



India | New Delhi

# Plenary session 3: Oil & Gas market stability and change: Investment in a New Era

## Background Paper



# Disclaimer

The observations presented herein are meant as background for the dialogue at the 16<sup>th</sup> International Energy Forum. They have been prepared in collaboration with The Boston Consulting Group and should not be interpreted as the opinion of the International Energy Forum or The Boston Consulting Group on any given subject.

# Introduction

## Market Context

- The low price oil regime has resulted in limited upstream investments risking a future demand-supply gap
- “Peak oil demand”, stalled FIDs and an expected decline in productivity will only exacerbate supply pressure
- Strategizing effectively with short, medium and long term in view can ensure sustained investments in new exploration projects



## Session Objectives

- To understand that oil would continue to be a dominant energy source in the future
- To identify measures that can help drive investments into new exploration projects
- To explore how optimal capital allocation, investment into technology and scenarios based approach can provide a necessary cushion during lean phases

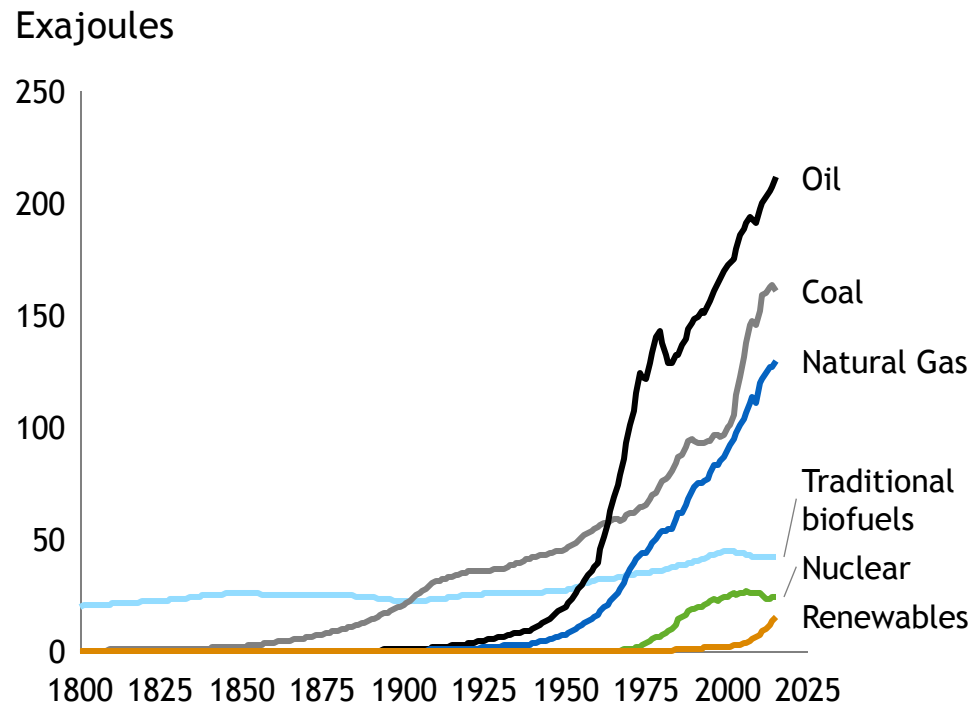
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**Key Question:** What can companies and governments do to get investment and exploration projects moving again to cope with future demand and maintain energy security?

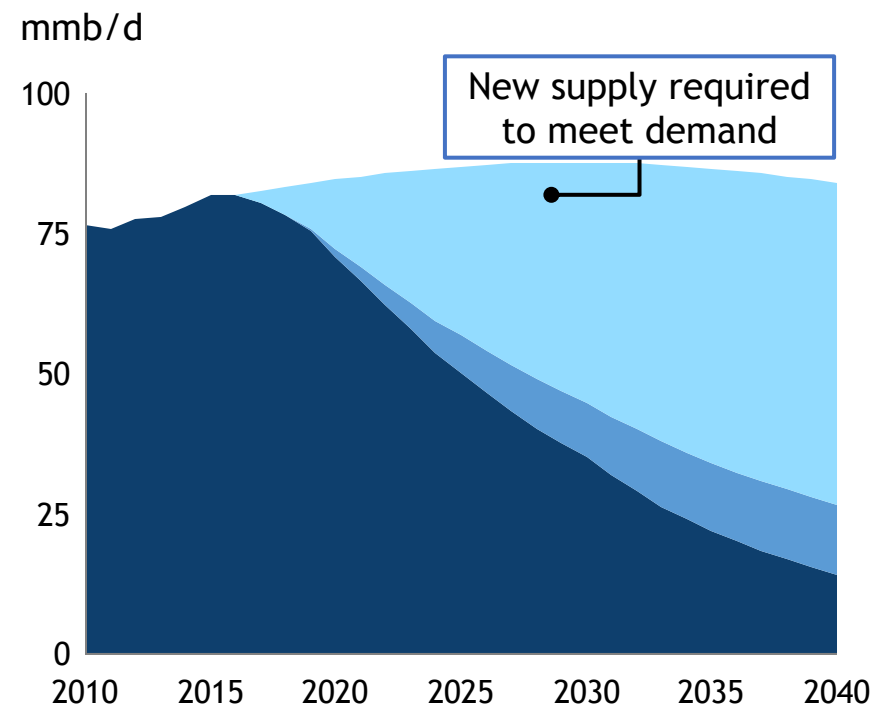
# Oil demand will not ease pressure for new supply

