



Demand vs Depletion

Long-term oil market fundamentals

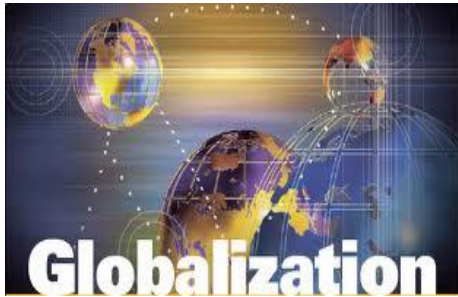
Norges Bank seminar: Modeling and forecasting oil prices
Oslo, 22 March 2012

Klaus Mohn, chief economist, Statoil
and professor II, University of Stavanger Business School

Long-term oil price fundamentals

Shape of supply curve – key to the long-term price level

Demand...

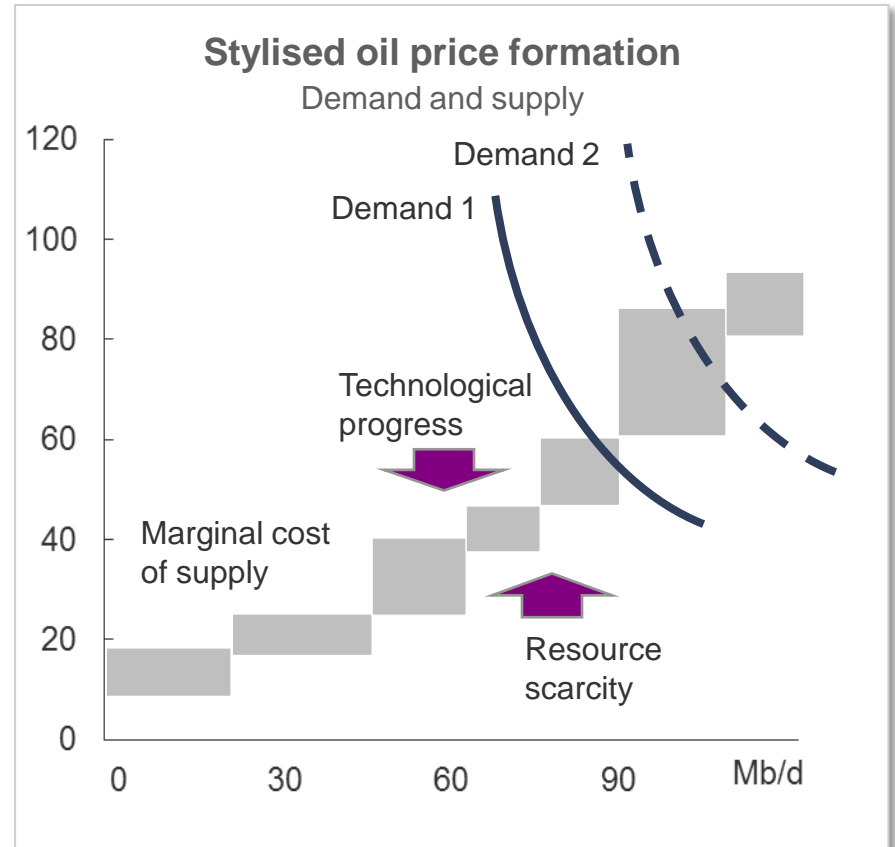


- Economic growth
- Energy demand
- Policy

... vs supply



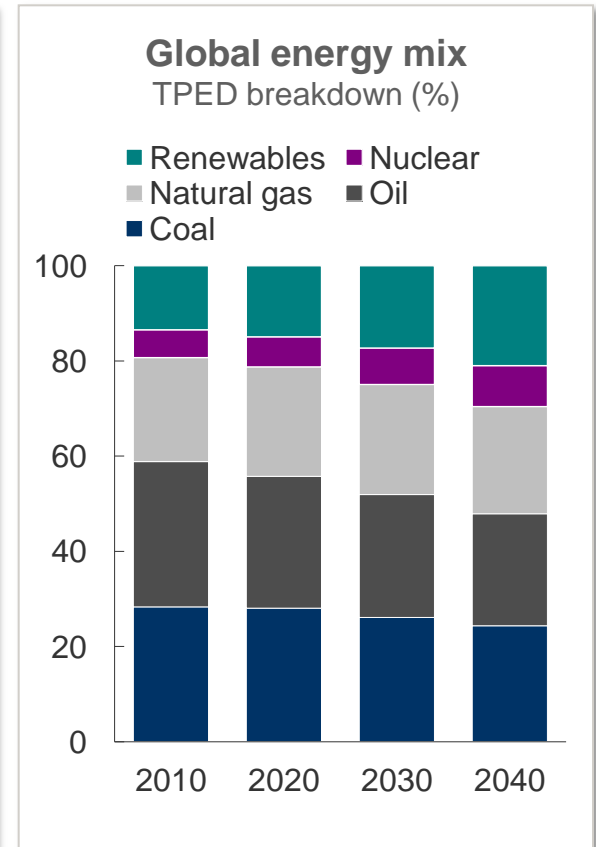
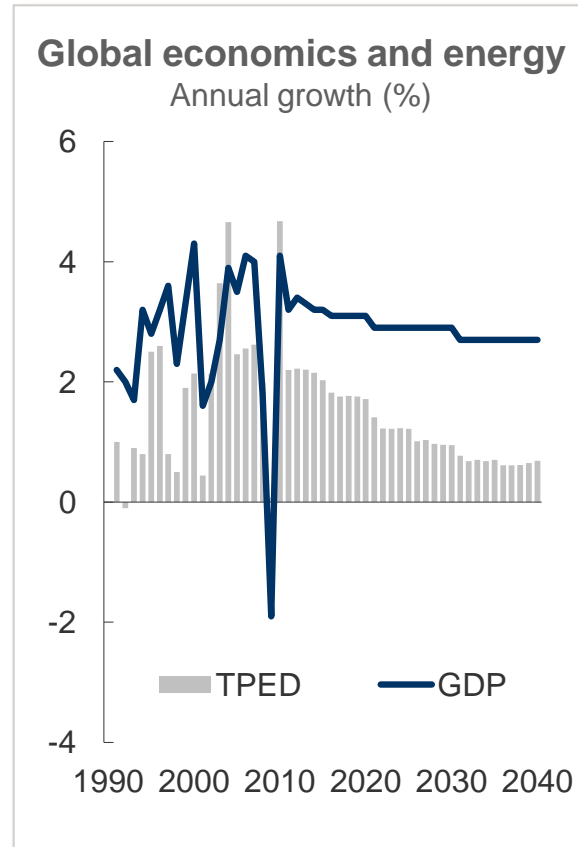
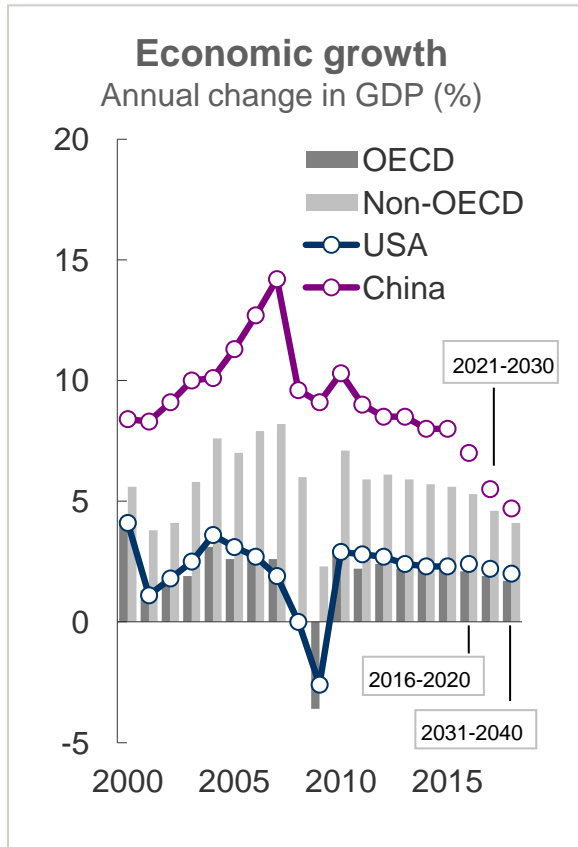
- Exploration
- Developments
- Producing fields



Source: Various consultancies, Statoil.

