



# Review of World Energy

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## Volatility and Structural Change

Christof Rühl  
August, 2009

# Outline

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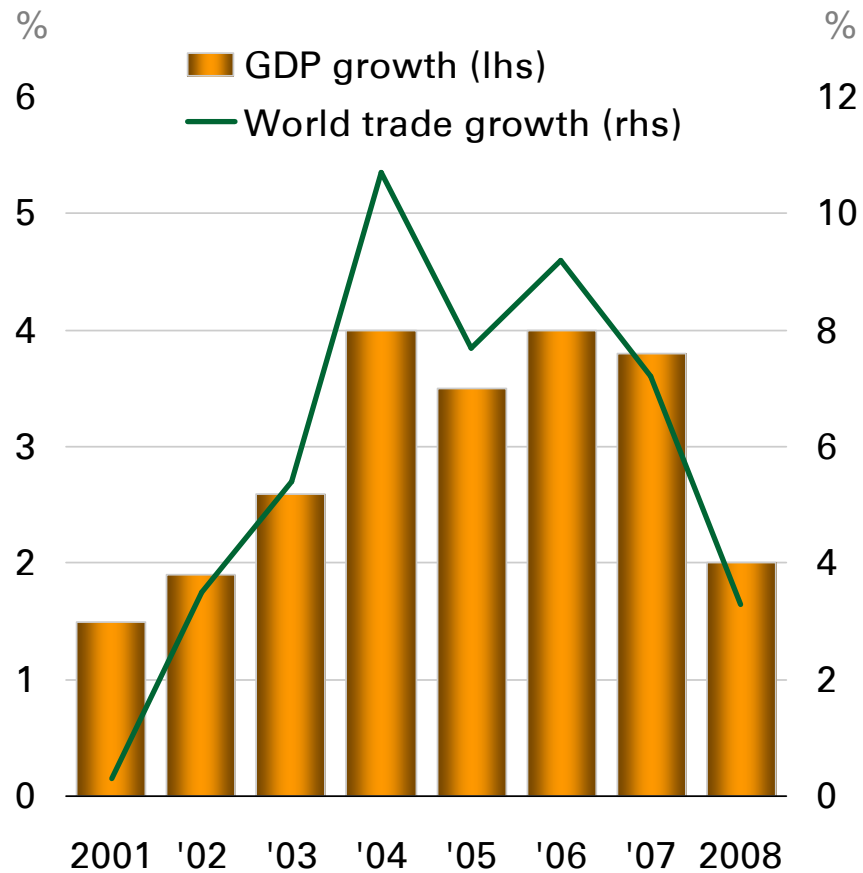


- Introduction
- Volatility and Structural Change
- Fuel by Fuel
- Conclusion

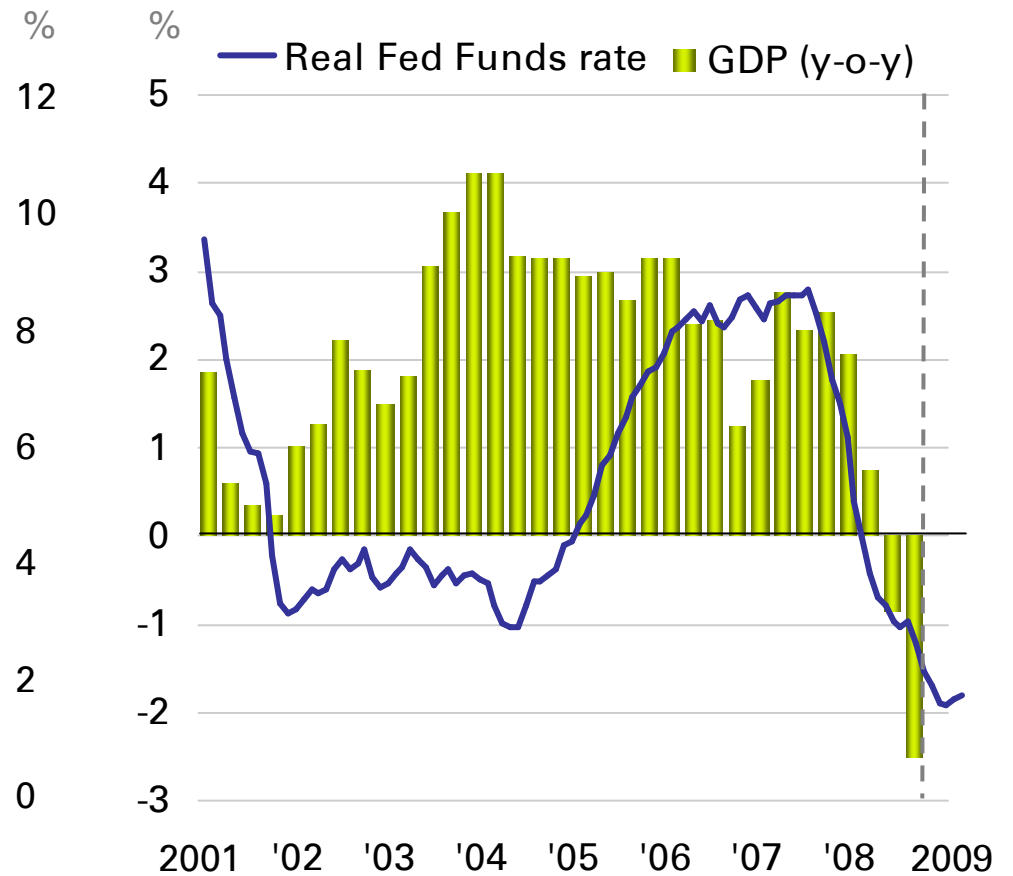
# The Economy



Growth in global GDP and trade



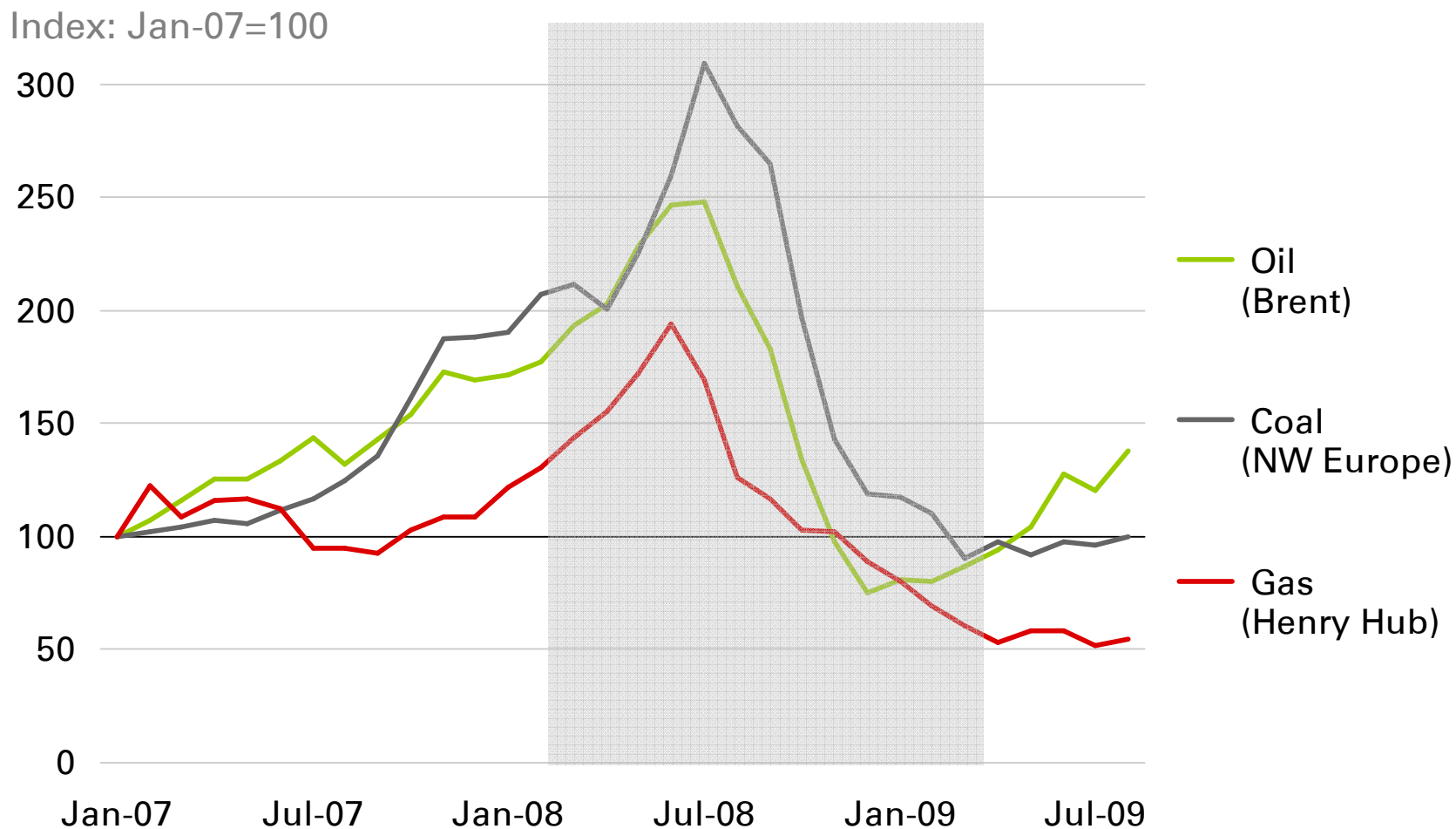
US real policy rates and GDP growth



Source: Includes data from IMF World Economic Outlook and Oxford Economics

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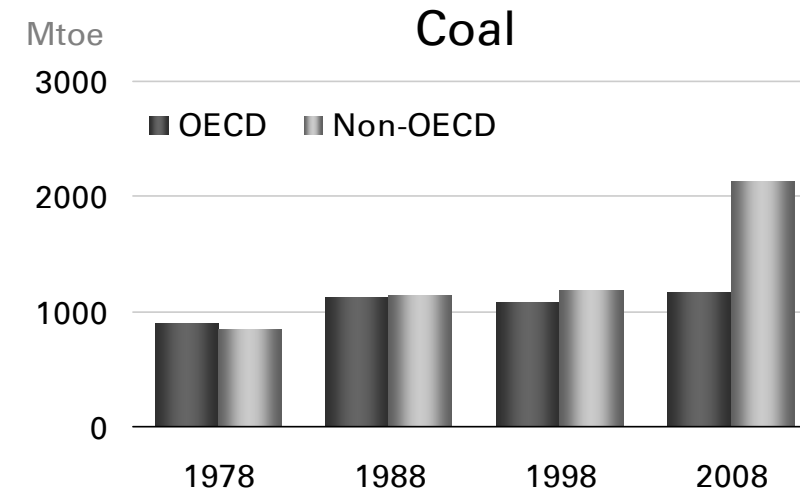
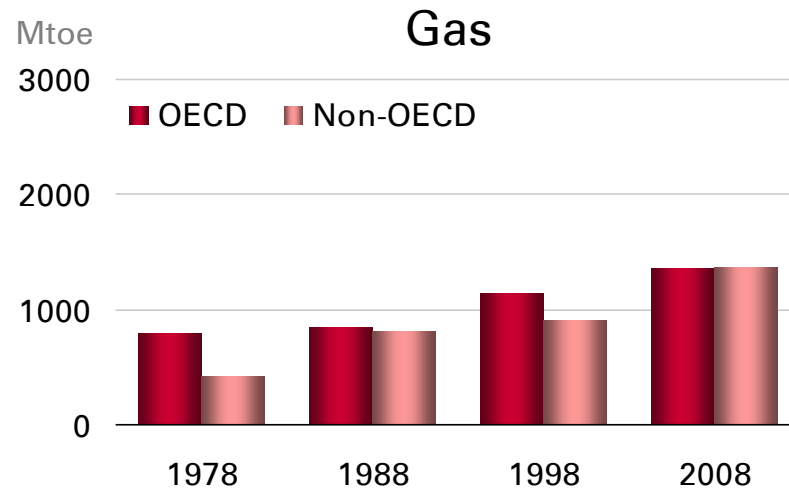
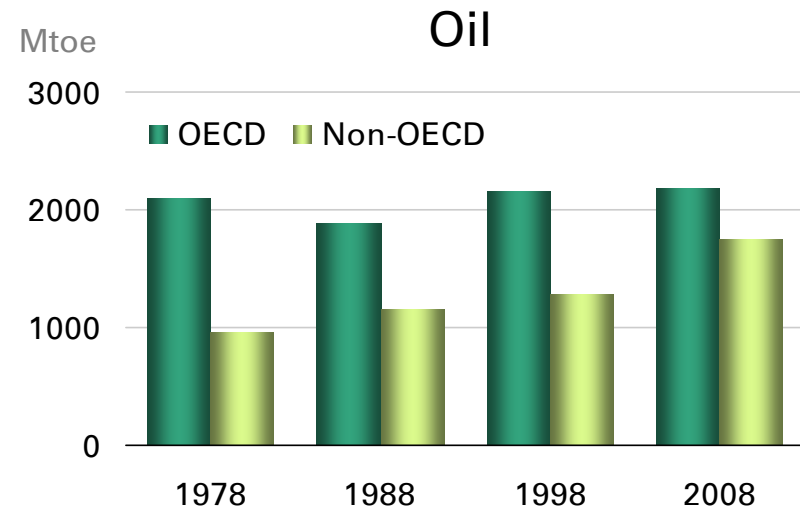
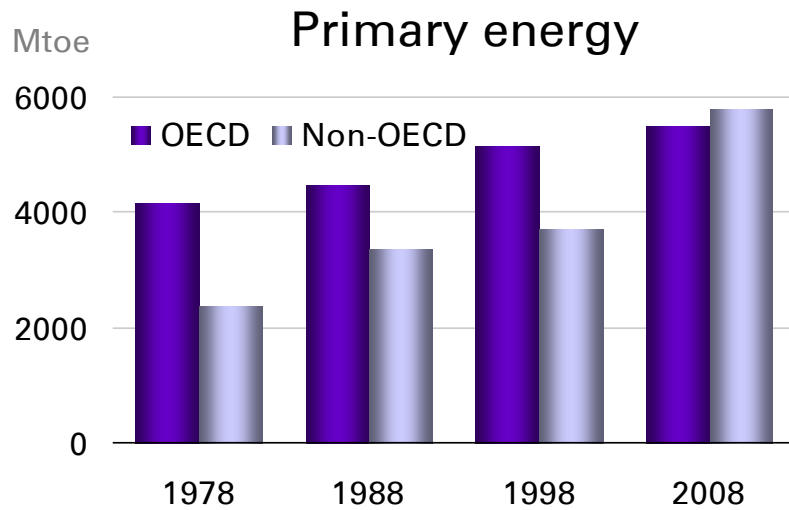
# Energy Prices



