



Resource Management and Safety Standards for Improved Efficiency in the Wake of Coal Mine Accidents, Gulf of Mexico Spill, and the Shale Gas Debate

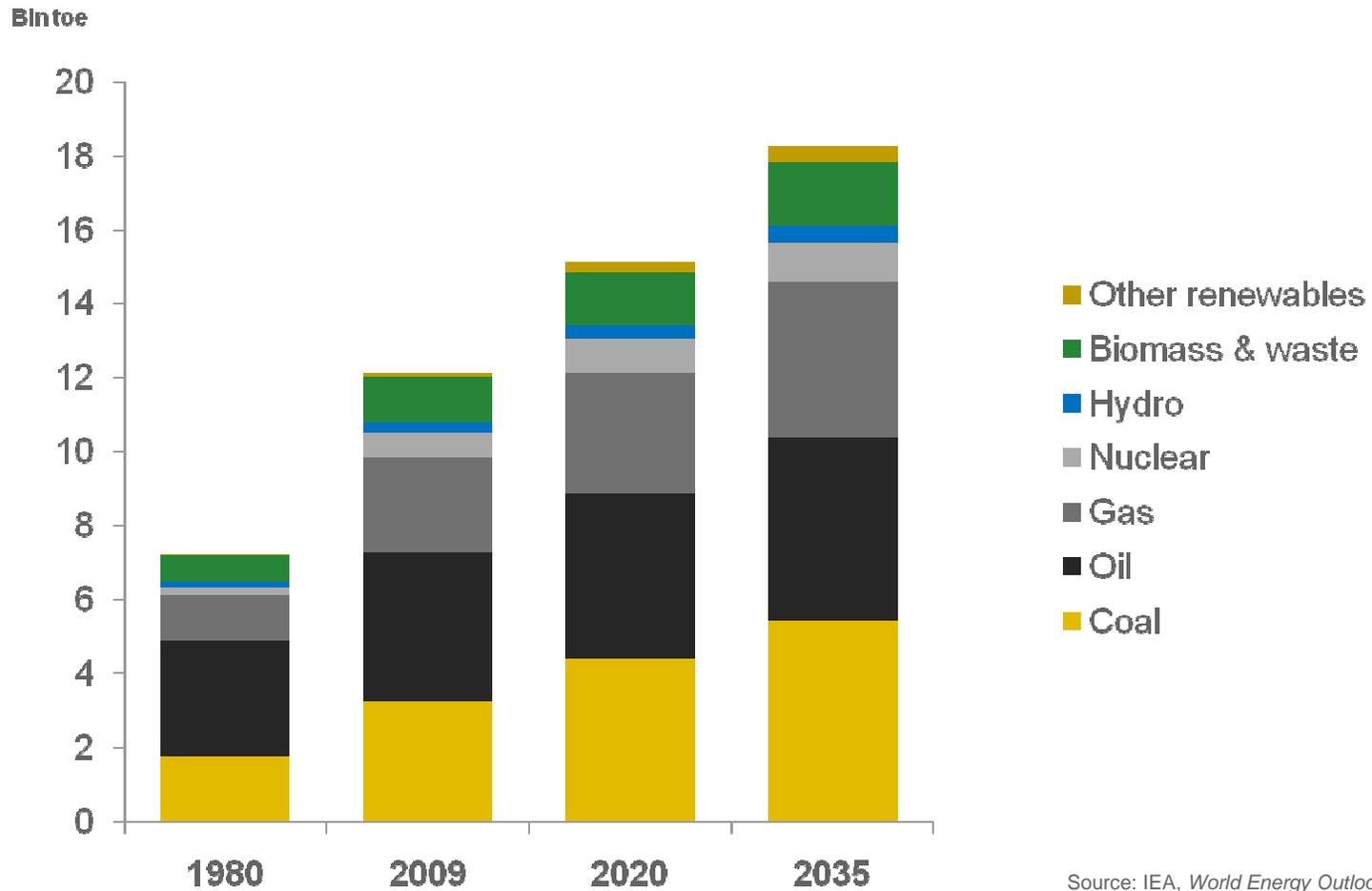
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World primary energy demand