Energy efficiency enables greener energy mix

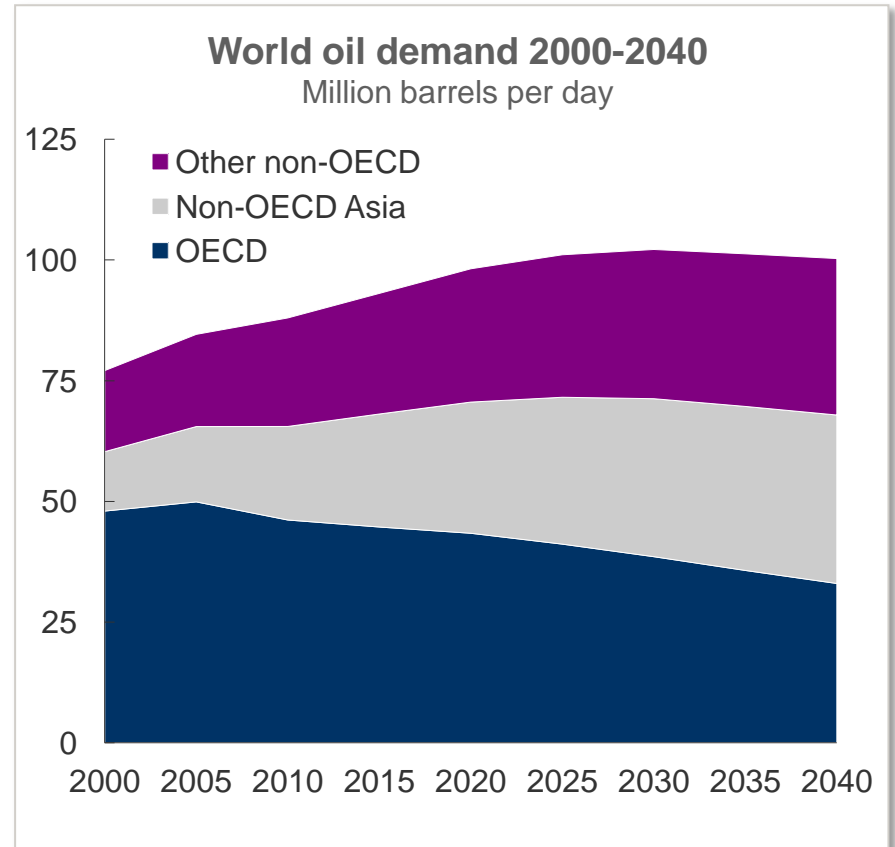
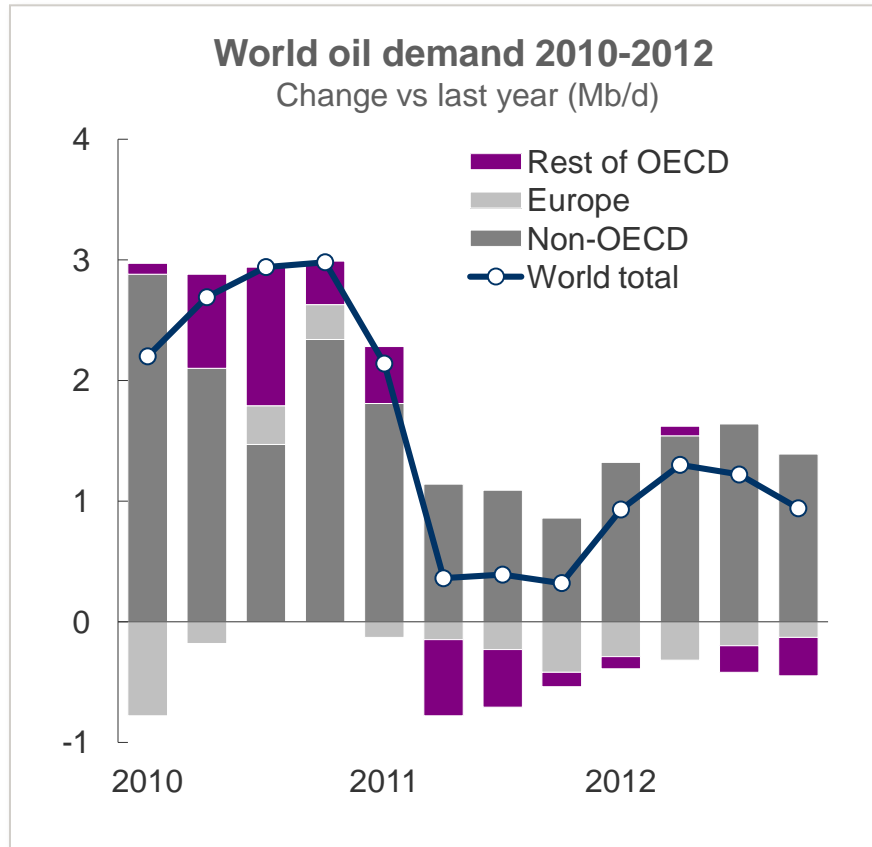
Activity and energy intensity: Economic growth and TPED



Source: Statoil (*Energy Perspectives 2011*).

World oil demand

Demand has already peaked for OECD countries

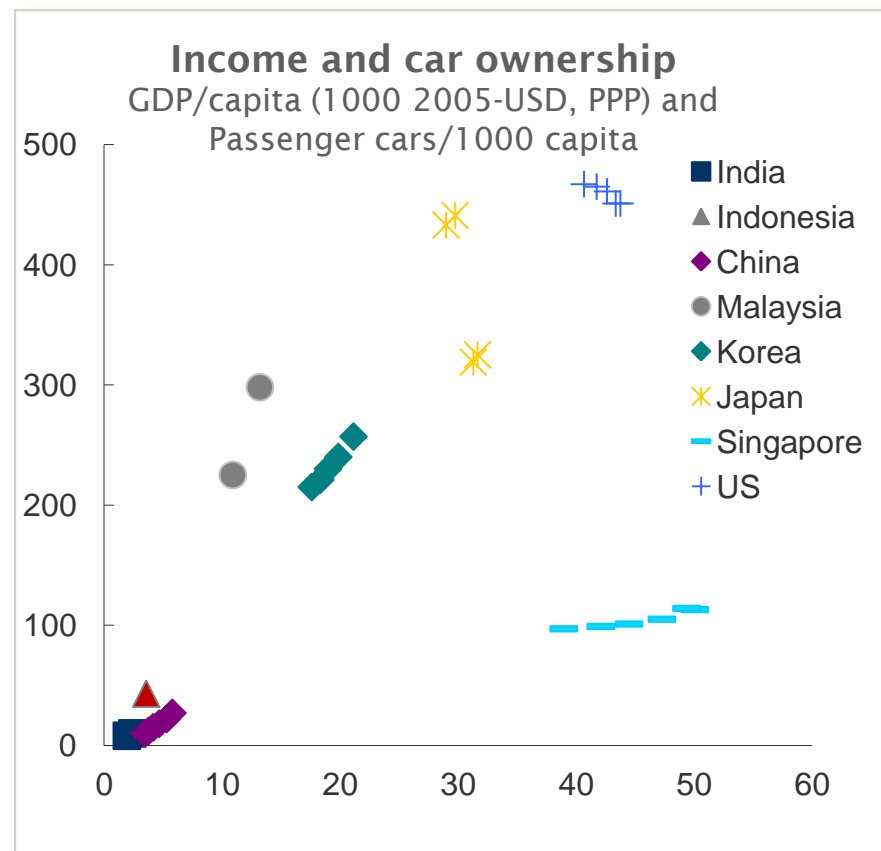


Source: IEA (historical figures), Statoil (*Energy Perspectives 2011*).