Source: Includes data from Platts and McCloskey

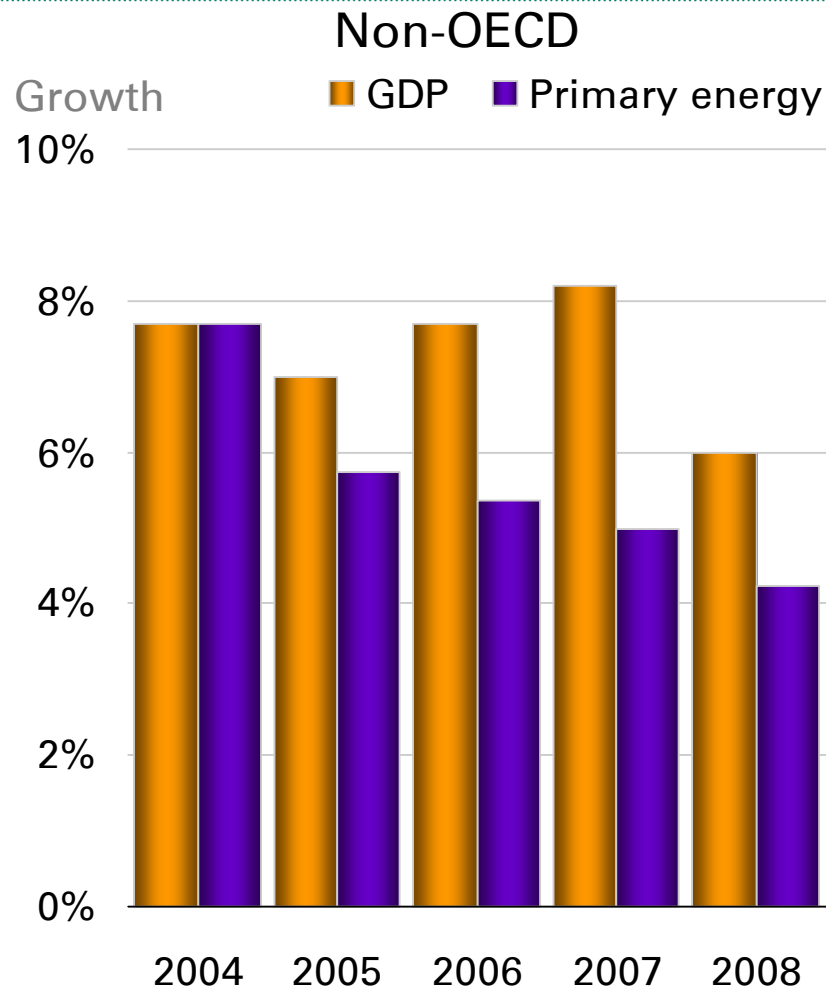
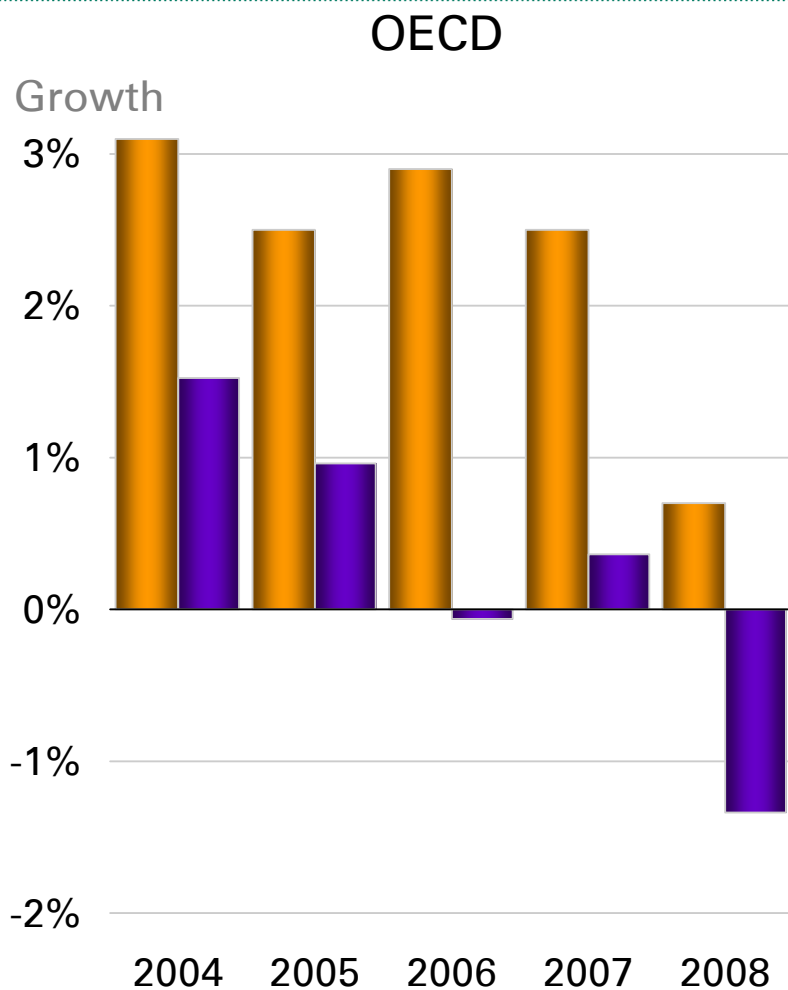
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# OECD and Non-OECD Energy Consumption



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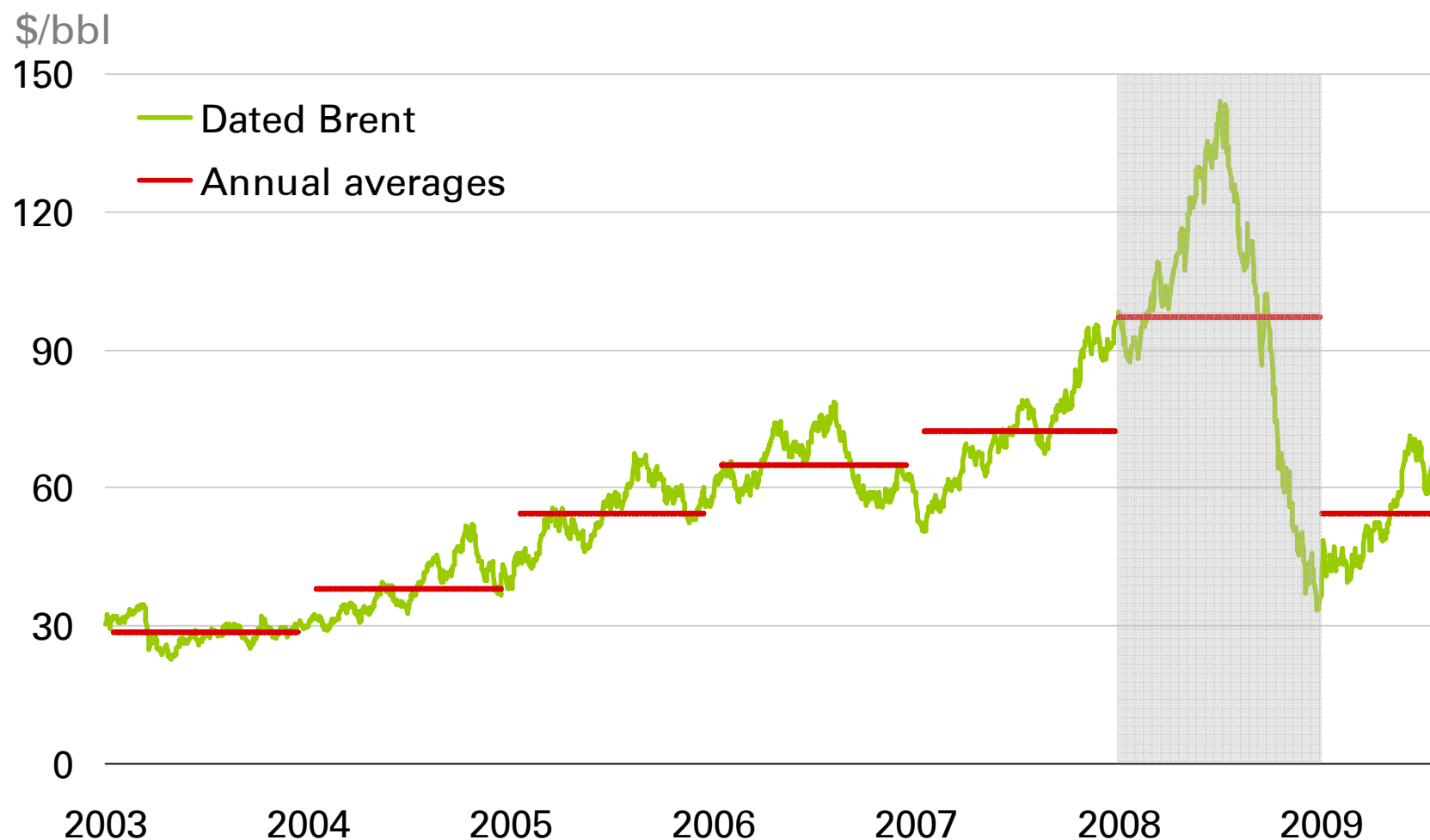
# GDP and Primary Energy Growth