Decline rates mean that ~50 mmb/d of new supply will be needed by 2040

## Energy transition...?



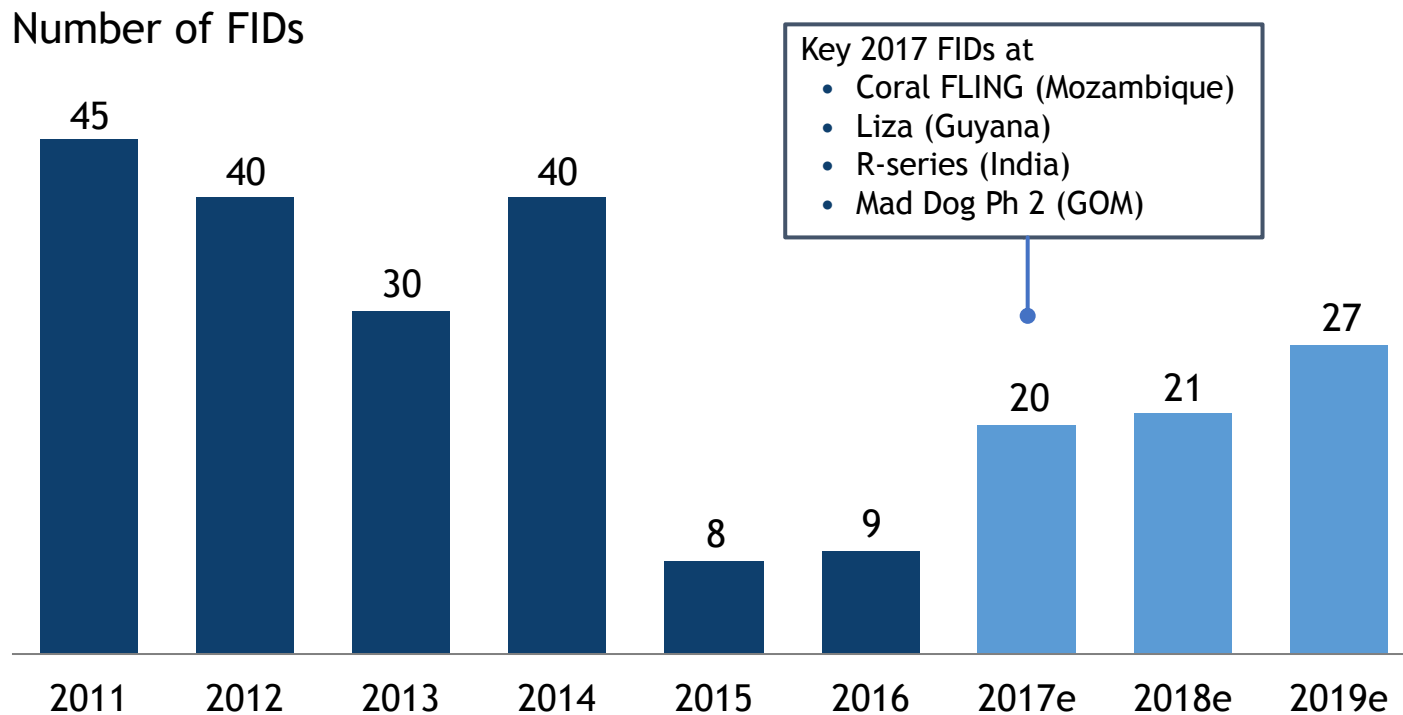
## ... with oil demand?



- New production
- Already producing @ 85 price scenario
- Already producing @ 50 price scenario

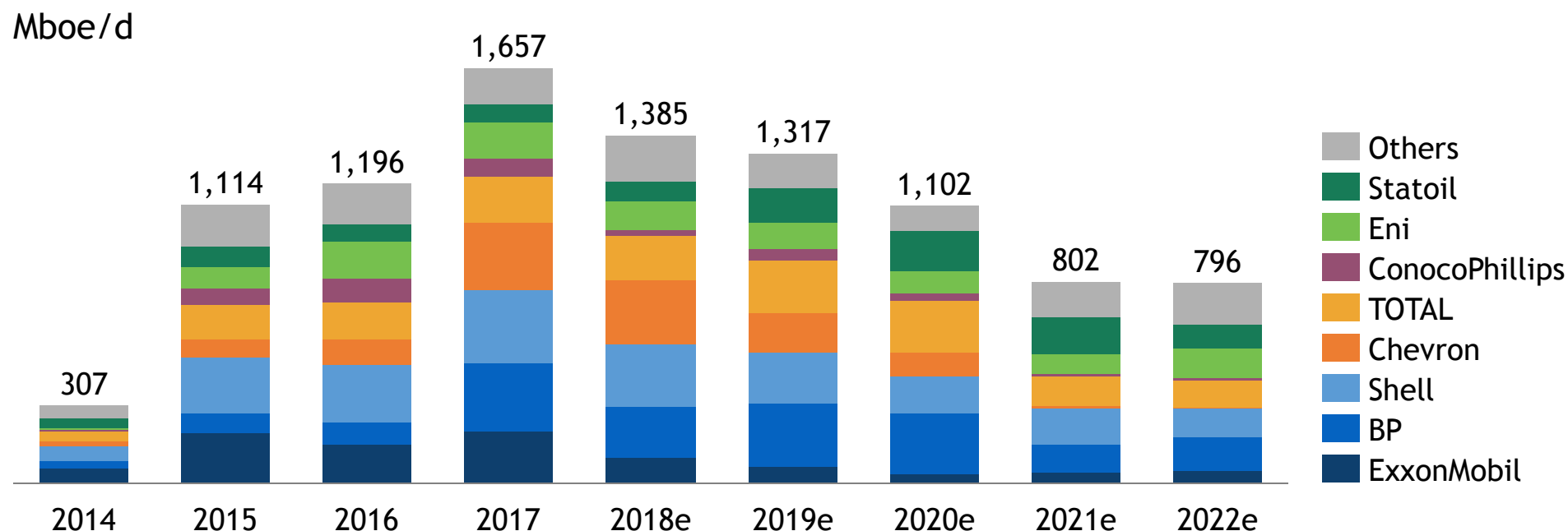
# Investment challenge is exacerbated by the stall in Final Investment Decisions (FIDs) over 2015-2016