Current policies scenario

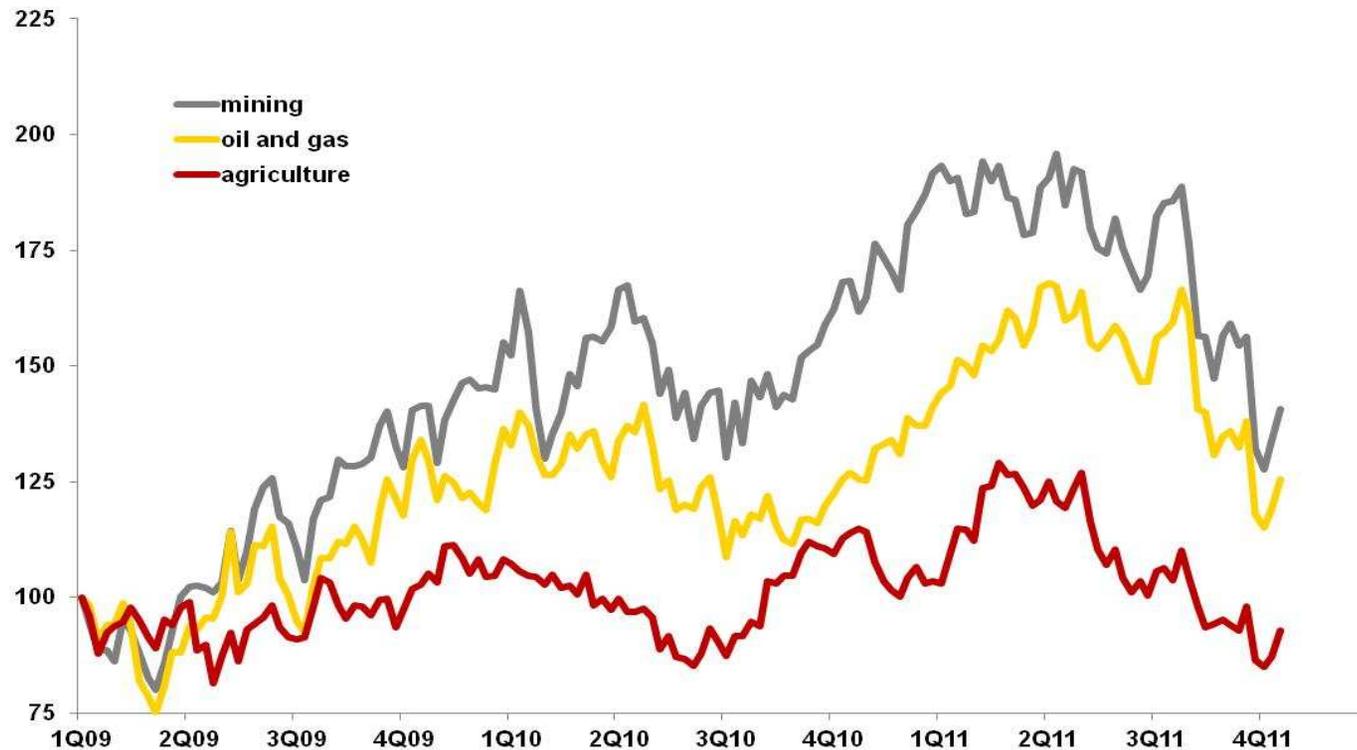


Demand for energy is set to rise

- ▶ Oil, gas and coal demand are not going away any time soon. World consumption set to rise significantly from 2009 to 2035:
 - ▶ Oil—65% increase
 - ▶ Natural gas—25% increase
 - ▶ Coal—66% increase
- ▶ Securing supply will continue to drive energy policy decisions
 - ▶ Oil demand growth in 2010 was second-largest in 30 years
 - ▶ Global deepwater oil production has grown almost 10% per year since 2000
- ▶ Emerging markets a long-term driver (rising personal income, industrialization and urbanization)
- ▶ Non-OECD countries account for 90% of all energy demand growth globally because of faster rates of population and economic growth, urbanization and industrial production

Early but strong inclines on natural resource markets

Global commodity indices
(1 Jan 2009 = 100)



Risks increase as supply challenges rise

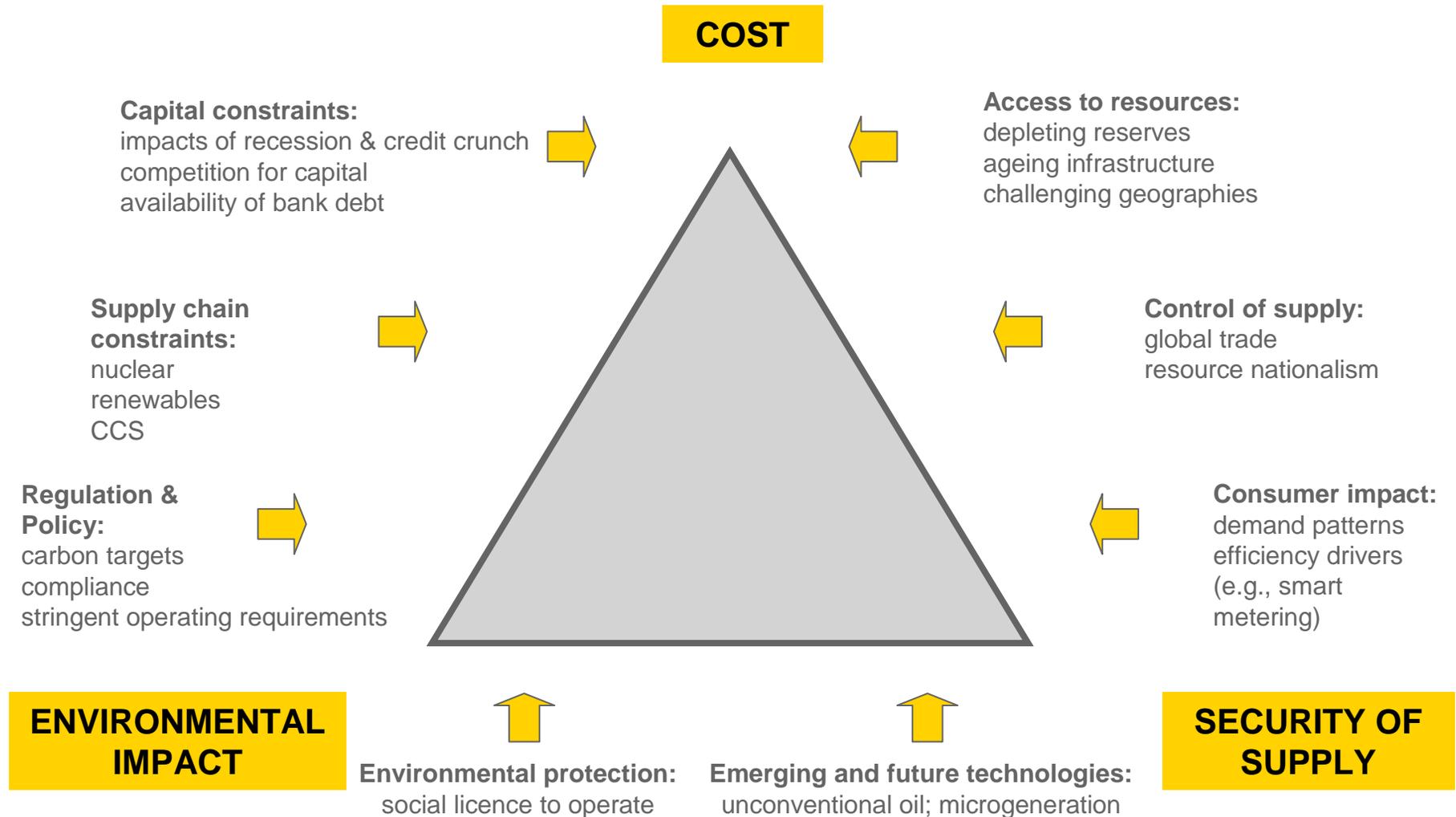
Competitive market players recognize the need for bold decisions. The supply picture is set to be reshaped as strategic choices and investment plans unfold. Already, increased commitment to frontier exploration and unconventional gas plays have increased some risk scenarios