Source: Includes data from Oxford Economics

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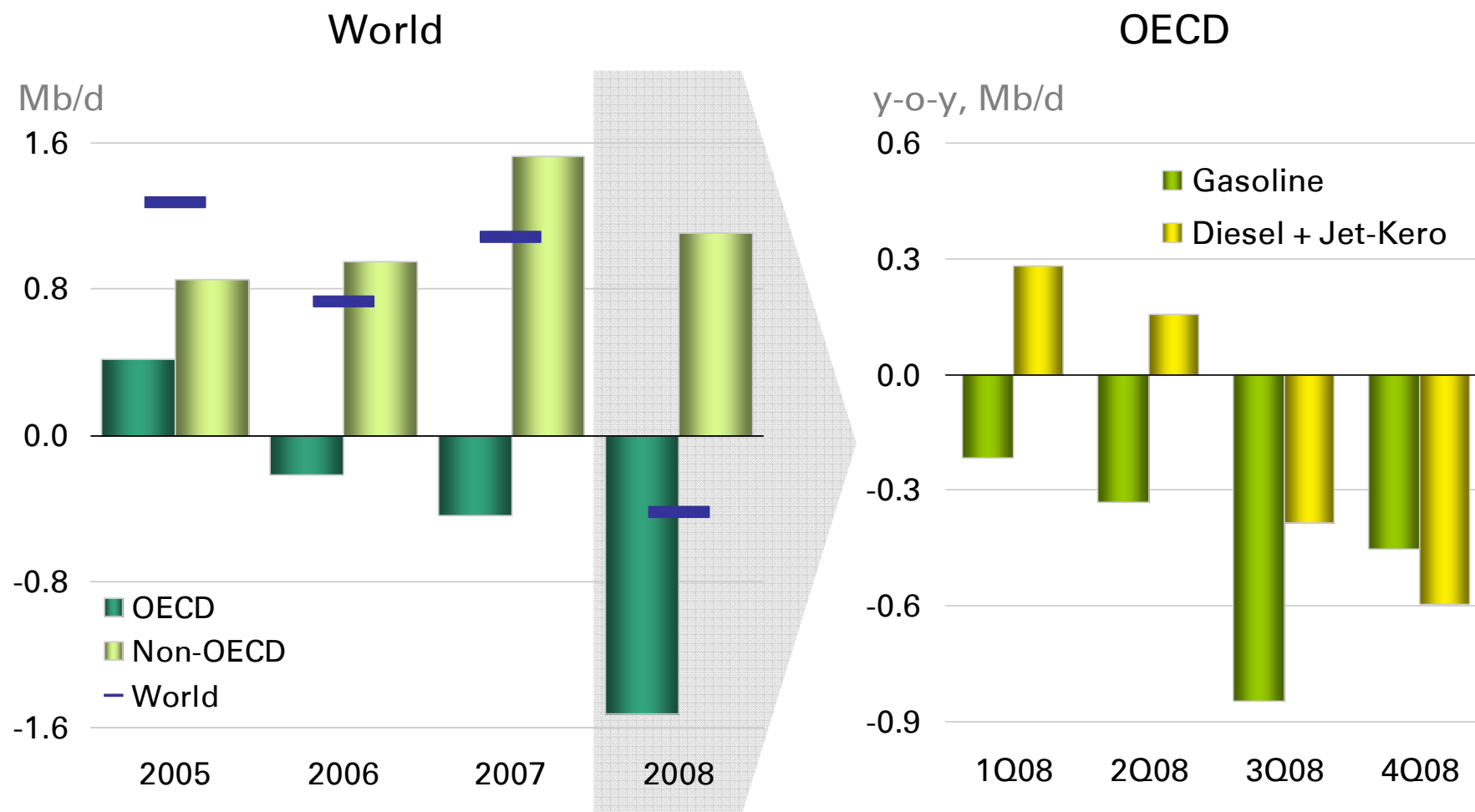
# Crude Prices: What Happened?



Source: Includes data from Platts

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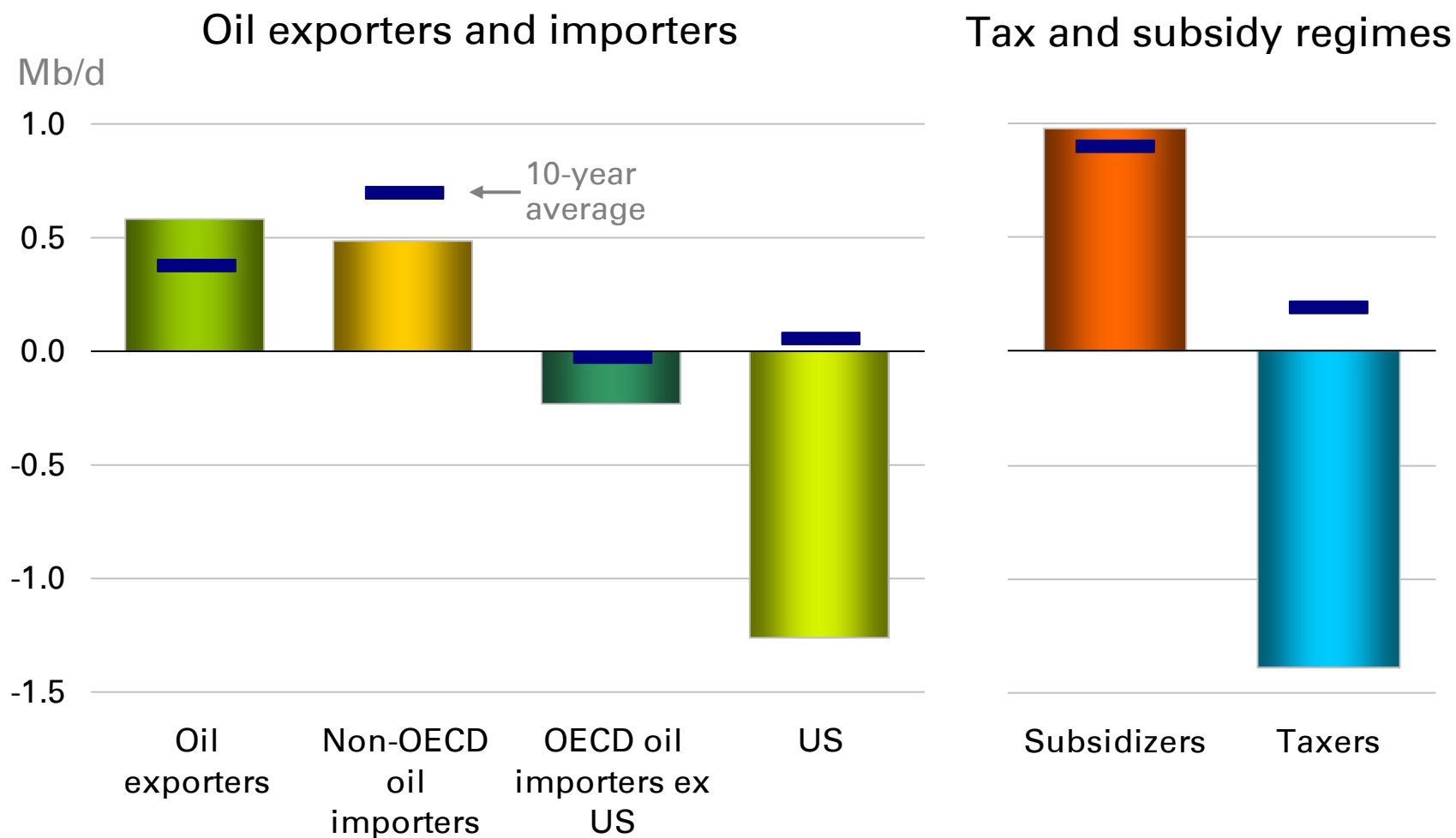
# Oil Consumption Growth



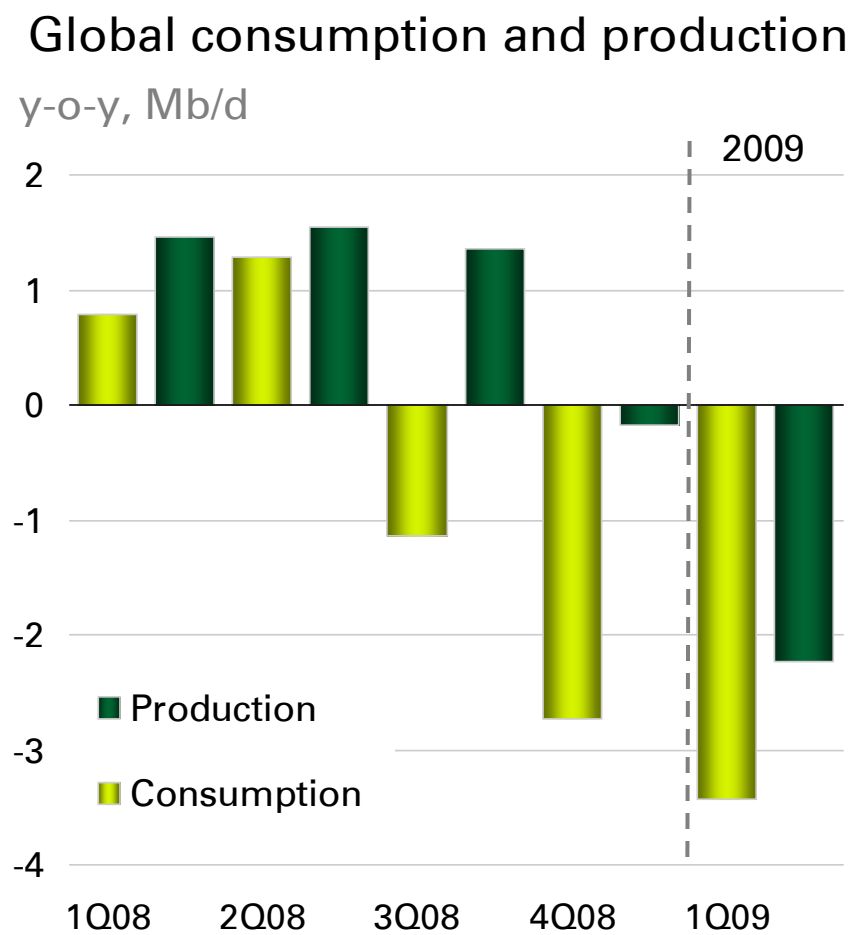
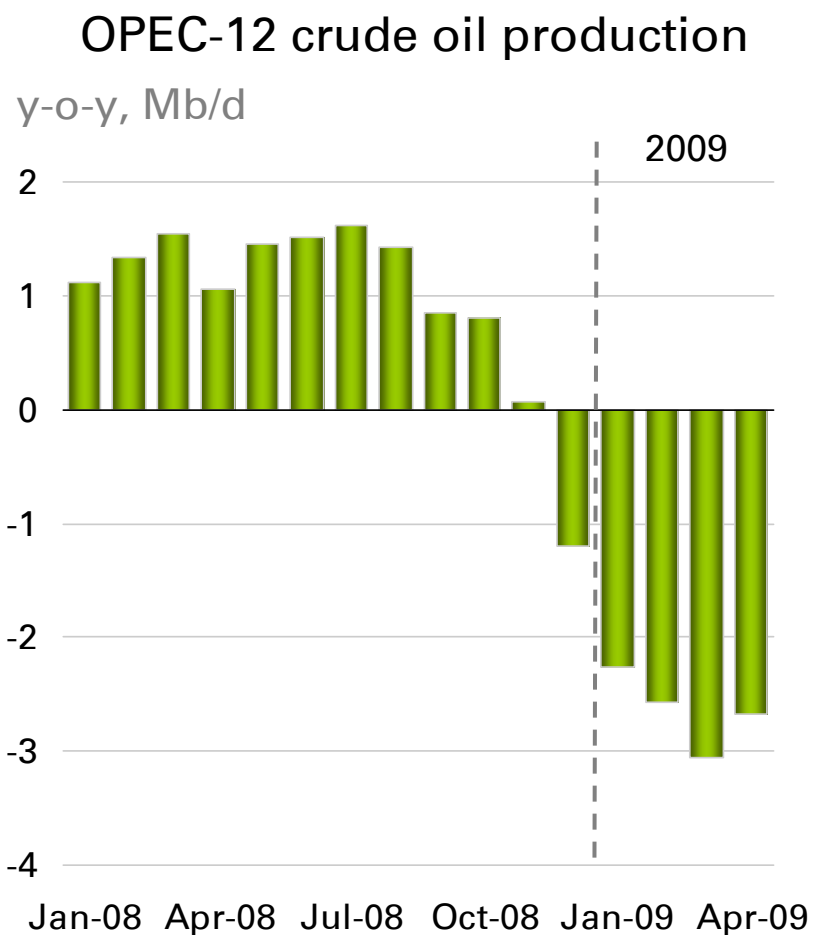
Source: Includes data from IEA

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# Oil Consumption Growth in 2008