Less than 10 p.a. industry FIDs for new project development in 2015 and 2016



# Incremental production from new start ups begins to decline after 2017, stressing the risk of a future supply gap

## Production evolution from 2014 to 2022

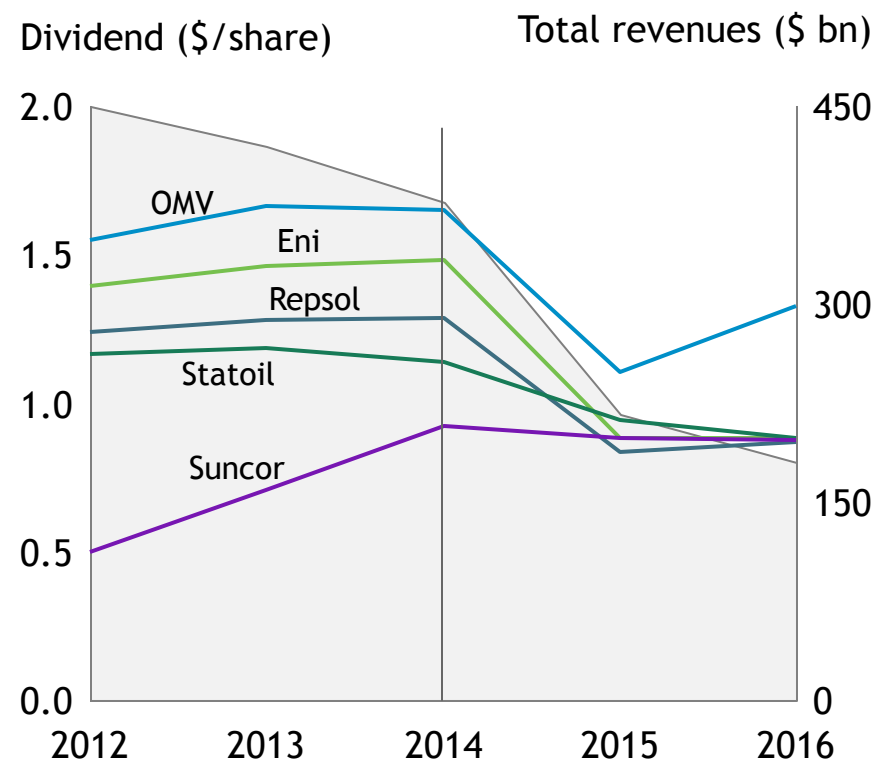
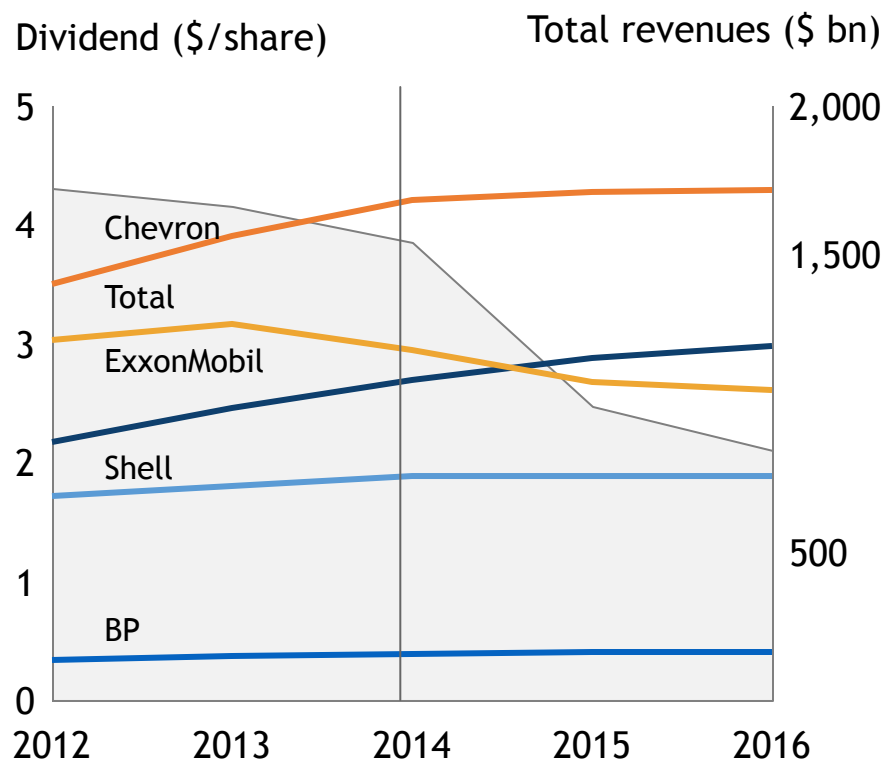