Oil demand uncertainty

Driven by economic activity, policies and technology

- Economic growth outlook
- Energy efficiency developments
- Relative prices of energy carriers
- Energy & climate policies
- Choice of transport systems
- Technological progress

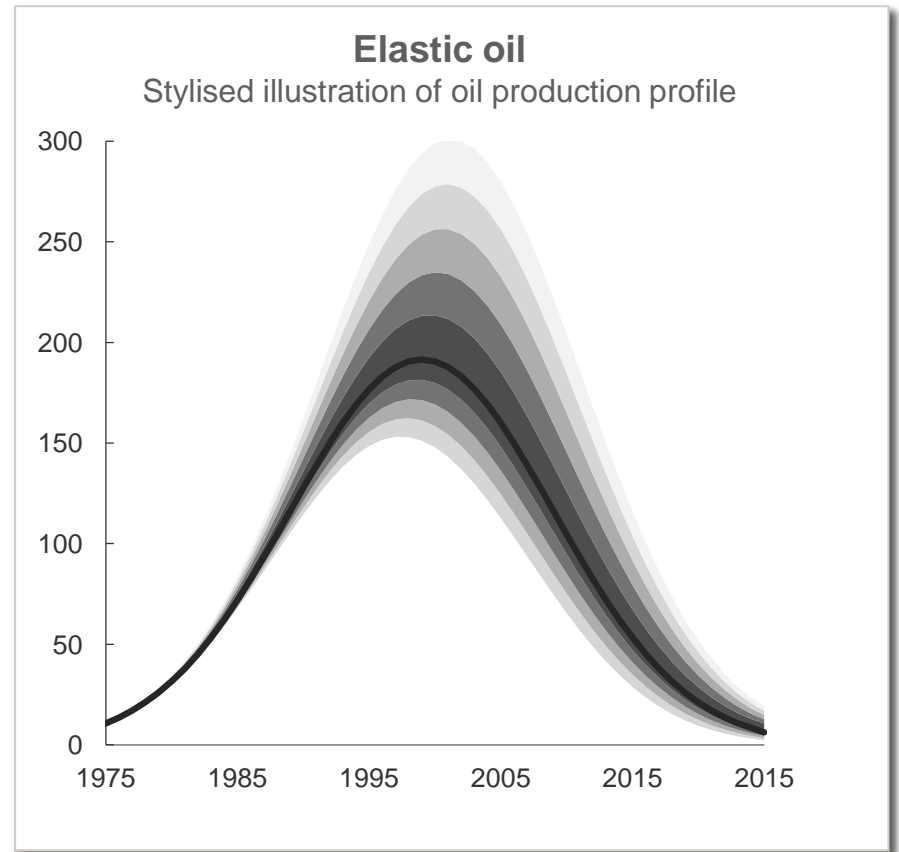


Source: International Energy Agency, World Bank, Statoil.

Oil supply will peak, but no reason to panic

Oil supply responds to economic variables

- Hubbert's peak
 - Pure geophysics
 - Logistic growth
- What role for economics?
 - Technological development
 - Input and output prices
 - Policy regulations
- Investment behaviour
 - Exploration, field developments, IOR
- Emergence of new resources