# OPEC Adjusts to Falling Consumption



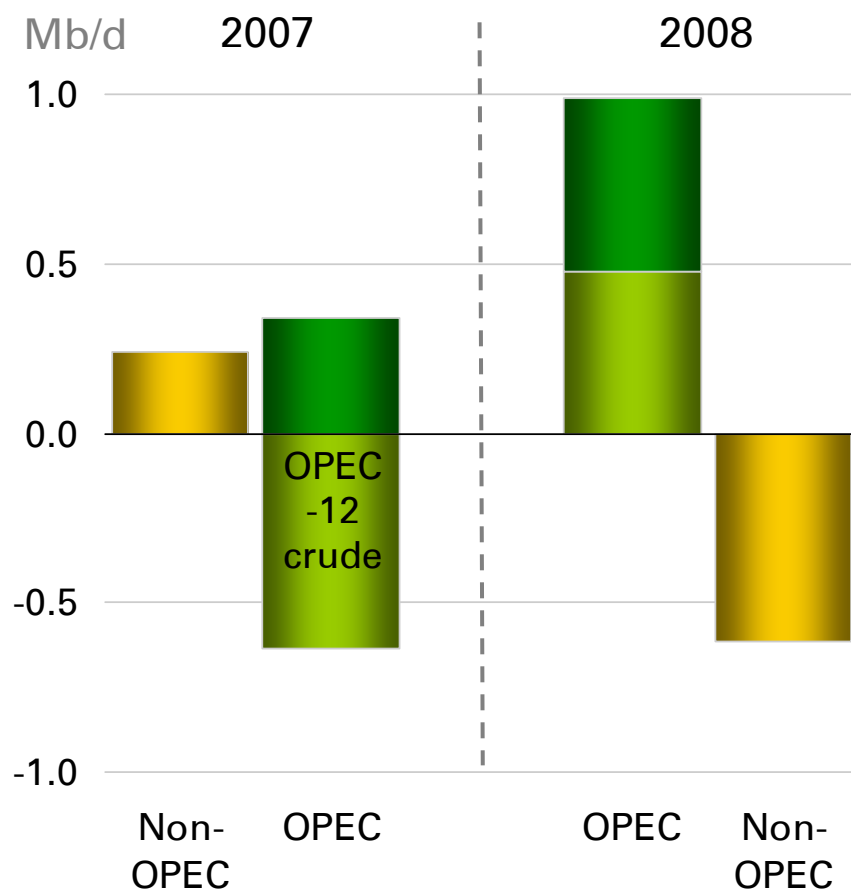
Source: Includes data from US DOE



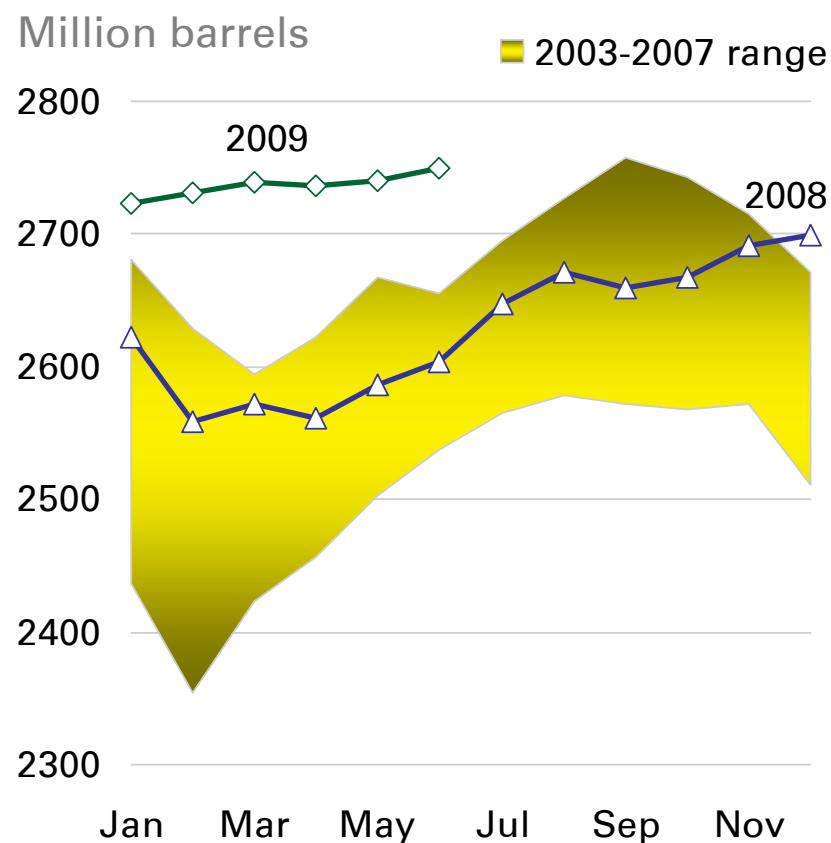
# Changes in Production and Inventories



## Global oil production changes



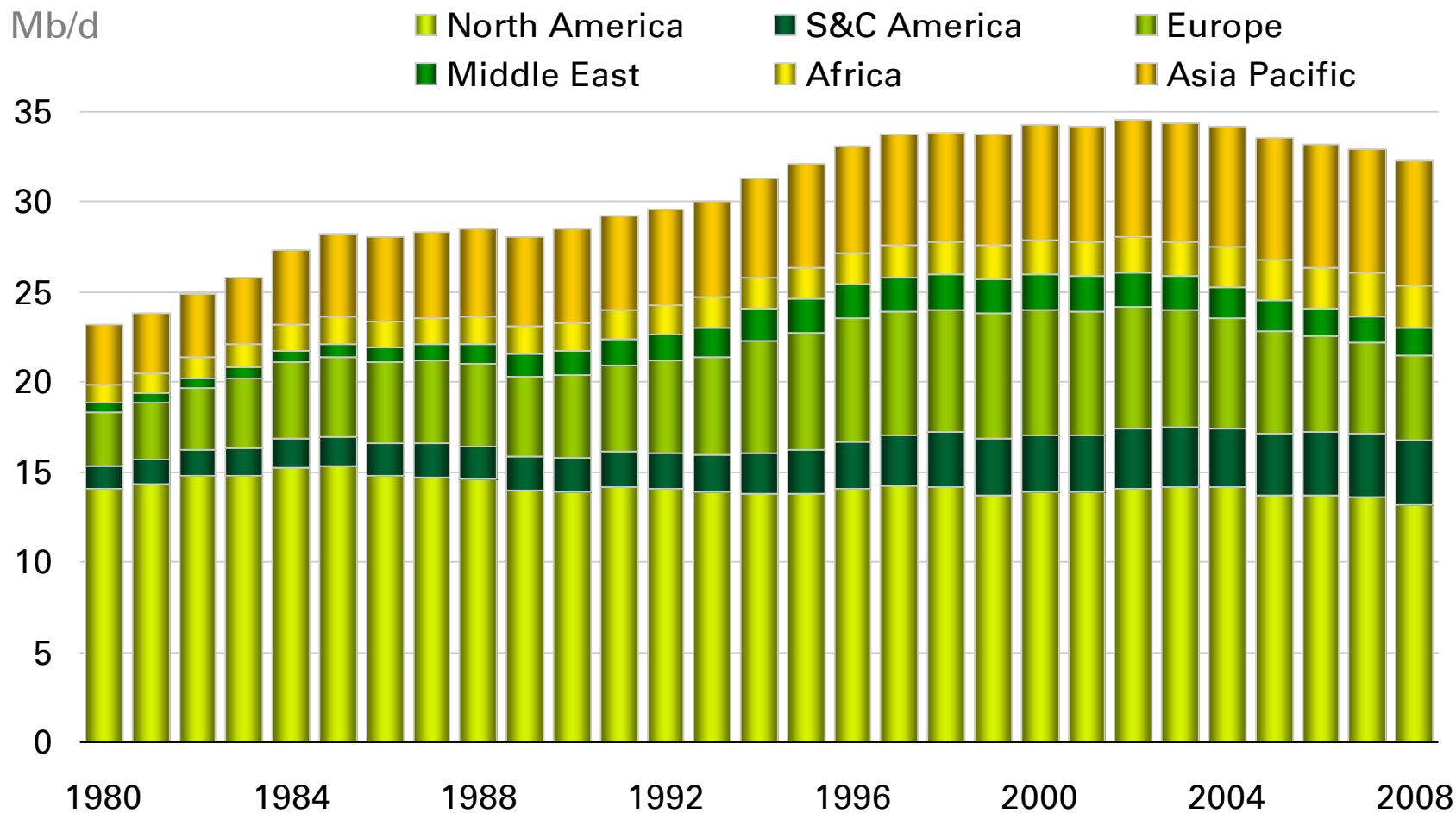
## OECD commercial inventories



Source: Includes data from IEA

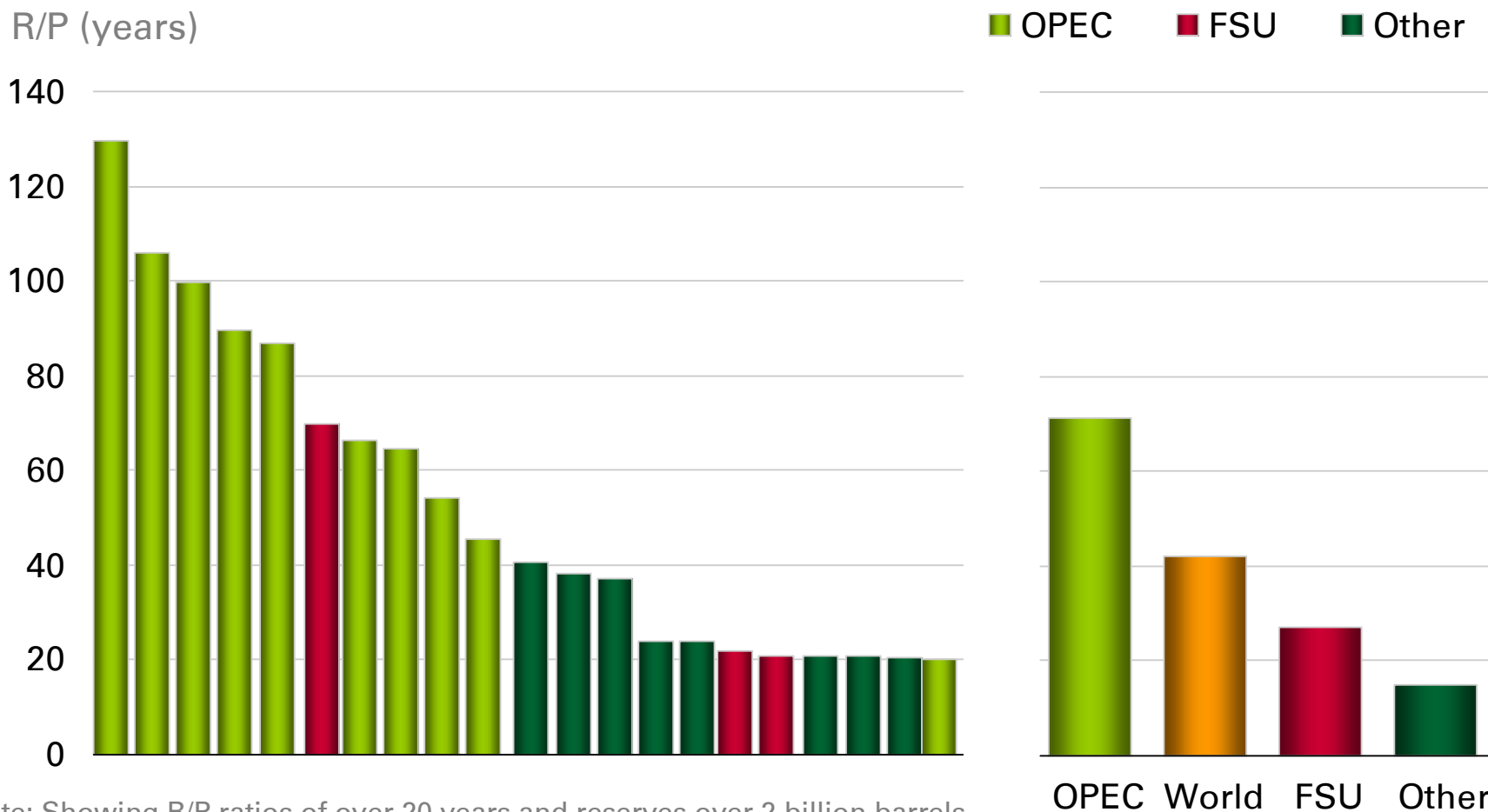
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# Non-OPEC ex FSU Oil Production