Challenges increase global focus on security of supply

- ▶ Inadequate and ageing infrastructure
- ▶ Falling discovery rates
- ▶ 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

Regional gas supply issues dominated in the short- to medium-term by gas developments in Australia (e.g., LNG and CSG), and in the medium- to long-term by shale gas developments, particularly in China

The energy and natural resources trilemma



Conflicting pressures add global complexity

Geopolitical factors

- ▶ Resource-rich nations demanding greater control over, and economic rent from, their natural resources
- ▶ Resource-dependent nations and industries competing for security of supply

Area	Supply	Demand	Complications
Asian markets	New LNG capacity is geographically concentrated in Asia	<ul style="list-style-type: none"> ▶ Global consumption of gas is forecast to increase by 510 bcm from 2010-2016. China, India and Taiwan are the biggest importers. ▶ China demand for oil is expected to double between 2009-2035. By 2030 it will consume more than any other country or region. 	<ul style="list-style-type: none"> ▶ Concentration of supply could result in infrastructure constraints and workforce shortages, leading to production delays. ▶ Government and private investment is needed to build the necessary infrastructure. ▶ Civil disturbances and political turmoil in these countries could negatively affect China's energy security.
Colombia	Colombian oil production and foreign investment have soared due to favorable market conditions implemented by the government.	Global oil demand	Social unrest, vandalism, and guerrilla insurgents are still a presence in regions expected to be the next frontier in Colombian oil exploration.
Arctic	Arctic Circle is estimated to contain as much as 160 billion barrels of oil, with much of it under the seabed.	Resource nationalism pushes IOCs to more challenging frontier regions to gain access to reserves.	<ul style="list-style-type: none"> ▶ The US, Canada, Russia, Norway and Greenland/Denmark all have territory in the Arctic. Russia is gathering geological evidence to support its claims to certain ridges. ▶ Extreme weather conditions, deep water and remoteness would magnify calamity of a spill.

Emerging markets—investments target resource-hungry consumers



Brazil

- ▶ Discovery of several potentially huge fields in the "pre-salt" layer of the deepwater offshore has opened a new frontier
- ▶ Discovery triggered a reassessment of the Brazilian regulatory model. Government wants to do the following:
 - ▶ Attract international capital to fund the development of these complex resources
 - ▶ Create a national development fund for infrastructure, education, housing and social services
 - ▶ Build a strong, technologically sophisticated domestic OFS industry

Australia

- ▶ More than \$250 billion of LNG projects planned or under construction
- ▶ Pilbara region iron ore development includes \$48 billion dollar Port Hedland expansion and various joint ventures to build related infrastructure and ensure sustainable water supply
- ▶ 2011 flooding and cyclone interruptions affect supply chain. Coking coal contracts between Australia and Japanese buyers up 44% to \$330/tonne—the highest contract price ever



Emerging markets—investments target frontier plays



Liberia

- ▶ African Petroleum has completed drilling the first well (Apalis-1) in deep water offshore Liberia
- ▶ US\$5 million from World Bank for programs to increase interest by private sector
- ▶ Unstable security situation and war in Sierra Leone are barriers to international investment

and others...

Equatorial Guinea

- ▶ Upstream oil industry is key to the economy and is growing rapidly with expanding foreign interest and investment
- ▶ US hydrocarbon producers announced \$7 billion in new investments starting in 2008. China began drilling offshore in 2009
- ▶ Per capita income rose from \$590 in 1998 to \$37,900 in 2010. Oil accounts for more than 81% of government revenue
- ▶ De-listed from EITI in 2010, but President Obiang intends to reapply

Poland

- ▶ Shale gas = ~300 years' domestic consumption
- ▶ Could turn Poland from an energy importer to a major exporter and reduce energy dependence on Russia



Resource management key to protecting significant investments

Increased scrutiny globally over the environmental footprint of oil/gas development has increased risk component for market participants. However, areas where increased transparencies and reputations exist will help.