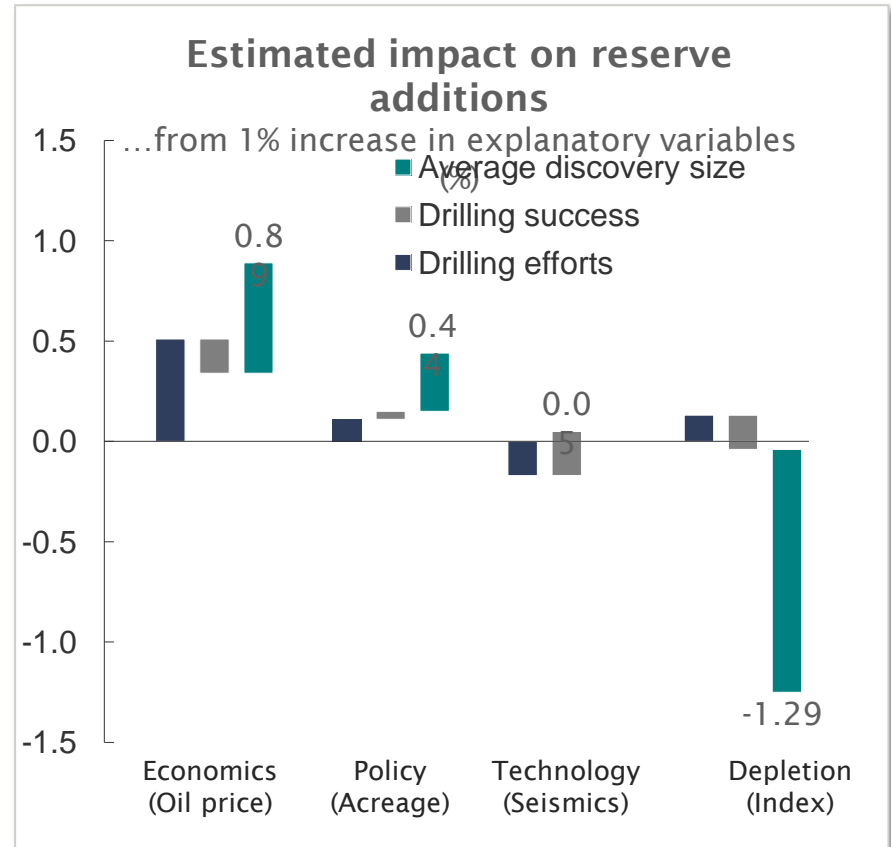


Source: Mohn, K. 2009. Elastic petroleum: A primer on the economics of exploration and production. In Bjørndal E. and Bjørndal, M. (eds.) *Energy, Natural Resource and Environmental Economics*. London: Springer.

Econometrics of oil exploration

Economic variables influence both efforts and success

- Reserve additions de-composed
 - Exploration efforts
 - Exploration success
 - Average field size
- Four explanatory variables
 - Economics (oil price)
 - Policies (acreage awards)
 - Technology (e.g., seismic activity)
 - Resource depletion
- Simultaneous modelling approach

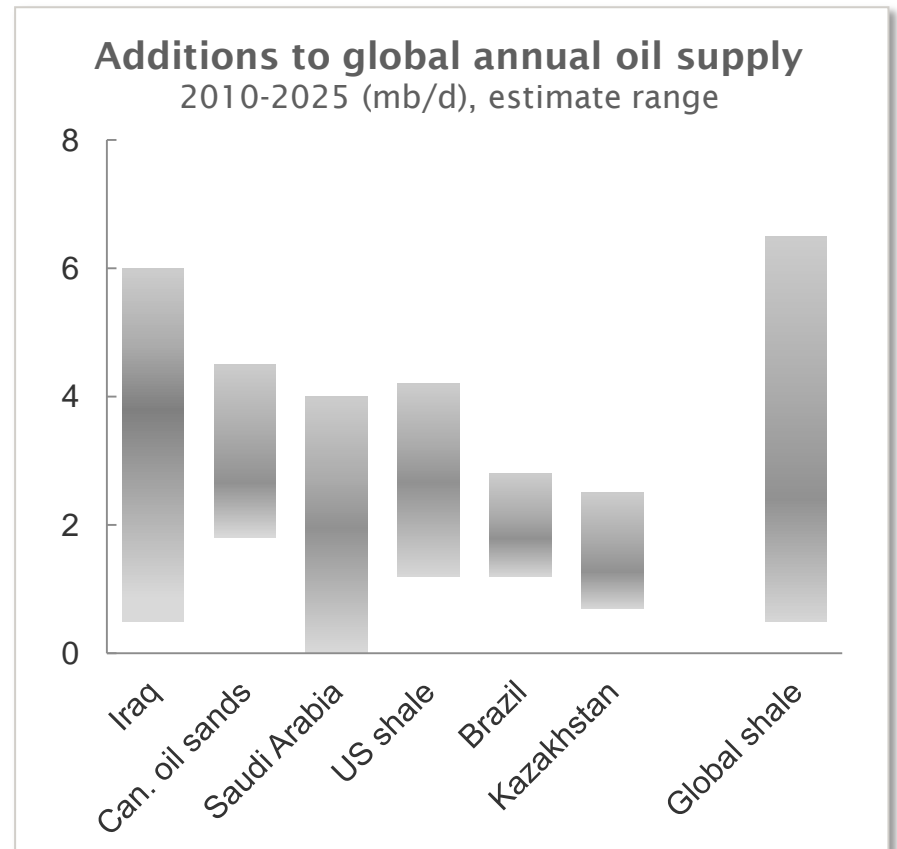


Source: Source: Mohn, K. (2008), Effort and efficiency in oil and gas exploration: a vector error-correction approach. *The Energy Journal* 30 (4), 53-78.