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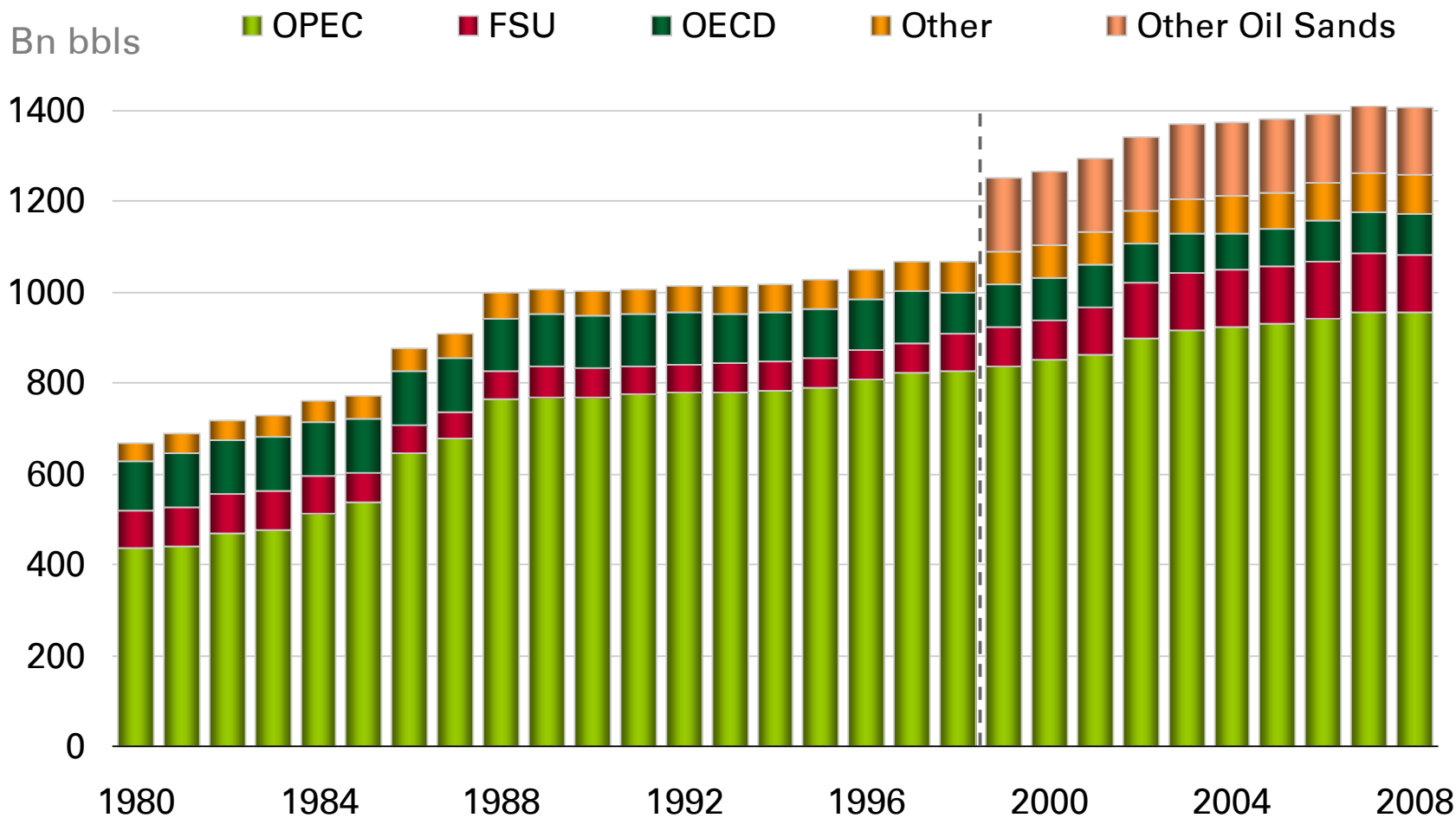
# Reserves-to-Production Ratios



Note: Showing R/P ratios of over 20 years and reserves over 2 billion barrels.

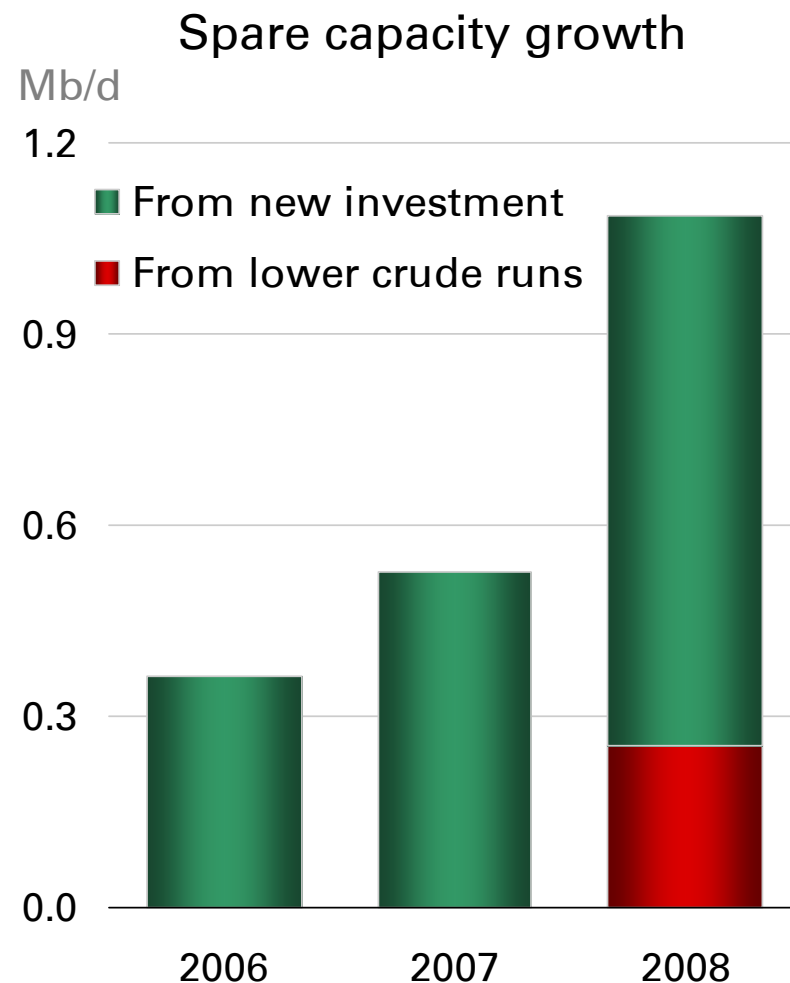
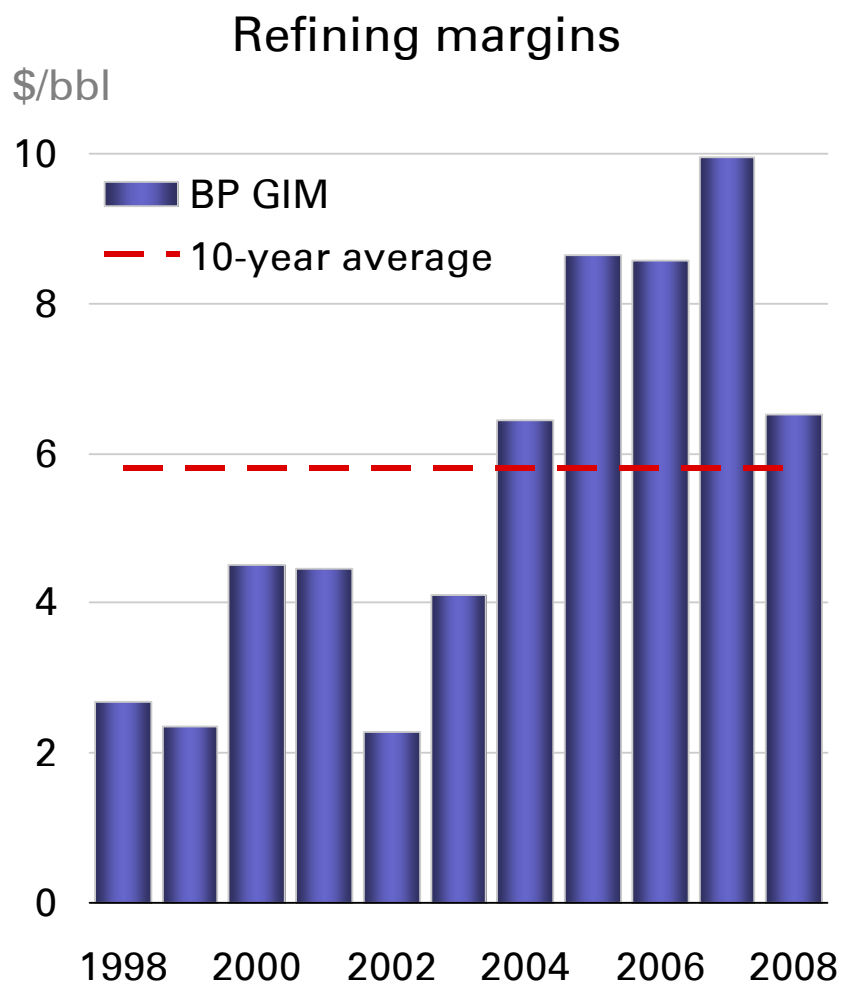
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# Global Oil Reserves



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# Refining Margins and Spare Capacity



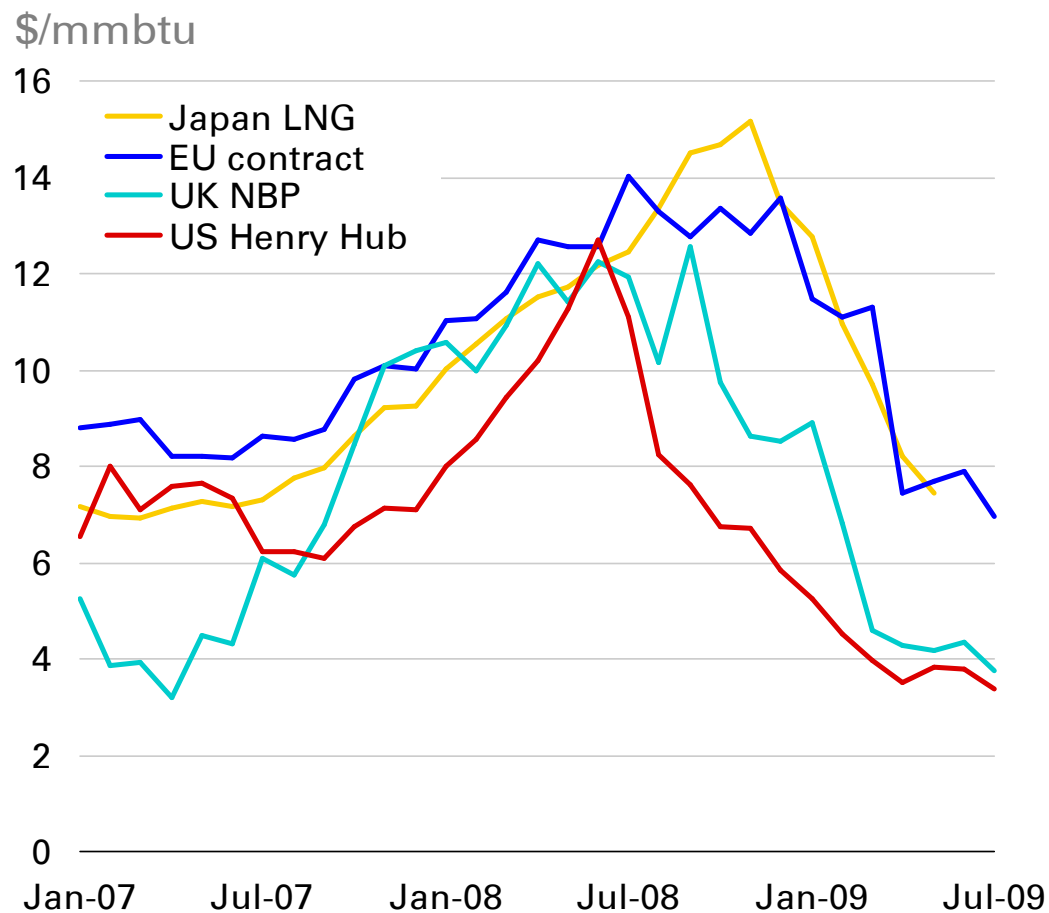
Source: Includes data from Parpinelli and Energy Security Analysis Inc.