- ▶ **Country perspective:** Unstable investment, regulatory and political regimes are counteracting mineral attractiveness, resulting in perceived high risk of corruption
- ▶ **Financial transparencies:** Emerging players are adding complexities such as increased JV partnerships and NOCs increasing the need for standards and governance of funding
- ▶ **Operational efficiencies:** Technological and geographic challenges exist, resulting in greater financial and operating risks and increasing desire to find/adopt proven practices and metrics

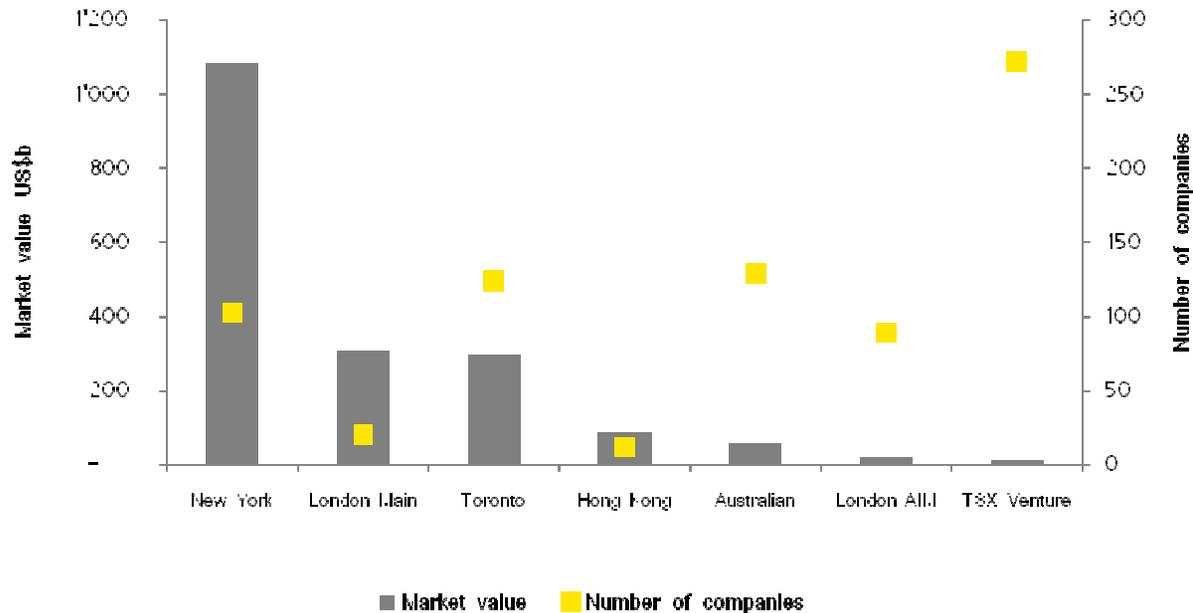
Regulatory changes will make companies increasingly responsible for fraud and corruption activities:

- ▶ **UK Bribery Act**
- ▶ **US Foreign Corrupt Practices Act**
- ▶ **Dodd-Frank Act**

Financing of the global resources industries plays a vital role...

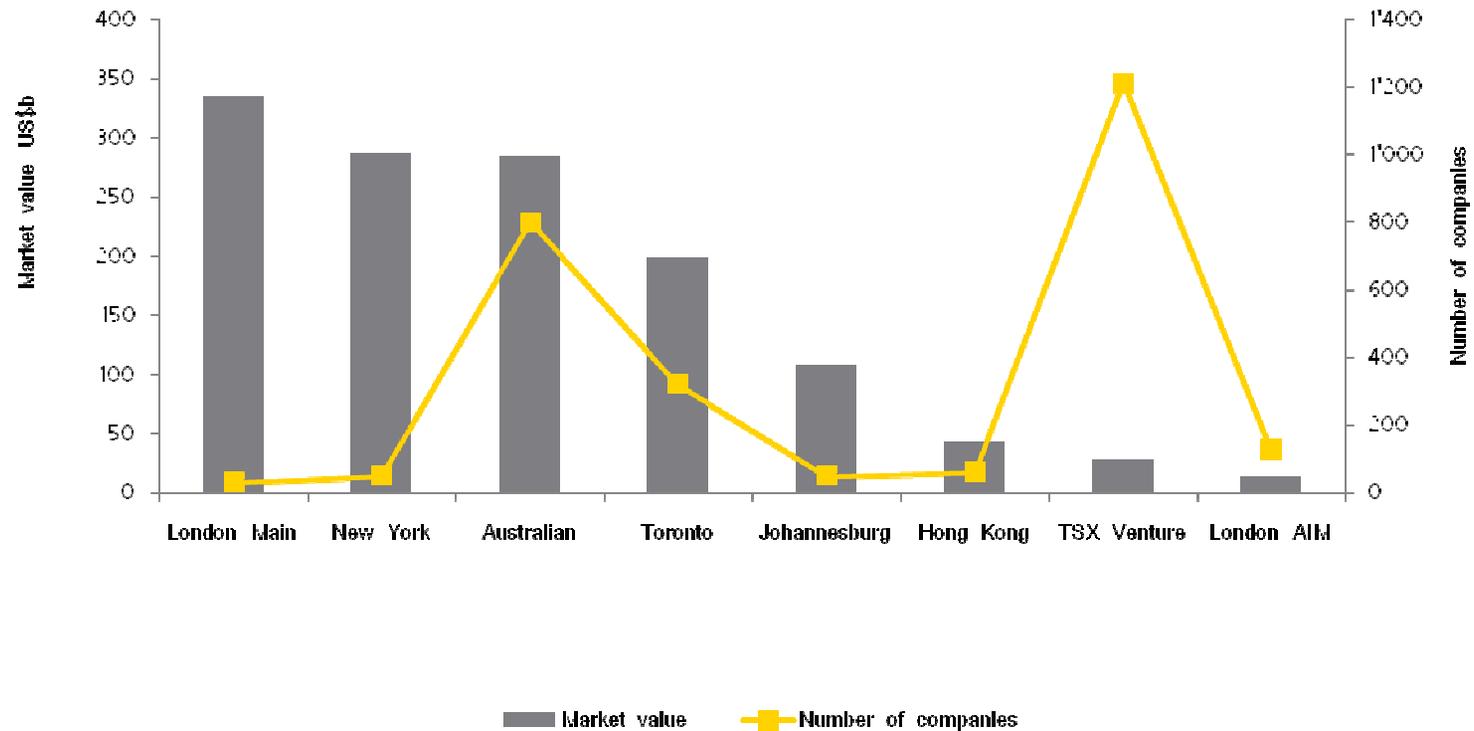
- ▶ In 2010, FDI flows into developing economies totalled US\$573.6 billion, a 45% increase from 2000.
 - ▶ Almost 52% of total petroleum and gas exporter FDI, or \$65.5 billion, is targeting developing countries.
- ▶ Major petroleum and gas exporters' FDI increased 540% to \$128 billion in 2010, compared to \$20 billion in 2000.