Development of new types of resources

Shale oil in the global oil balance – one of many uncertainties

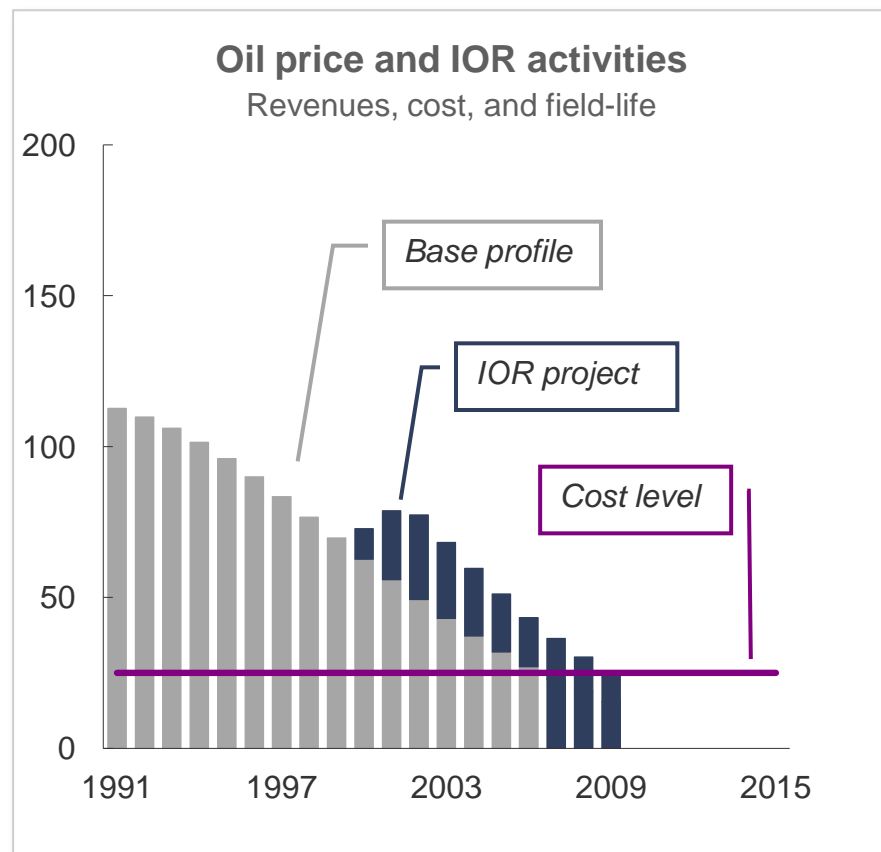
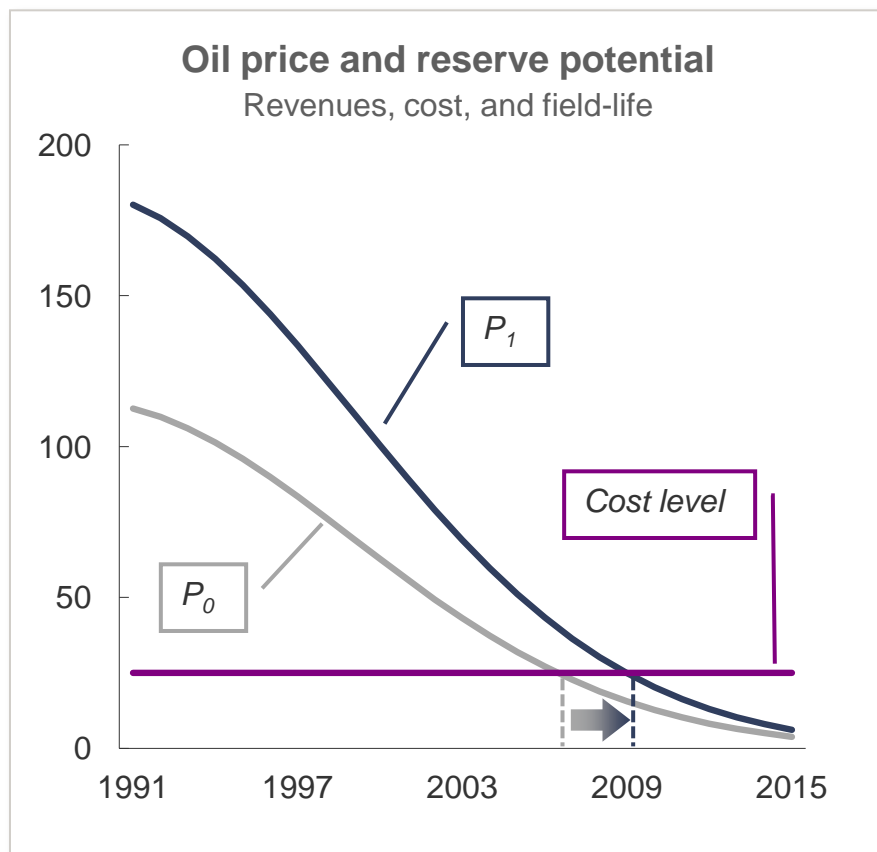
- Shale oil could meet supply challenge
 - Iraq, oil sands, Venezuela EHO, ultradeepwater/presalt, GTL, biofuels
- Oil sands is a relevant comparison
 - Enormous reserves in place, challenging extraction
- Oil to remain a global commodity
 - Global market will cope with US shale volumes
 - International potential is the great unknown



Source: Various consultancies and press reports and Statoil.