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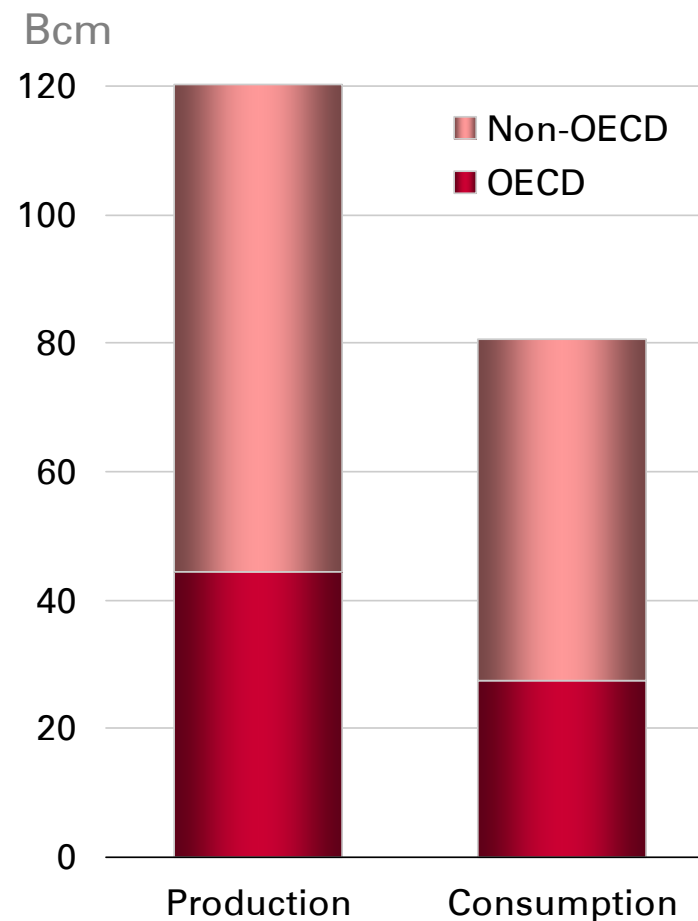
# Natural Gas Market