Value and number of oil & gas companies by primary exchange of listing



Financing of the global resources industries plays a vital role

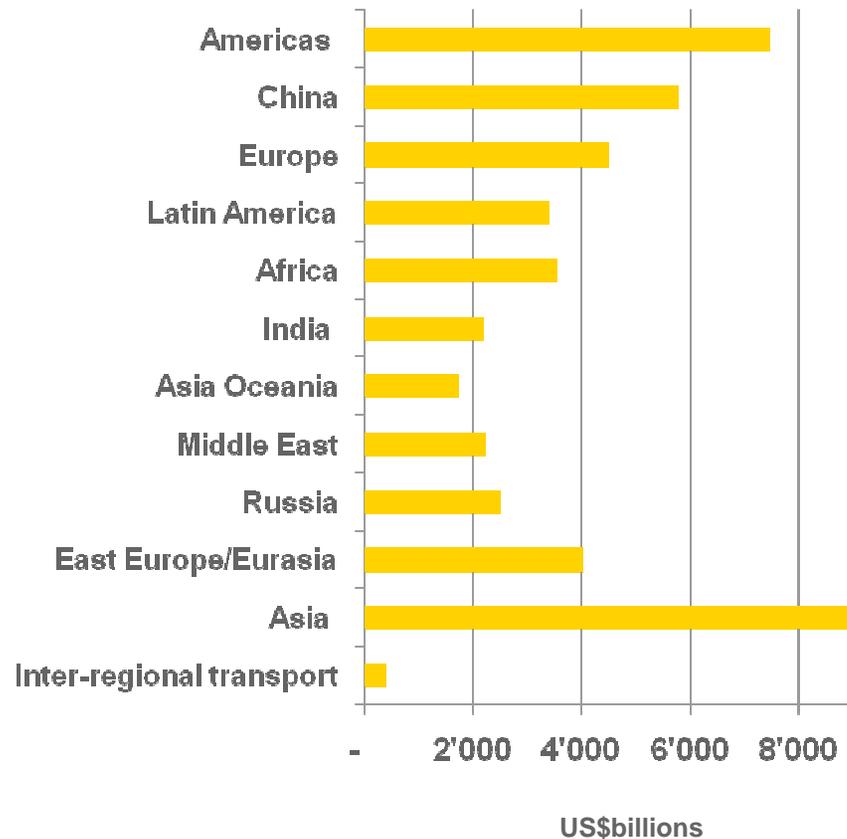
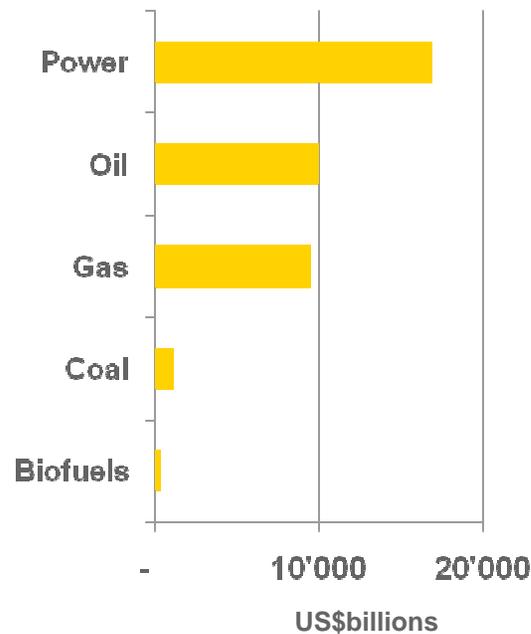
Value and number of mining & metals companies by primary exchange of listing



Source: Ernst & Young, Thomson Datastream. Value of primary listing converted to US\$, as at 30 September 2011.
*Value on major international exchanges. Does not include domestic-only exchanges.

\$38 trillion in capital needed for energy supply over the coming 25 years

Cumulative investment required in energy-supply infrastructure, 2011–2035



2011 forecast rose 15% from 2010, due to increased uncertainty of energy policies, fiscal regimes, and mounting project costs

Source: IEA, World Energy Outlook, 2011.