Note: Others includes Hess, Marathon Oil, Anadarko, Oxy, Apache, EOG, Noble Energy, OMV, and Repsol  
 Source: Rystad Ucube (September 2017 Release)  
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# Balancing reinvestments in business with shareholder dividend expectations can provide necessary cushion for capital allocation

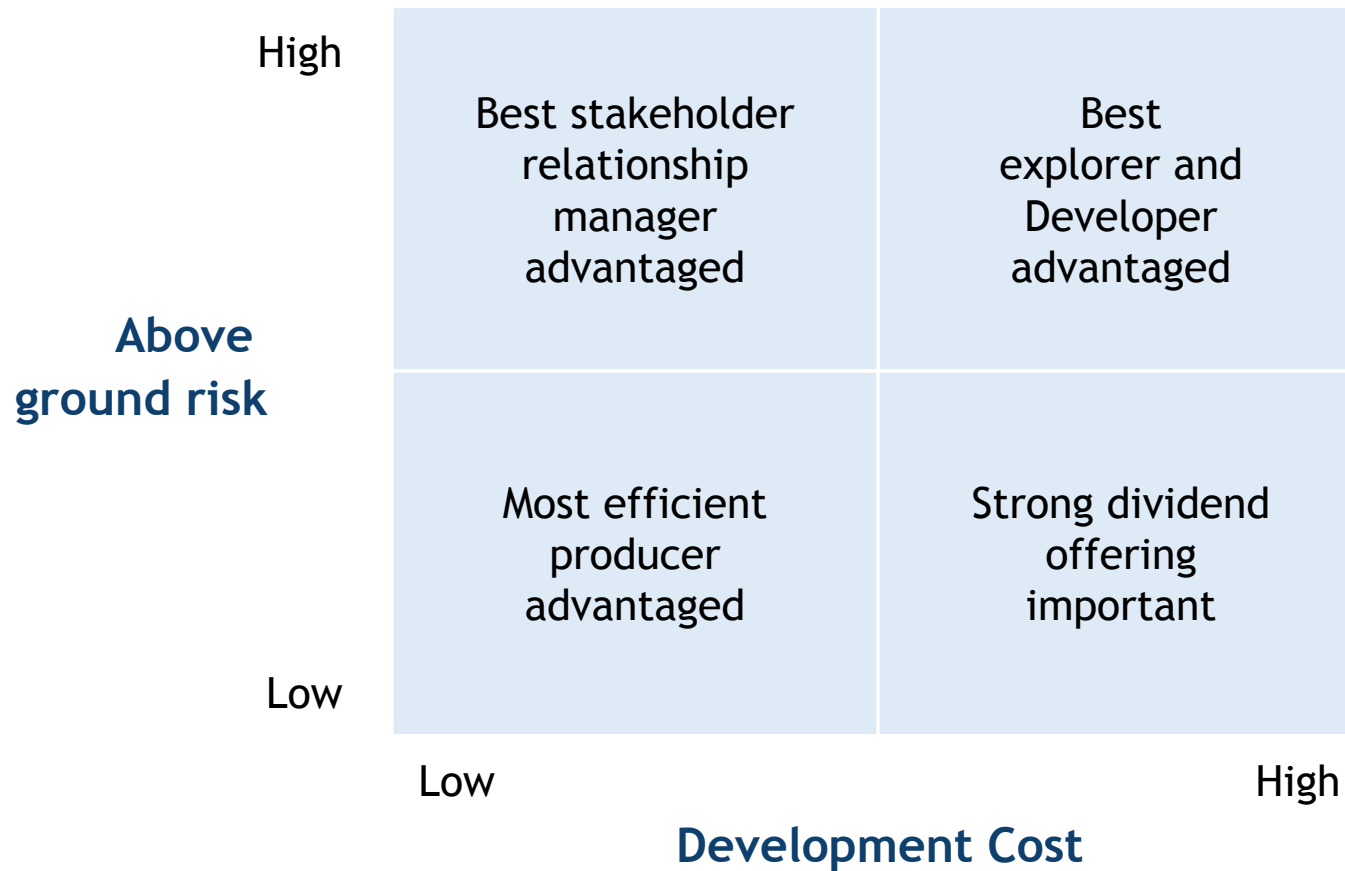
**TOTAL was the only Major to cut dividend following drop in price**

