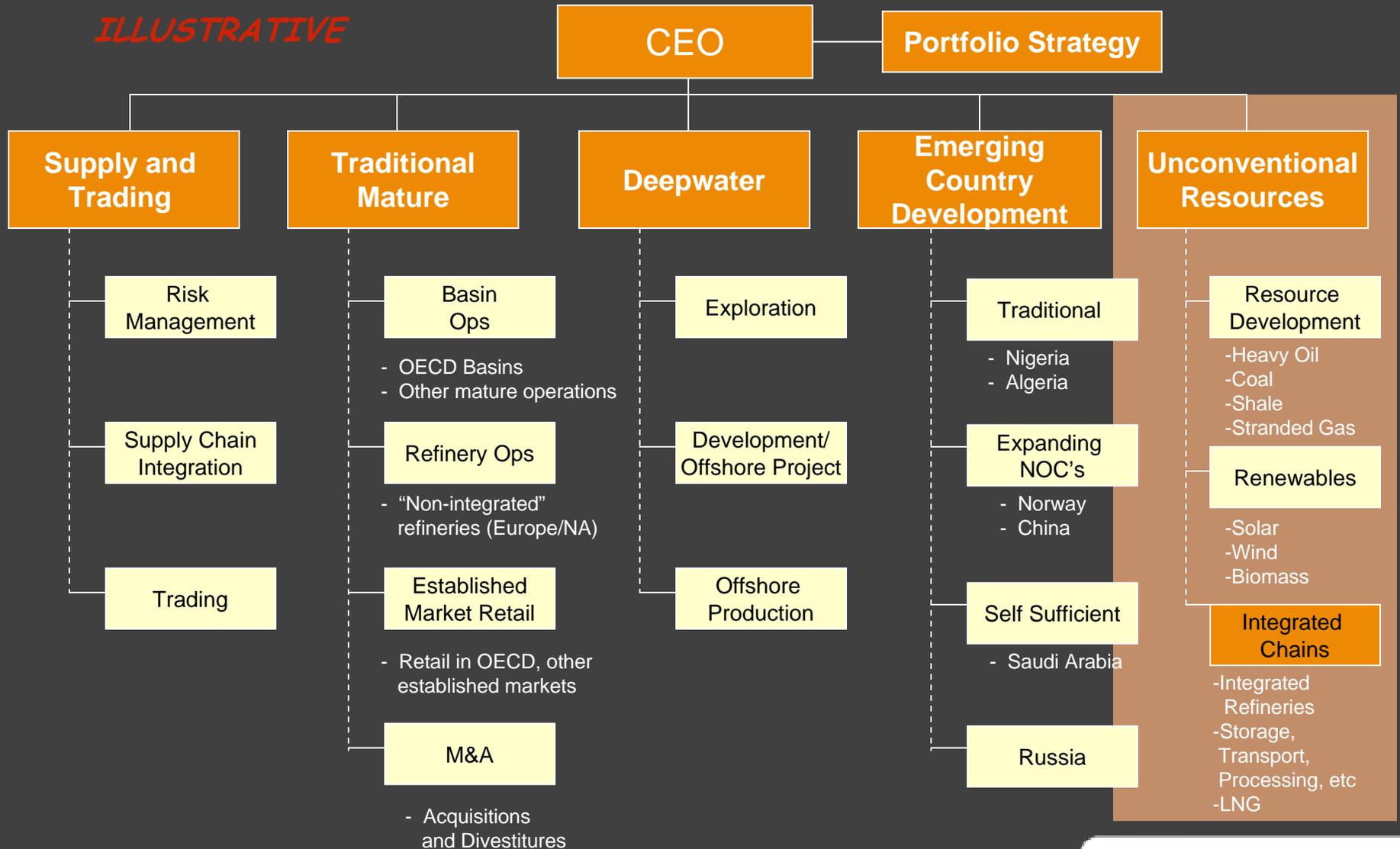


Major Uncertainties

- Crude oil price
 - Natural gas price
 - Light-heavy spreads
 - Refinery investment cycle
-
- Vehicle efficiency
 - Public transportation
 - Plug-in hybrids
 - Ethanol subsidies
 - Cellulosic ethanol
 - Greenhouse gas limits
 - FT/ CTL learning curve
 - Sequestration costs
 - Product flows/ blending

Organization Design will need to balance functional excellence with integration benefits

ILLUSTRATIVE



The “phase change” demands a different approach to strategy development



- ### Implications
- Explore multiple futures
 - Challenge mental models
 - Seek new insights
 - Apply multiple lenses
 - Develop leadership alignment
 - Establish clear direction
 - Deal with ambiguity
 - Plan for experimentation
 - Rigorously test business logic
 - Articulate strategic metrics
 - Embed learning processes
 - Emphasize organizational capability

| | |
|-------------------|--|
| Direction: | Position downwind of major trends; redefine corporate boundaries; Refine business model |
| Execution: | Secure commitment; access opportunities; deploy resources; organize; address stakeholder needs |
| Leadership | Convey purpose; shape values & culture; establish decision rights; motivate and renew people |

“The winds and waves are always on the side of the ablest navigators.”

Edward Gibbon, Decline and Fall of the Roman Empire

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