Access to capital remains a challenge

- ▶ Regulated change is affecting capital flows
 - ▶ Impacts for risk weightings of capital allocation
- ▶ Financial systems have improved and systemic risks reduced, but credit/capital markets remain somewhat constrained
- ▶ China and India have implemented export tax hikes in a bid to keep product in country
 - ▶ 25 countries have announced or implemented mining tax increases

DEBT

- ▶ Banks are beginning to lend again but only to the strongest
- ▶ Risk aversion and shorter-term investment appetite is impacting the traditional project finance model
- ▶ Recapitalisation of the banking sector will be an ongoing process

EQUITY

- ▶ Equity markets remain volatile
- ▶ Maintaining credit ratings via a healthy balance sheet remains a priority
- ▶ Ongoing disposal programmes
- ▶ Corporate risk under severe scrutiny
 - ▶ Aftermath of Gulf of Mexico spill

Tax contagion: Spreading resource nationalism

Tax contagion (2010-2011)



Resource nationalism — implications

75–80% of the world's reserves are controlled by national governments.



Expansion into emerging and frontier markets is creating a greater focus on sovereign risk, notably security of tenure and changes in mining, tax and royalty regimes.

Heightened importance of public-private partnerships

Multi-stakeholders' processes concerning energy and environmental strategy as well as policy are critical

- ▶ Minority asset stake sales by governments in NOCs and state-owned assets to raise investment capital and increase accountability
- ▶ Allow infrastructure investment by customers in return for offtake
- ▶ Hone strategic partnerships
- ▶ Share cost and accountability when developing significant new frontiers

Underlying EITI Principles

- ▶ Prudent use of natural resource wealth should be an important engine for sustainable economic growth
- ▶ Natural resource wealth should be managed for the benefit of a country's citizens and national development
- ▶ Public understanding of government revenues and expenditure over time will help public debate and inform choices
- ▶ Financial transparency by governments and business in the extractive industries is critical and should enhance the environment for domestic and foreign direct investment
- ▶ High standards of transparency and accountability in public life, government operations and in business are required

Increased fatalities deepen safety reviews

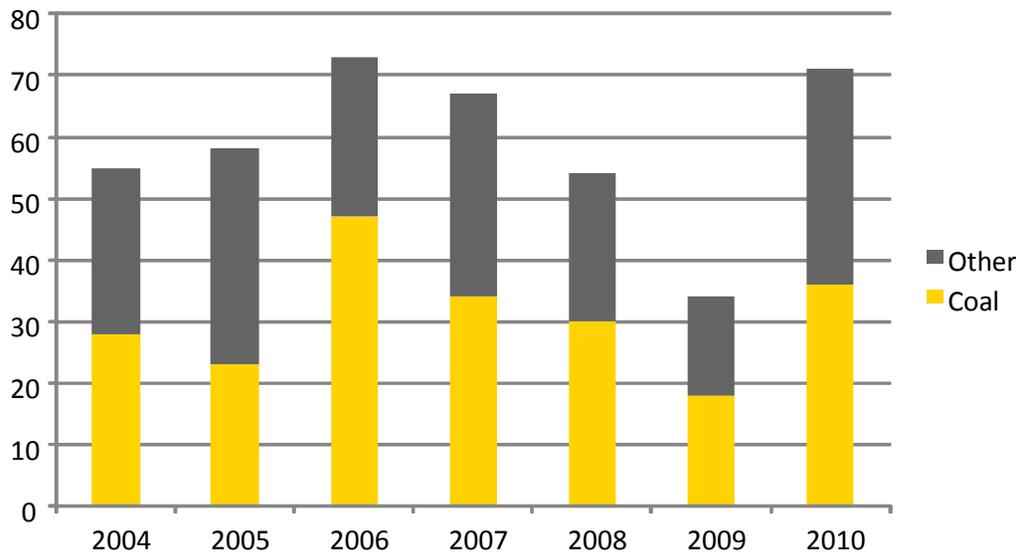
Mining

Improving trend in accident rates in the international mining industry due to increased safety prevention efforts. Countries such as the US continue to tighten regulations and expand disclosure transparency to help reduce accidents

Oil and gas

Regulators watchful on staffing injuries and equipment missteps

Number of fatal injuries in the US mining industry (2004 – 2010)



Fatalities can be prevented by using:

- ▶ Effective safety and health management programs
- ▶ Workplace examinations for hazards
- ▶ Effective and appropriate training

US Department of Labor. Mine Safety and Health Administration

Transparency is key building block for sustainable development

Capital markets

- ▶ Increasing costs can negatively impact credit ratings ultimately impacting debt repayment capabilities. “Maintaining an investment grade credit rating” is at the top of public companies’ capital management agenda.



Regulatory structure

- ▶ Continued uncertainty, particularly with regard to access and liability limits. Compliance requirements and rising customer specifications will sharply raise costs.

Collaboration

- ▶ Industry-sponsored Center for Offshore Safety established to facilitate collaboration and accredit third-party certifiers. Multiple cross-border, inter-agency efforts continue to define, propose and support changes intended to protect people and environment.

Safety standards for energy industry a mixed-bag

Globally, increased awareness and clarification of responsibilities have become more commonplace



Safety measures are expensive, but going without them could be even more costly.