**In contrast, most Large Integrated cut dividend**



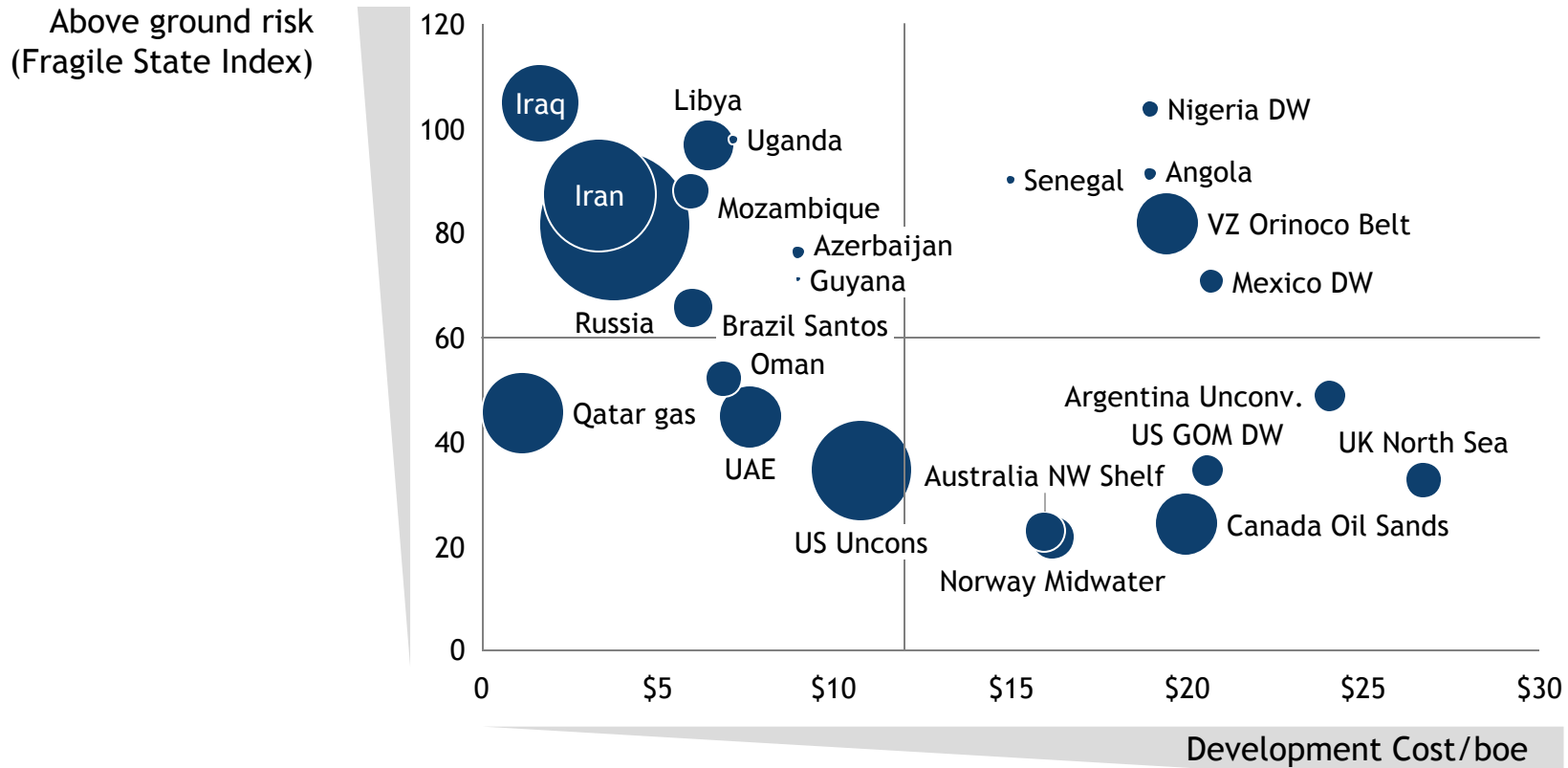
□ Total revenues

# Strategic positioning between above ground risk and development cost can be used as a tool for savings





# Companies need to critically think through Risk-Cost trade-off for strategic investments into new assets



1. Average Development/boe costs include projects slated for commissioning between 2010-2030; Development costs defined as total investment costs excluding exploration and government take 2. The Fragile State Index scores 12 risk factors on 1-10 scale 3. Circle size denotes relative size of resource base