## Gas prices



## Growth in 2008



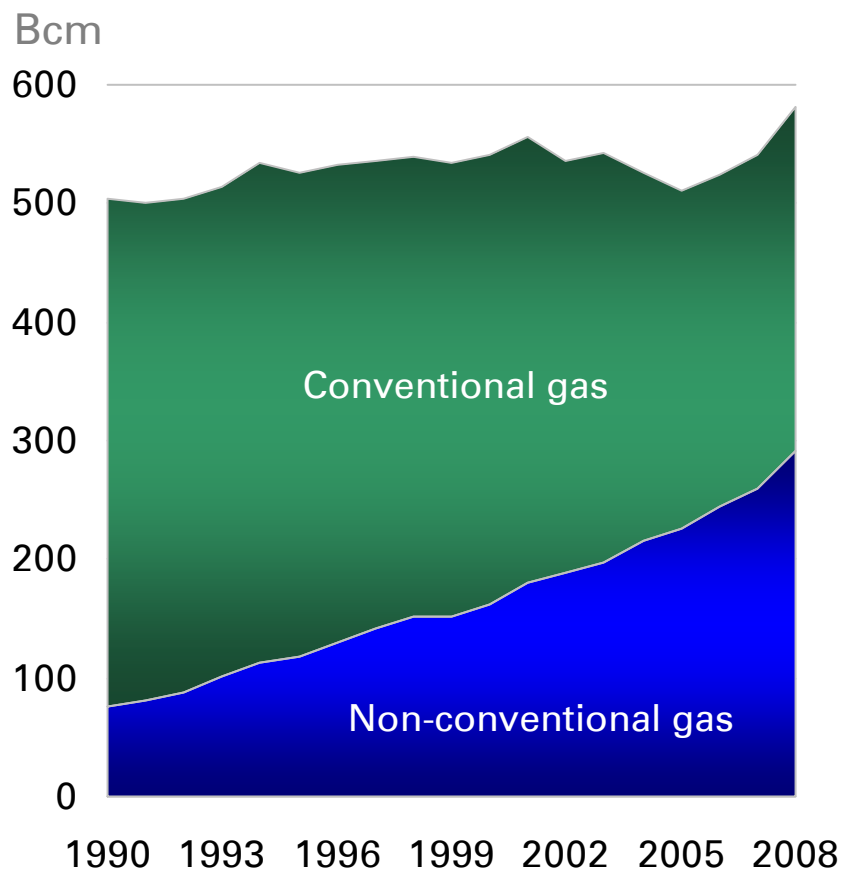
Source: Includes data from Platts

© BP 2009

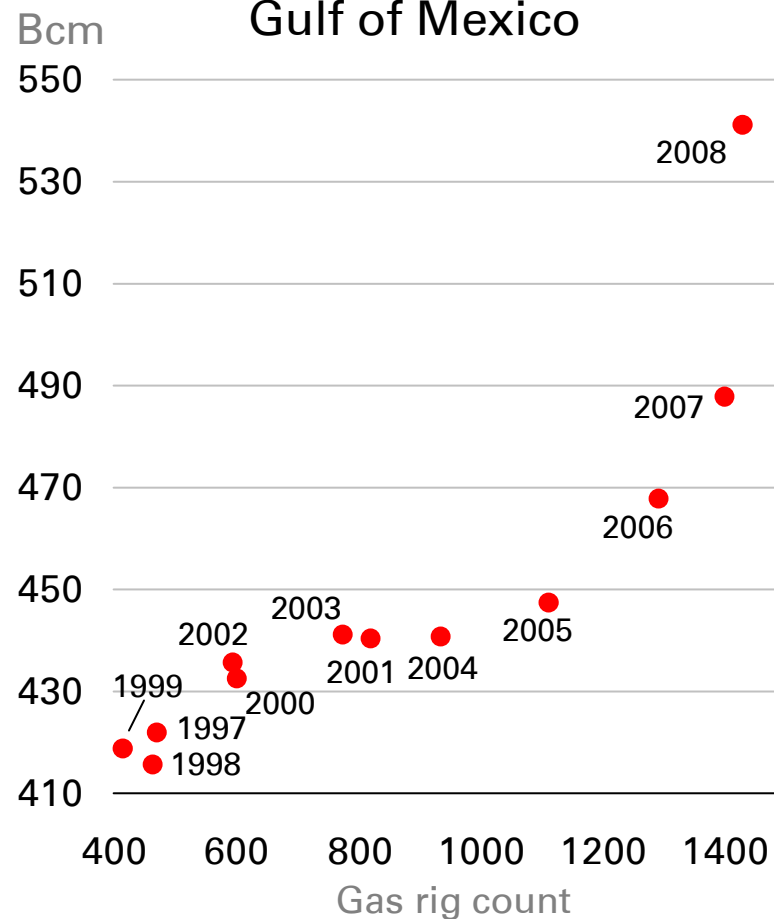
# US Gas Production



## Gas production



## Production vs. rig count outside Gulf of Mexico

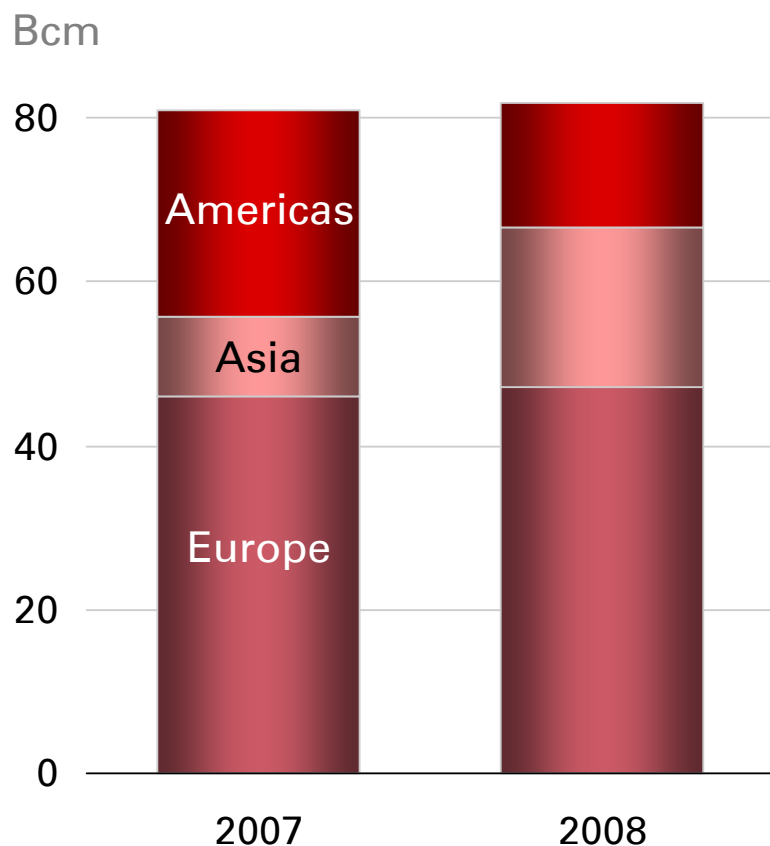


Sources: Includes data from US DOE and Baker Hughes

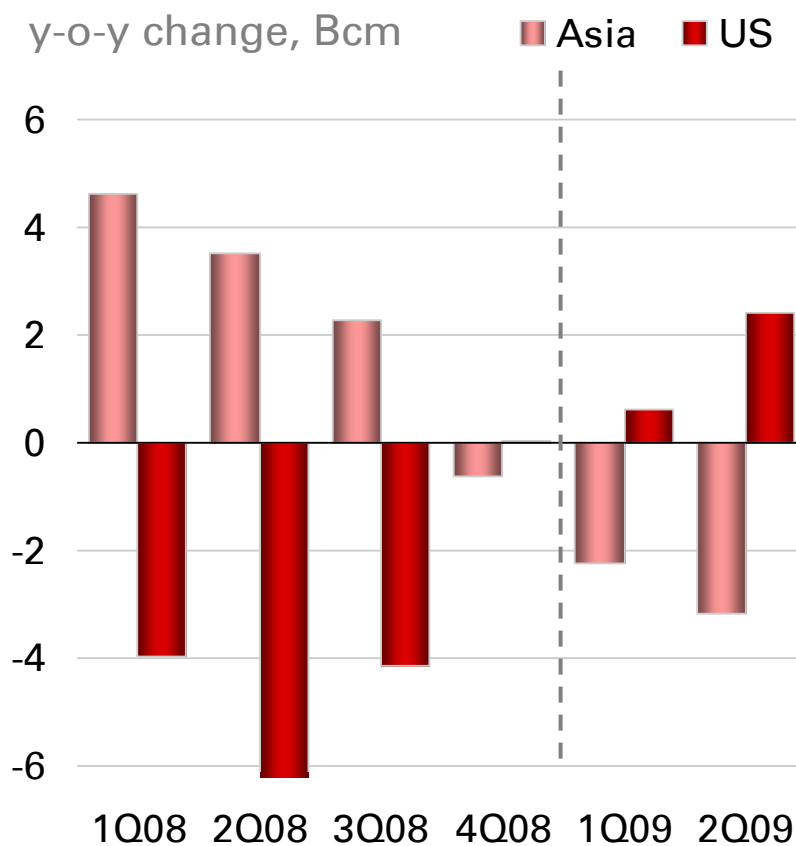
# Atlantic Basin LNG\*



By importer



Switching between markets



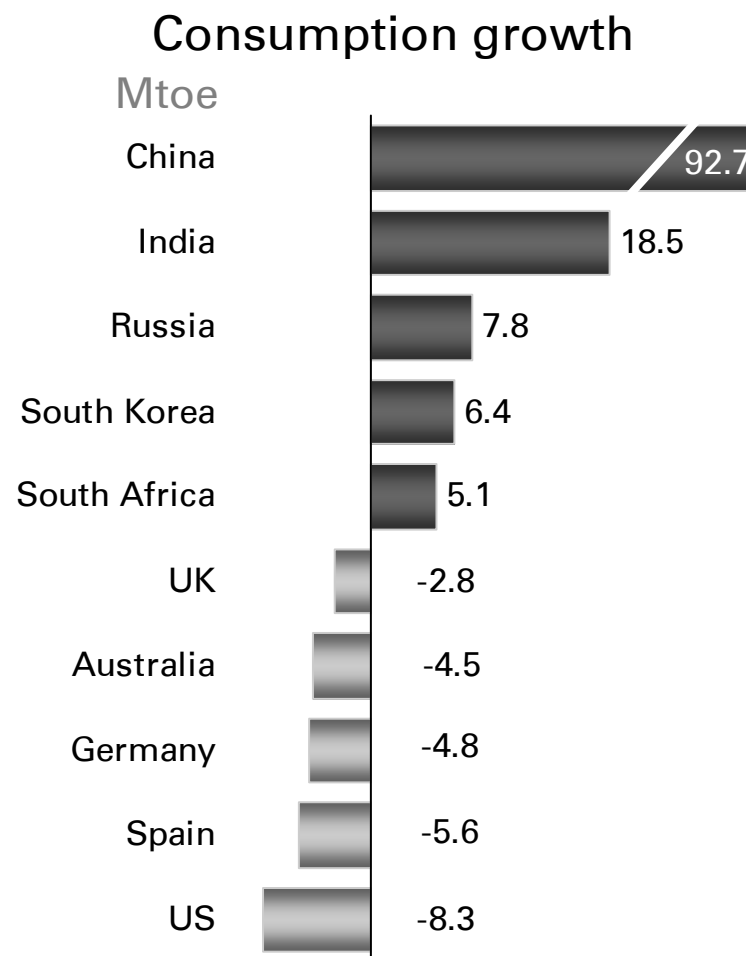
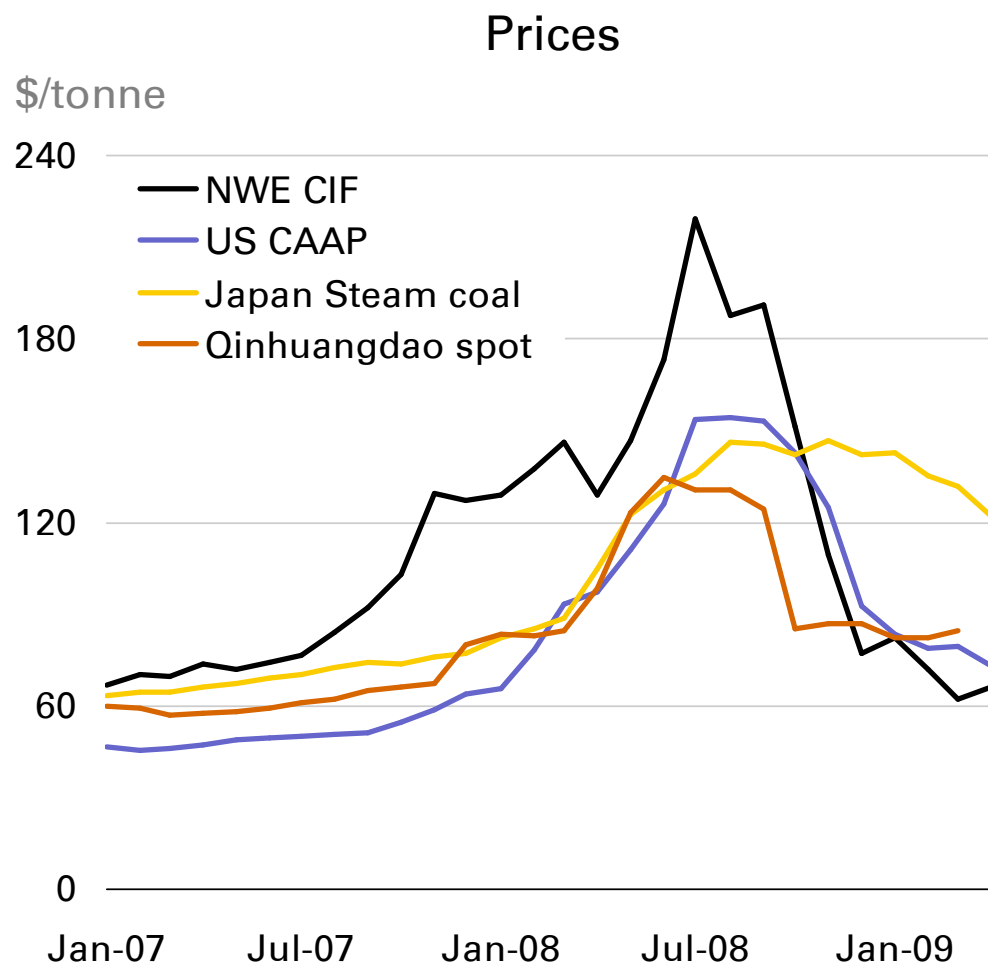
\* LNG from Algeria, Belgium, Egypt, Nigeria, Norway, Trinidad and Equatorial Guinea

Sources: Includes annual data from Cedigaz and quarterly figures from Waterborne LNG

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# Coal Prices and Consumption Growth



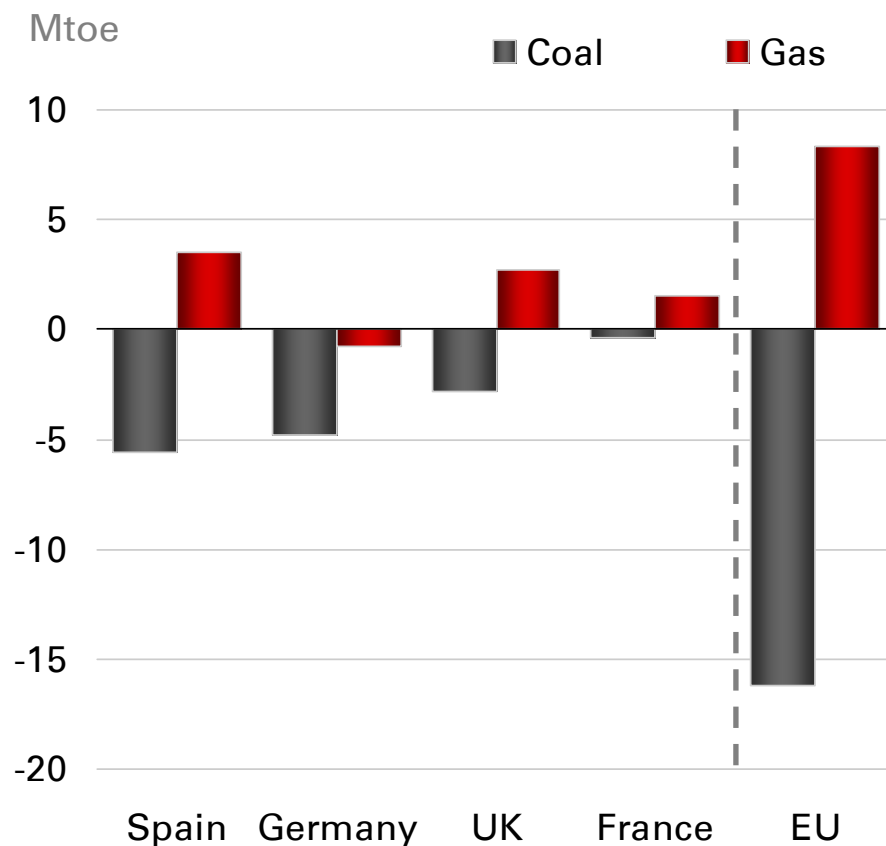
Sources: Includes data from McCloskey and Platts

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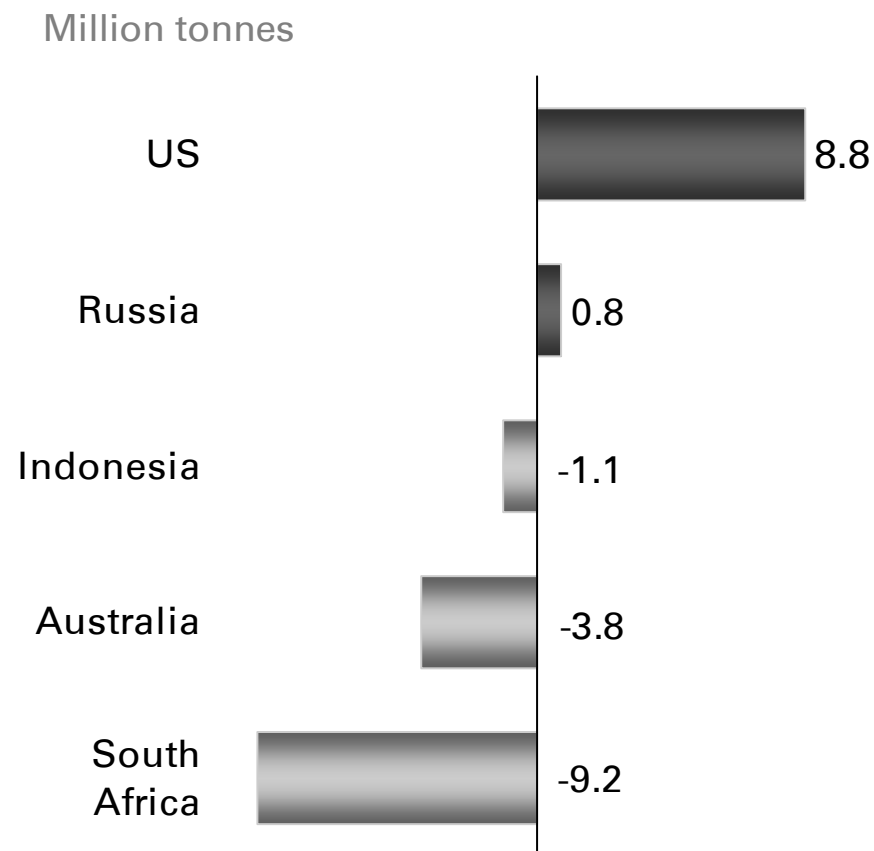
# Coal in the European Union