▶ More mature oil and gas markets perceived as less risky

- ▶ Conventional oil and gas operations
- ▶ Well-defined and active regulatory regimes
- ▶ Strong collaboration between industry, government

▶ Shale, CBM and frontier exploration markets challenge existing standards

- ▶ Framework of technical and quality standards for control equipment being legislated
- ▶ Proposed standards for groundwater sampling to check contamination levels

Four critical components

- ▶ Contingency planning/preparedness, particularly with regard to evolving well design parameters
- ▶ Equipment design, testing and certification
- ▶ Processes, procedures and training to embed an HSE culture
- ▶ Communication/collaboration between and among operators, contractors and service providers

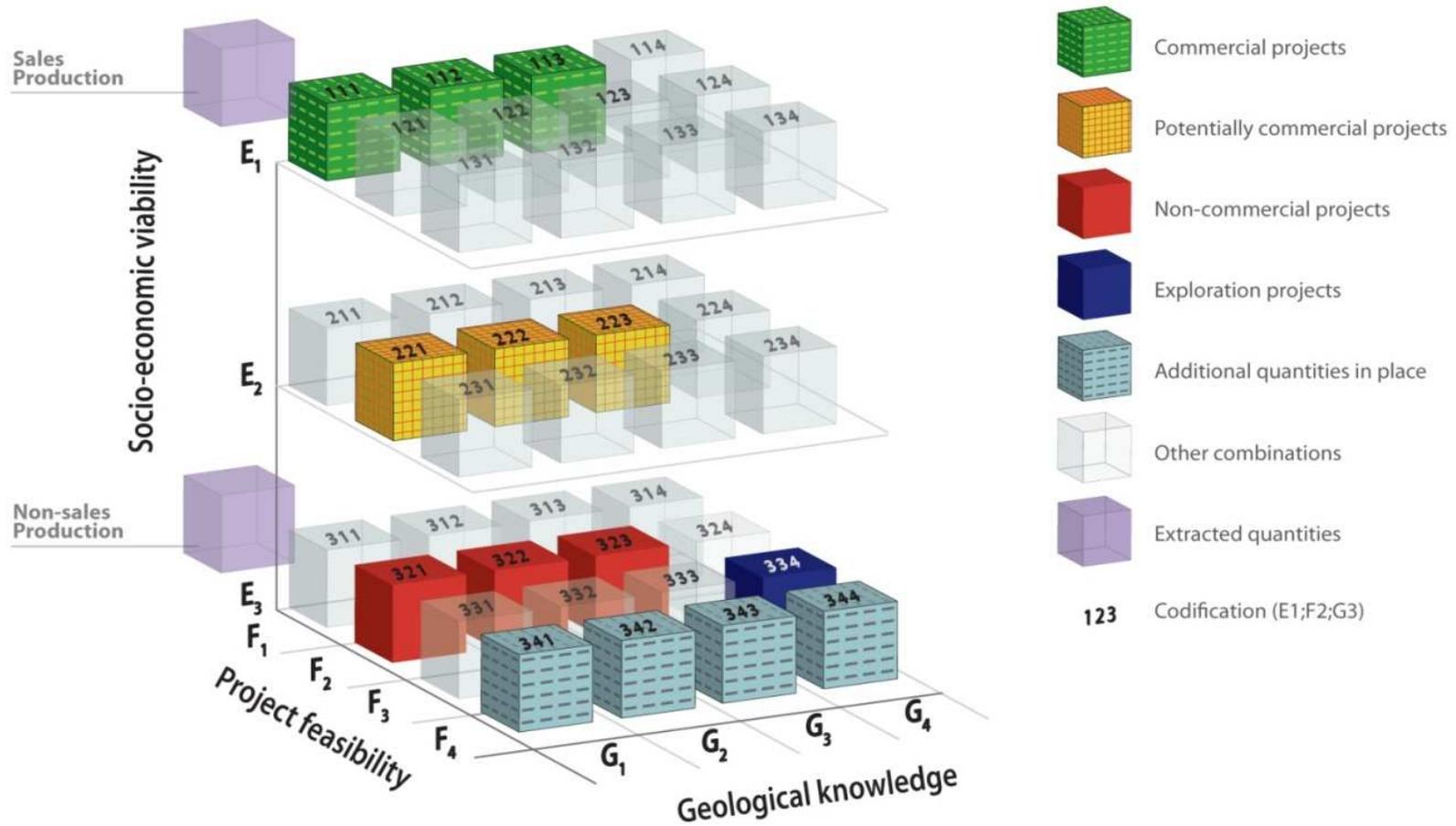
How has the global community responded?

- ▶ Increased efforts to improve EHS practices:
 - ▶ US legislating stricter standards for well control systems and operational practices to reduce the risk of disasters caused by human error
 - ▶ European Commission envisages comprehensive EU legislation on oil platforms “aimed at ensuring the highest safety standards in the world”
 - ▶ US shale gas development challenged by potential pollution and water safety regulation at state and federal levels

- ▶ Increased proposals to increase transparency and improve governance in the extractive sector:
 - ▶ EU considering applying new rules on disclosures paid to governments for exploration, production, processing and distribution
 - ▶ Would oblige company disclosure of profits and sales in countries where they operate