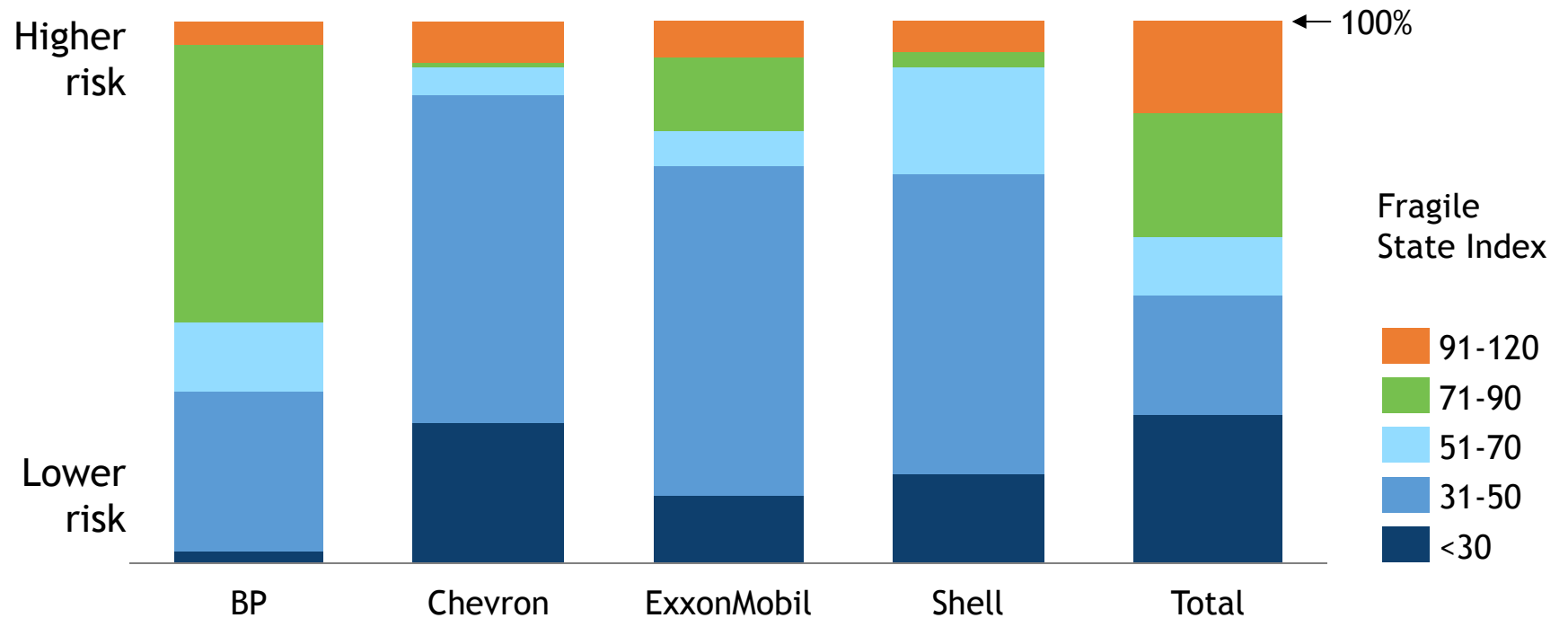
Source: Rystad (Feb 2017 release); Fund for Peace, "Fragile State Index; 2016";

BCG CEI

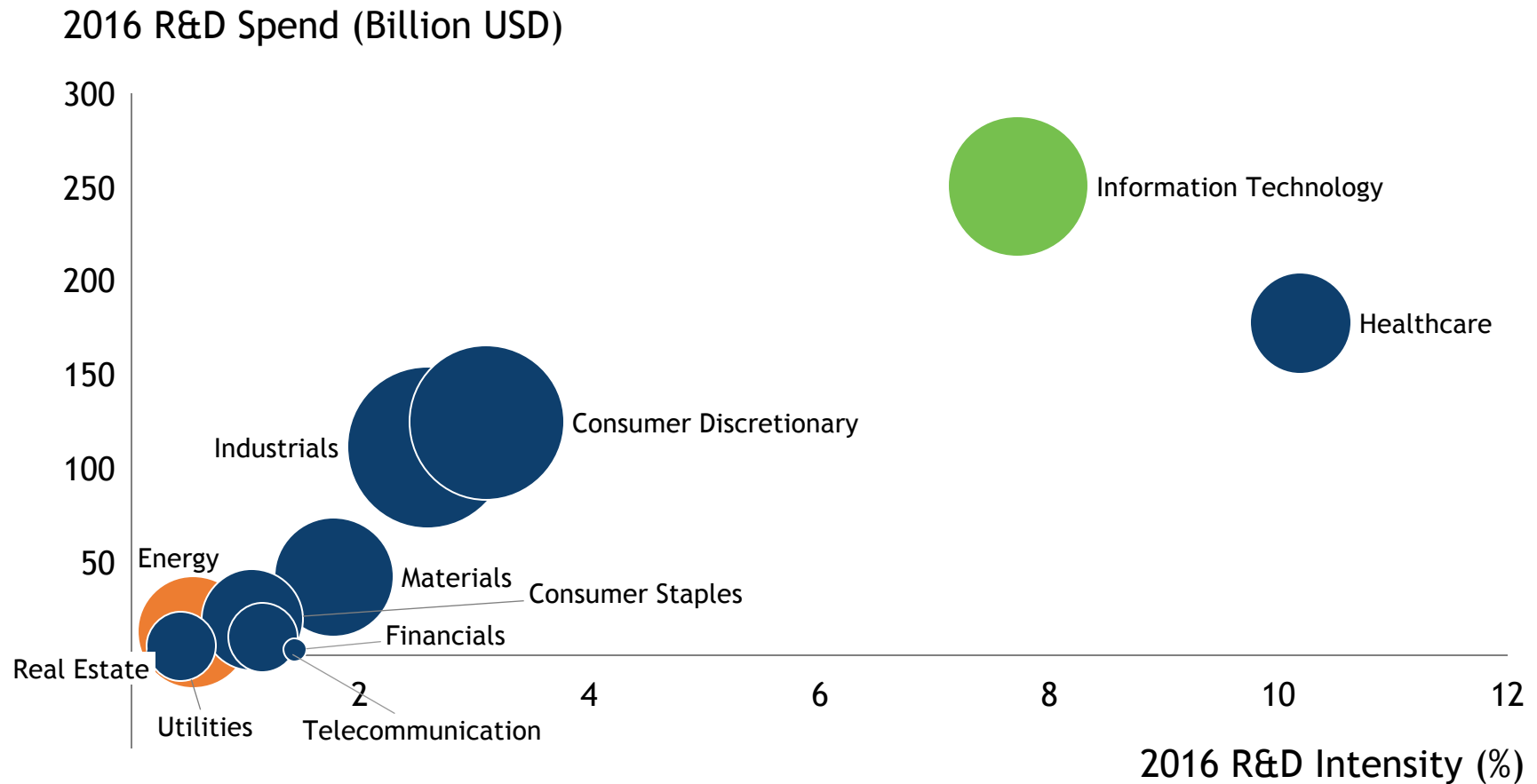
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# New investments skew toward lower above ground risk areas BP and TOTAL are the exceptions