Oil price impact on producing fields

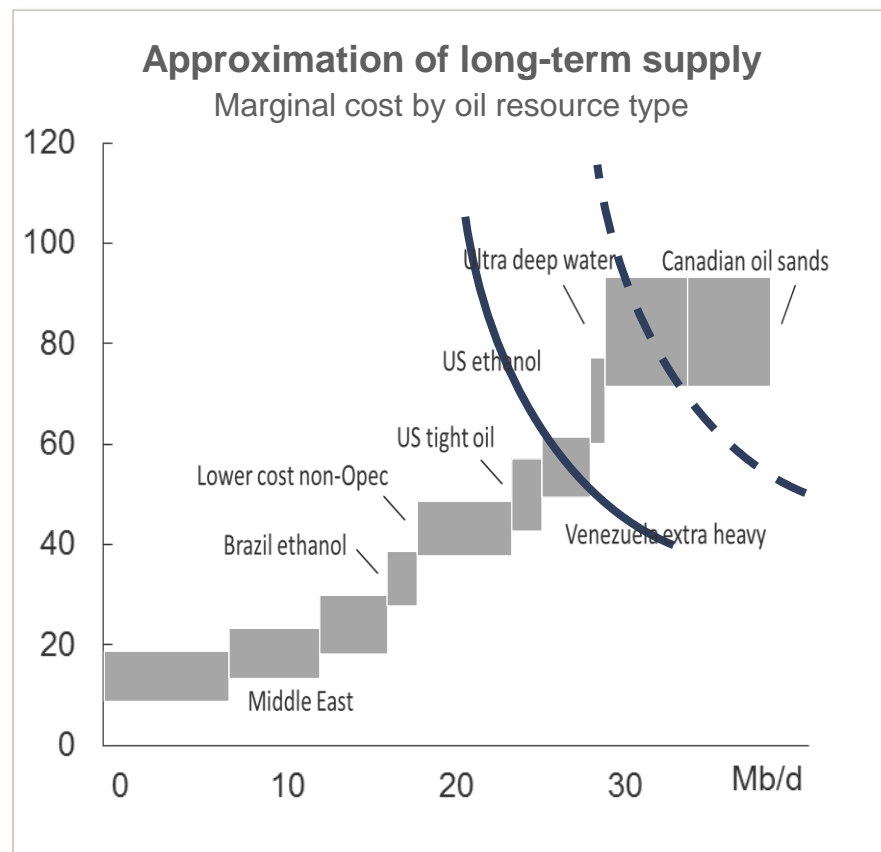
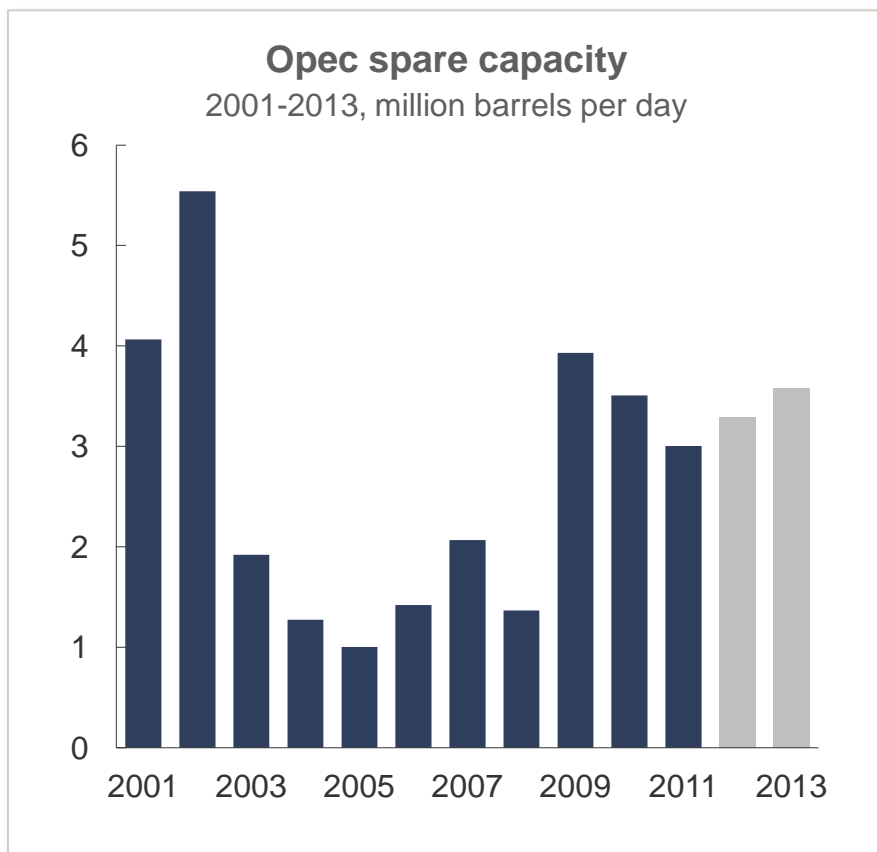
Value and volume implications*



* Literature example: Farzin, Y. H. 2001. The impact of oil prices on additions to US proven reserves. *Resource and Energy Economics* 23, 271-291.