- ▶ CSR efforts multiplying as result of increased oversight demands

UNFC-2009 – examples of classes



Conclusion

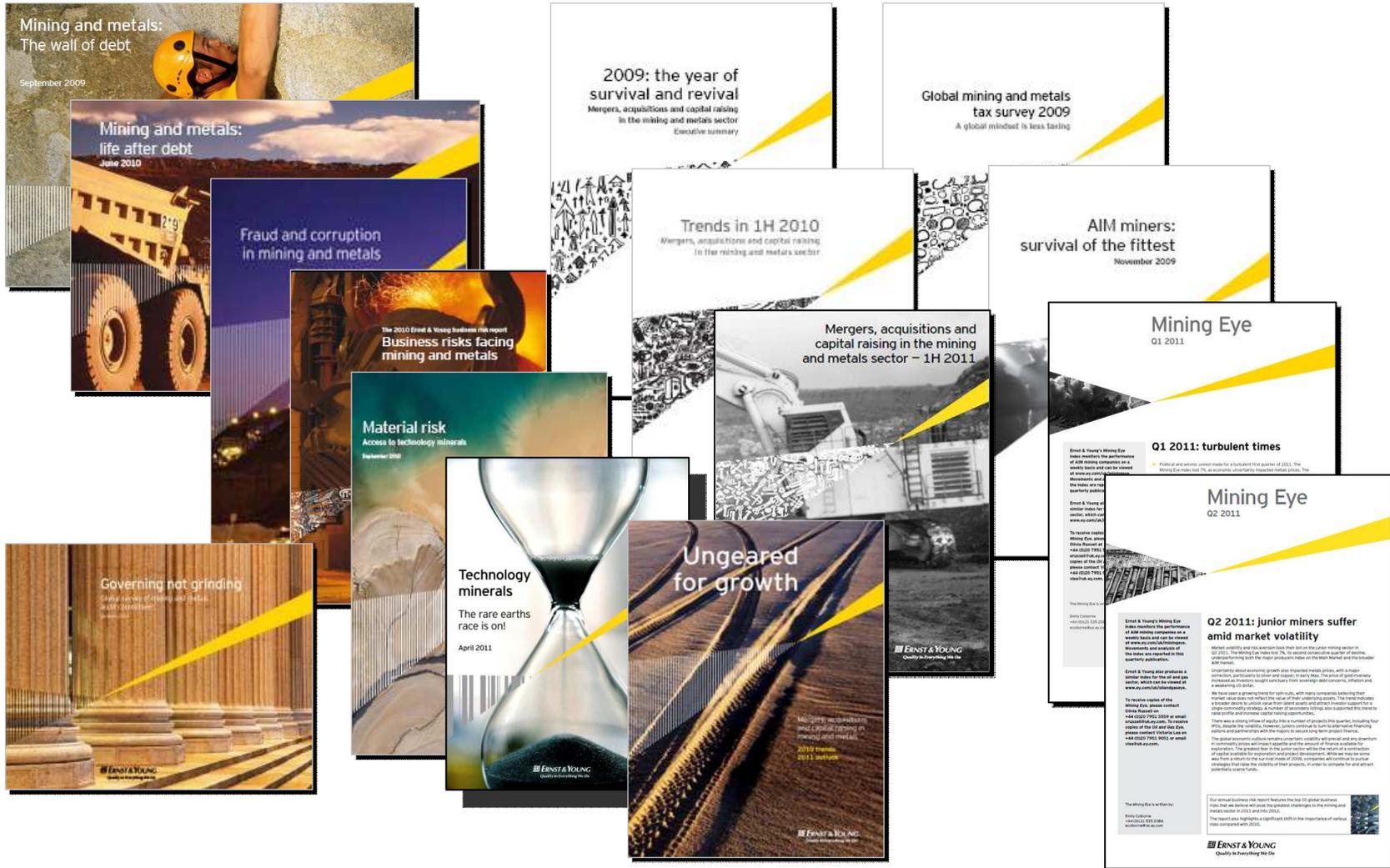
The drive for improved operational efficiencies in extractive industries is increasing

- ▶ More collaborative and cross-border initiatives by industry, governments and the public
- ▶ Increased pressure for standardized metrics and more clearly understood disclosures
- ▶ Growing acknowledgement of the importance of recognized global frameworks

Energy is everybody's business...

Our views and opinions

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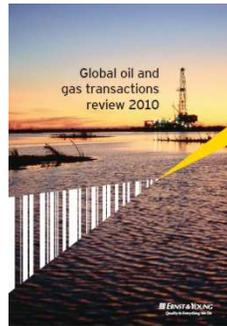
The 'Hot Topics' and Market Alert 'series examines current industry and regulatory developments for the oil and gas sector:



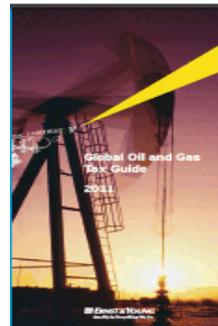
Oil & Gas Eye: A quarterly update of our O&G Eye Index and analysis of the performance of the AIM listed O&G companies



NOC Monitor: A quarterly update of NOC announcements from around the world and EY insights on emerging NOC trends



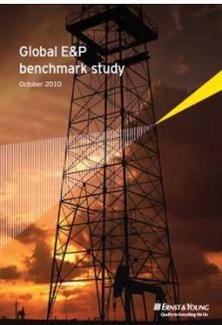
Global Oil & Gas Transactions Review 2010: an annual review of the years transactions and potential future trends



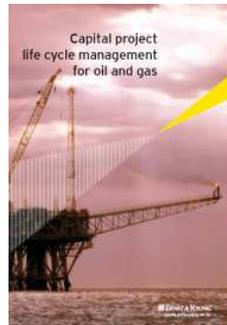
Global Oil & Gas Tax Guide : an annual publication detailing the O&G tax regime in over 60 of the worlds leading O&G fiscal regimes



Turn risks and opportunities into results : an annual look at the top risks and opportunities facing oil and gas companies as compiled by a panel of industry experts



Global E&P Benchmark Study: EY analysis of reserves data and trends from over 100 leading O&G companies



Capital Project lifecycle management: EY's views on how to manage and optimize the capital project lifecycle



The Global Gas Challenge: an analysis of the challenges and prospects for gas markets around the world



Divesting in the Downstream: an analysis of the trends and leading practices when divesting a downstream asset

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Thank you

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UN Expert Group on Resource Classification

<http://live.unece.org/energy/se/reserves.html>

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