Gas and coal consumption growth



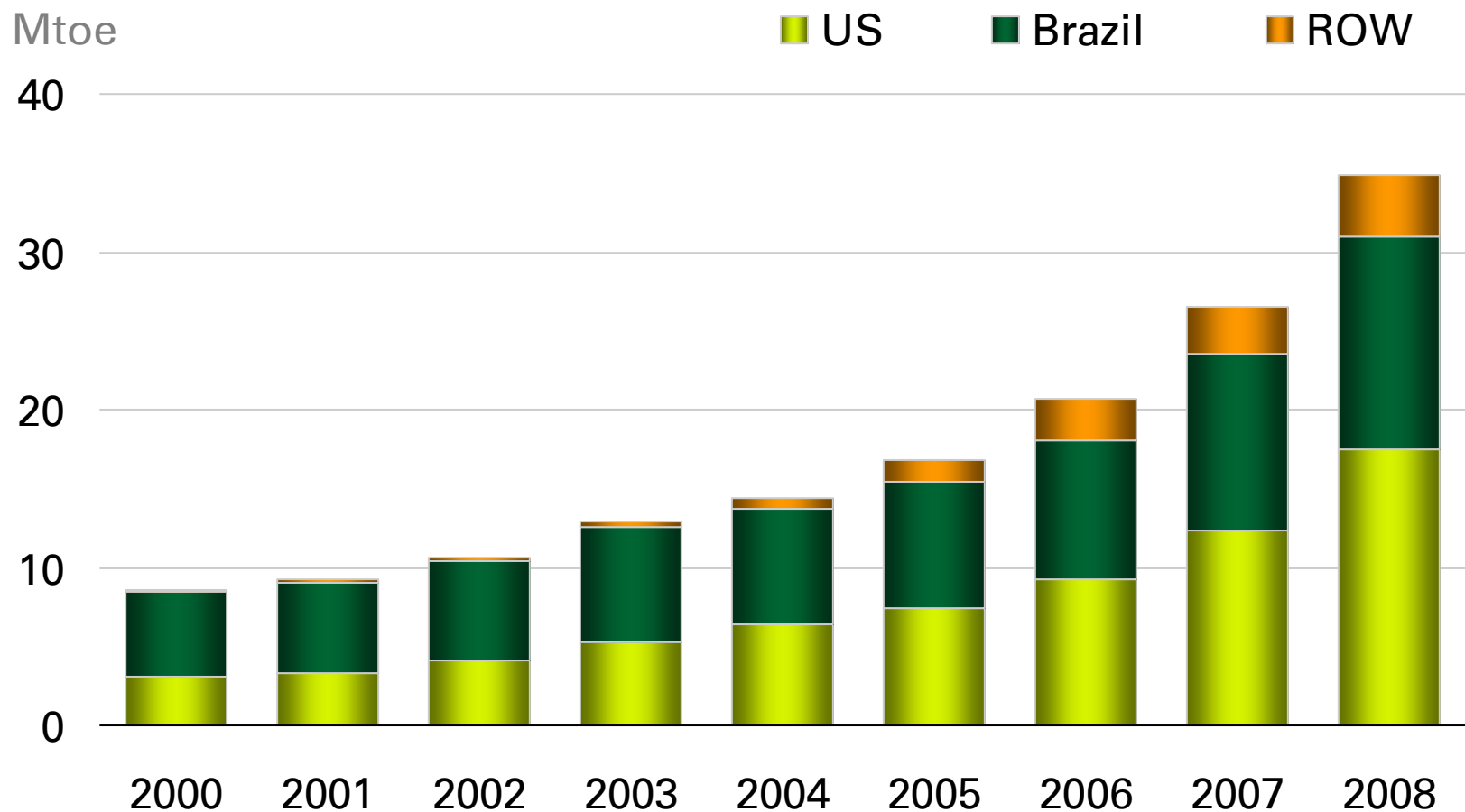
Changes in EU coal imports by source



Sources: Includes data from Eurostat

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# Global Ethanol Production

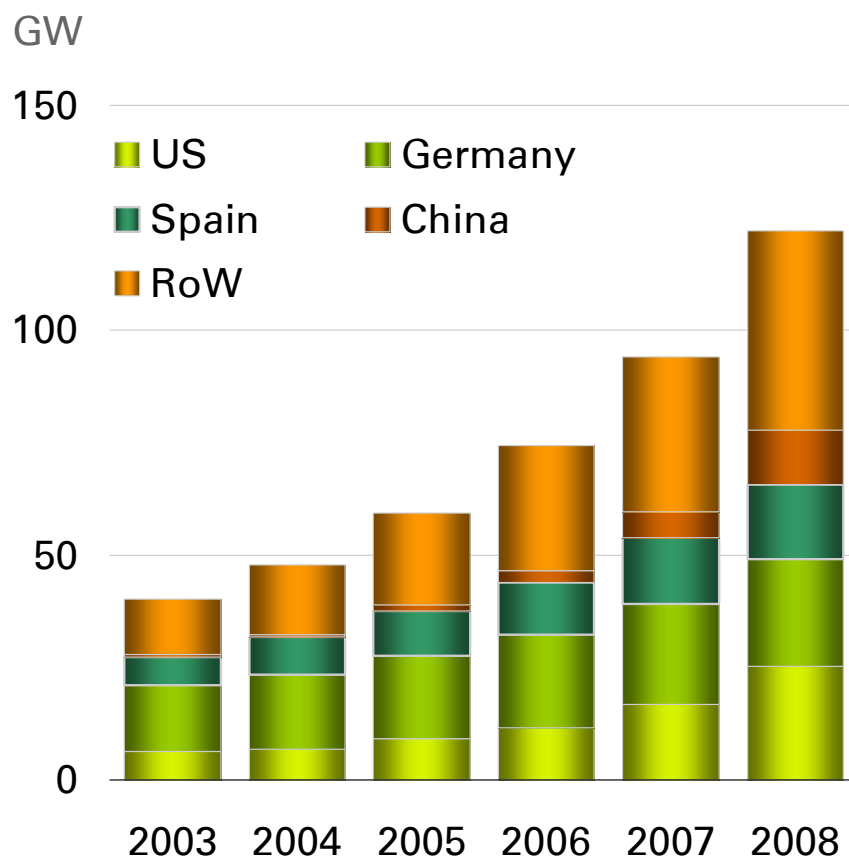


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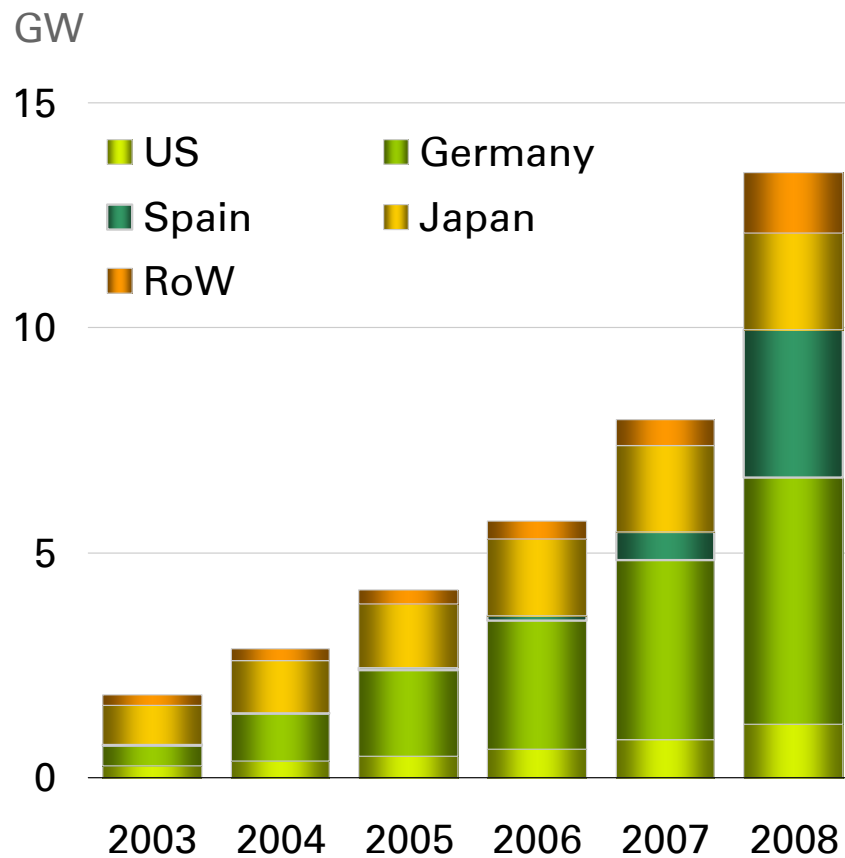
# Renewable Energy



## Wind capacity



## Solar PV capacity



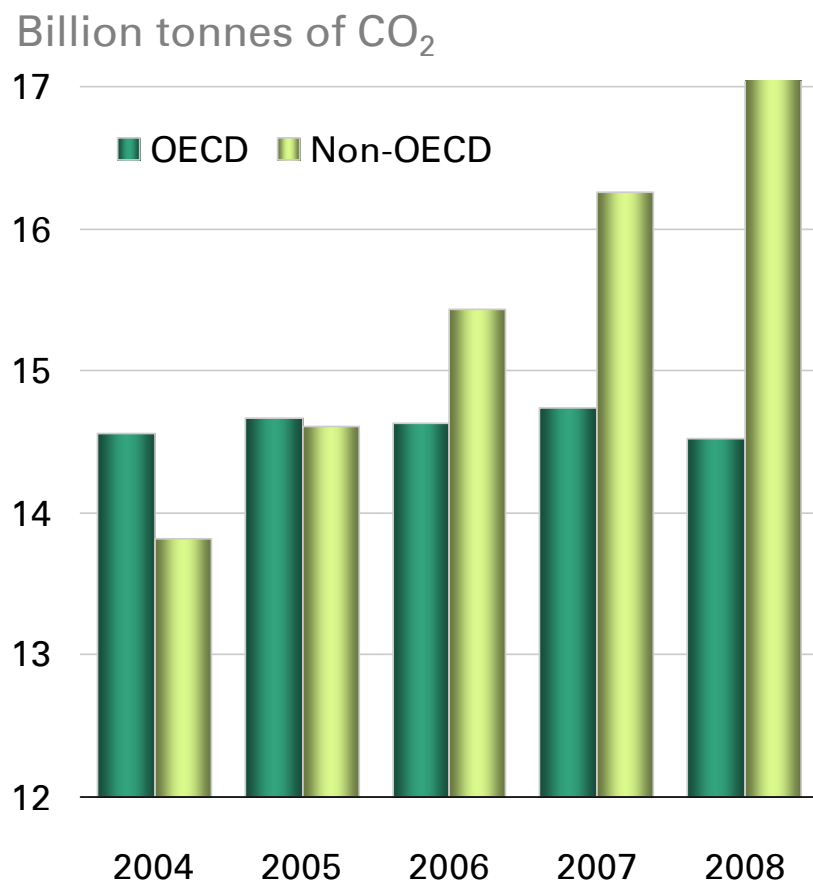
Sources: Includes data from BTM Consult, IEA, EPIA and EurObserver

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# CO<sub>2</sub> Emissions and Prices



## Global CO<sub>2</sub> emissions



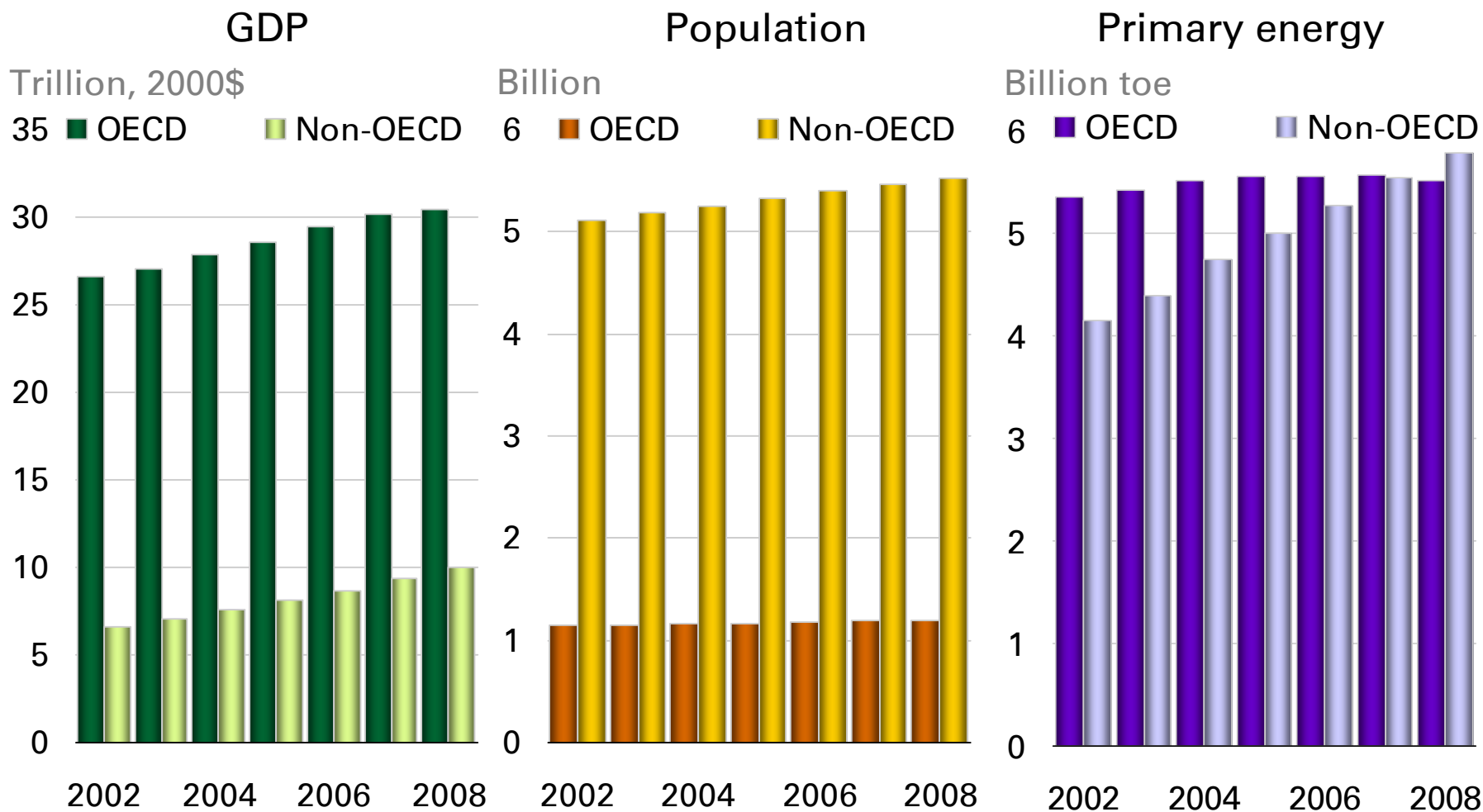
## EU Emissions Trading Scheme



Source: Includes prices from European Climate Exchange

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# GDP, Population and Primary Energy Consumption



Source: Includes data from Oxford Economics and US DOE

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# Conclusion

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- 2008: Rapid market adjustment
- Non-OECD: The future is here
- Volatility: Unavoidable in our industry?



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## Volatility and Structural Change

Q & A

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