Medium- and long-term price formation

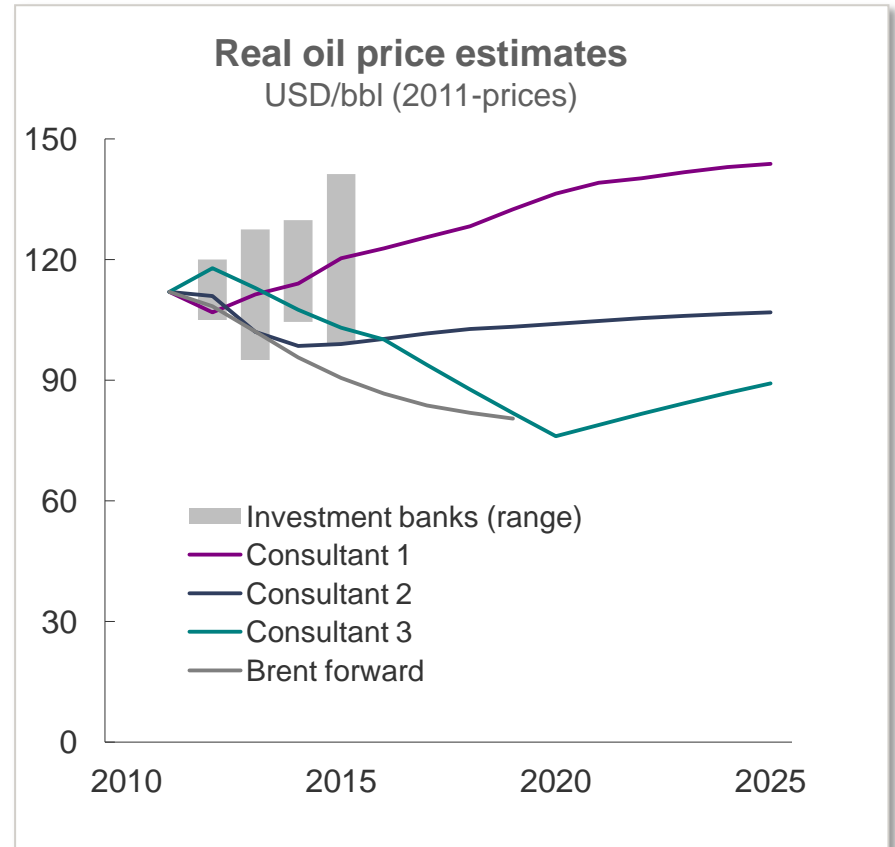
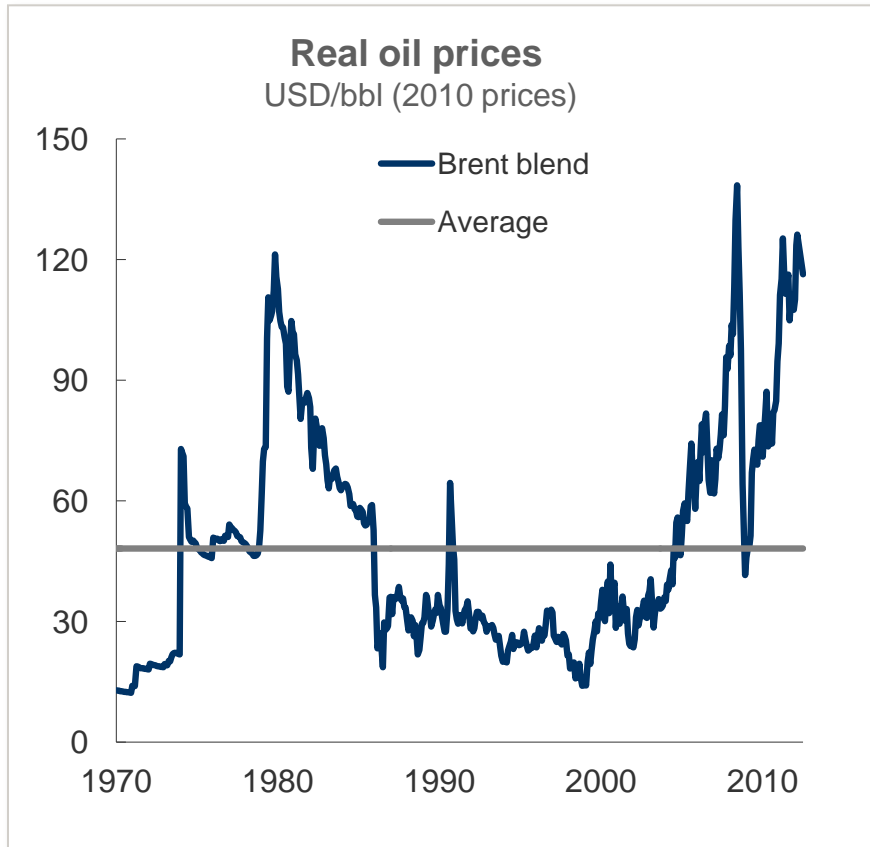
Opec behaviour and non-Opec marginal cost



Source: US Department of Energy (EIA), various consultancies, Statoil.

Oil prices – history and future

Markets and expectations suggest a structural shift

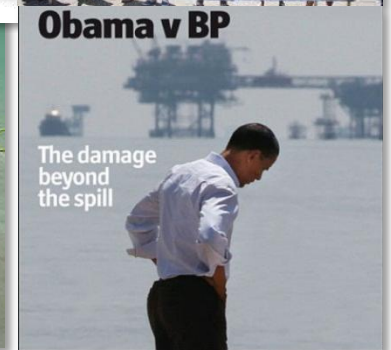
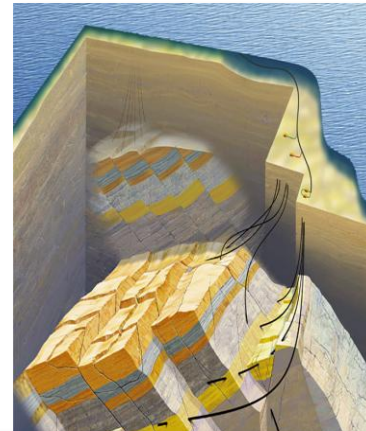


Source: EcoWin, Statoil

The future is uncertain, also for the oil price

Risk factors: The big four

- Underground risk: resource scarcity
 - New resources in the pipeline
- Economic risk: markets and prices
 - Incentives matter for behaviour
- Policy risk: energy & climate policies
 - Energy security
 - Sustainability
 - Mobility
- Technological risk: a wild-card



There's never been a better
time for good ideas

Thank you!

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