Resource management and energy sustainability

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Demand for all types of energy is set to rise

**Figure 2.1**: World primary energy demand and related CO2 emissions by scenario

- **Current Policies Scenario**: reflects demand prospect to 2035 taking account of existing policies as at mid-2013.
- **New Policies Scenario**: indicates demand prospect to 2035 with existing policies together with the impact of declared policy intentions.

*Source: IEA, World Energy Outlook, 2013*
But on the supply side, major challenges have to be faced

- Issue prominent given International Energy Agency anticipate under their *New Policies Scenario*, demand to increase 33%, 2011-2035.
- Inadequate and ageing infrastructure
- Falling discovery rates
- Earlier under-investment in finding and developing new sources of supply
- Scale of finance and lead times needed to bring new projects into production
- Commercial viability of carbon capture and storage
- Managing diversification into development of alternative fuels and renewables
- Skills shortages
Technology is enabling the extraction of unconventionals at scale...

Source: BP, Annual Statistical Review, 2014

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Nevertheless, future supply is typically more challenging and costly to develop

- This is despite the concerted shift in supply from West to East
- Exploration in new frontiers (i.e., Falkland Islands, Greenland) and potential being realised for significantly higher production from Northern Iraq and Libya
- Deepwater fields could account for 10% of total world oil output by 2020
  - Deep and ultra-deepwater potential in Gulf of Mexico, Nigeria and Angola
  - Brazil’s new frontier: pre-salt and ultra-deepwater finds
- Complex supply chains
- More stringent environmental operating standards
- New technology often not yet tried and tested at scale (e.g. next generation nuclear) or at all (e.g. CCS)

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Likewise, new mineral resources lie in politically unstable geographies

- World-class deposits of the future lie in ‘frontier’ countries - perceived high risk of corruption
- Technical, political and geological challenges are high – leading to greater investment, financial and operating cost risks
- Supply growth continuing to override impact of geopolitical unrest
- Unstable investment, regulatory and political regimes and civil war are counteracting mineral attractiveness, deterring foreign investment and the benefits it could bring:
  - Improved infrastructure (water, power, roads, rail, ports)
  - Sustainable job creation and up-skilling
  - Education and Community development
  - Economic benefit through royalties and taxes

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$33 trillion in capital investment needed for energy supply over the next 25 years

Cumulative investment required in energy-supply infrastructure, 2010-2035

- Power: 16.6 billion (bn)
- Oil: 8.0 bn
- Gas: 7.1 bn
- Coal: 0.7 bn
- Biofuels: 0.3 bn

Source: IEA, World Energy Outlook, 2010

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Post-Macondo, heightened oversight of extractive industries

- Greater compliance and regulatory burden
- Cross border complexity in operations
- Varying reserves/financial reporting standards
- Corporate governance structure
- The expectations of minority shareholders
- Health & safety, corporate social responsibility
- Need for greater transparency (especially if capital raising)
- Opposition from special interest groups
- These trends are likely to continue…….
The Energy & Natural Resources ‘Trilemma’

Capital constraints: impacts of recession & credit crunch; competition for capital; availability of bank debt;

Pressures on supply chain: new and untested products; pressure to deliver infrastructure of all kinds

Regulation & Policy: Low carbon agenda; corporate compliance and CSR; heightened operating requirements

Environmental protection: social licence to operate: carbon, water etc.

Global Reporting Standards

Need for Transparency

COST

Access to resources: depleting reserves; ageing infrastructure; challenging geographies;

Control of supply: changing trade patterns; resource nationalism

Consumer impact: demand patterns; efficiency drivers – e.g. smart metering

Security of Supply

Emerging and future technologies: unconventionals; microgeneration; CCS; smart grids

Source: EY
Thank you

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