## New source production (2017-2027)



# Energy industry has low R&D Intensity and companies need to build on this opportunity for medium to long term gains









Note: R&D Intensity is total R&D spend as a percentage of Revenues; Size of bubble represents total revenues  
 Source: Capital IQ; BCG CEI  
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# Investment into technology will optimize the entire value chain for all industries including Oil & Gas



Technological application close to commercial use


- 1 Developed Well Advisor to leverage operational data & advanced analytics 
- 2 Combining IT and Operational technology reduced analytical cycle from months to few weeks. This has helped make decisions faster, improved operations efficiency in an uncertain market 


- 3 Remote operations center decreases per unit costs 
- 4 Through predictive maintenance 
- 5 Aker BP would reduce production platform employees. It hopes to lower production cost to \$7/bbl 
- 6 Precision farming as use case for more precise mining, decreasing operational costs 





- 7 Through use of digital technologies MOL expects to increase yields more than 5%, decrease energy consumption year by year by 2%, and reduce hydrocarbon losses in the refinery by 30% 
- 8 Deployed real-time production optimization in 200+ wells 



- 9 Commercial revolution in the diamond business through blockchain initiated by large diamond producer; could be applied for other mine materials
- 10 Digitalized marketing/ trading allows for big data enabled strategies, algorithm enabled opportunity capturing and potentially revolutionizing distribution models

Technological application with disruptive potential in the future

- 11 Centralized data repository helped the company to extend well field life and generate revenue 

- 12 Research on smart robots and swarm intelligence decreases employees required 
- 13 Lab for 4D-printing enabling multi-material & self-assembling devices

- 14 Universal quantum computers could allow for data assessment on currently unimaginable scale optimizing routing and interaction among all supply chain elements    

- 15 Fewer accidents through:
  - 16 Smart helmets to assist the overall aging workforce 
  - 17 LiDAR sensors to autonomous trucks, recognizing humans within range 

# O&G majors clearly focused on technology with diverging approaches

Other players can also choose to create their own path to digital



## Digital Upstream Company

Very strong emphasis on modernization and transformation through digitization and automation

Looking to become the “Digital Upstream company”



## Improving performance through Technology

Focused on technologies that can improve Chevron’s base business operations

Established a venture capital arm (Chevron Technology Ventures)



## Improve profitability through Technology

Additional focus on R&D with \$1 billion invested annually on innovated technologies (Algea, Fuel Cells, CCS, etc.)



## Start-up mentality in technology investments

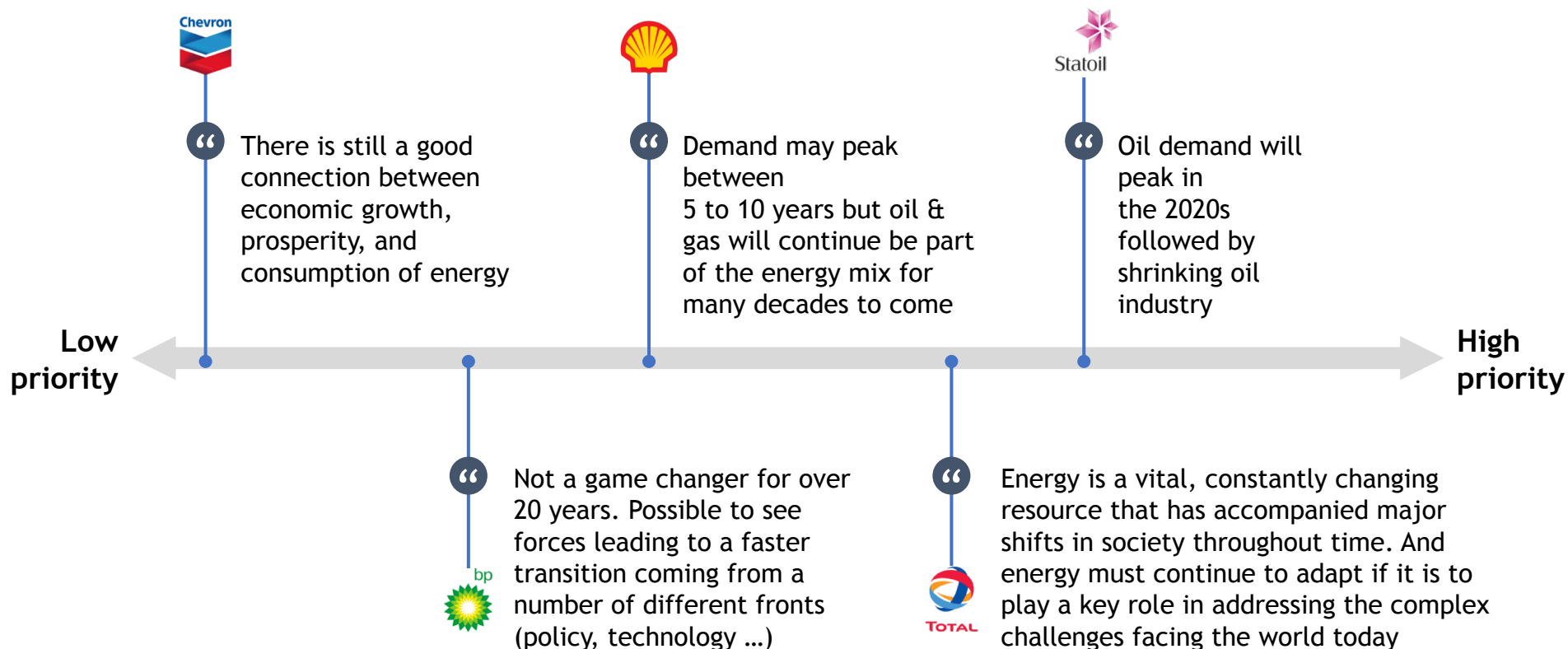
Venture capital arm (Shell Technology Ventures) and a technology center Techworks at MIT



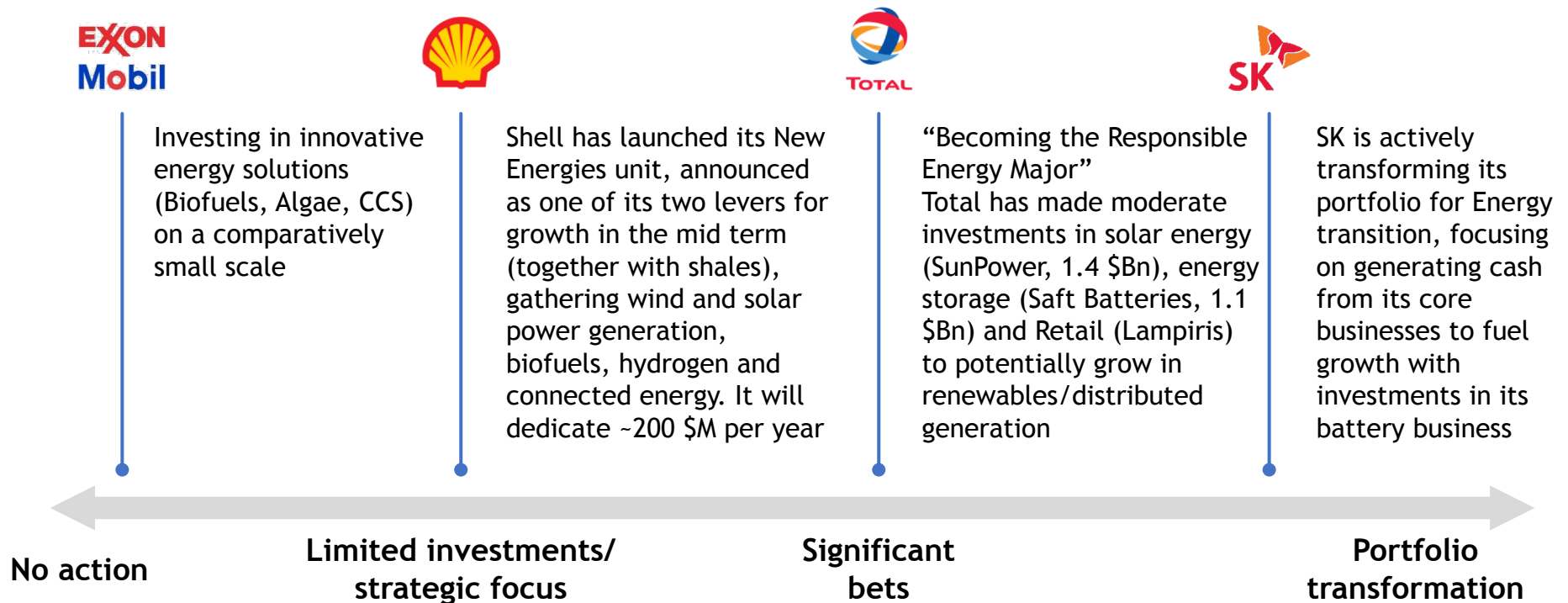
## Climate focused Innovation

Emphasis on renewable technologies to meet the demands of the future

# Different views on energy trends for the Oil demand leaves O&G industry directionless and investor confused



# Only few companies have long-term energy scenarios based approach which other players must choose to consider



# Key Questions

- 1 How can governments provide an environment or support O&G companies to continue to invest in new exploration projects during a low price regime?
- 2 What measures must O&G Industry as a whole consider for increased investments in R&D, where it has lagged traditionally?
- 3 Is it time to move from a traditional O&G company to an Energy company?



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