



# BP Energy Outlook 2030

Washington DC, January 2012



# BP Energy Outlook 2030

Christof Ruehl, Group Chief Economist

# Outline

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## Global energy trends

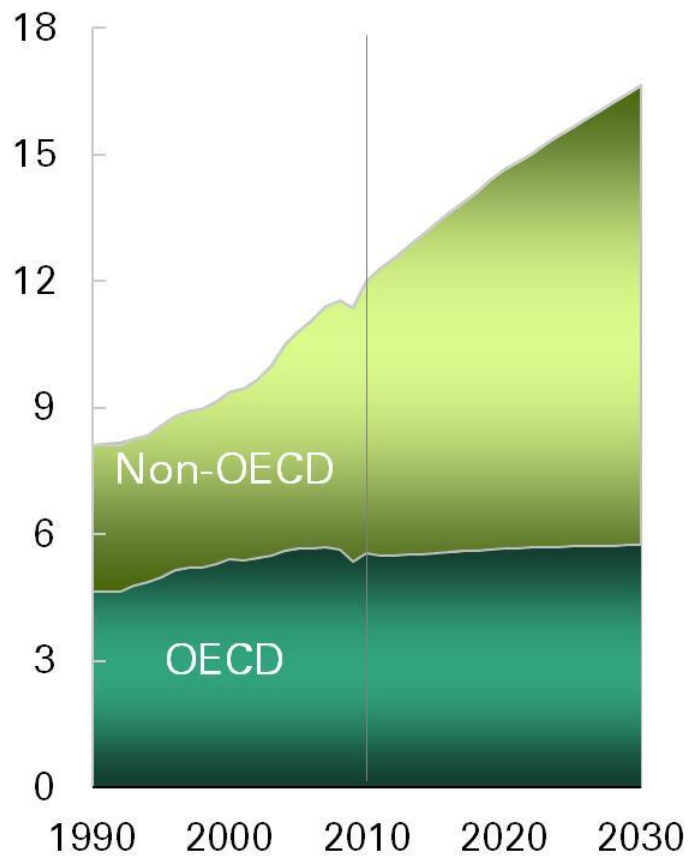
Outlook 2030: Fuel by fuel

Key determinants

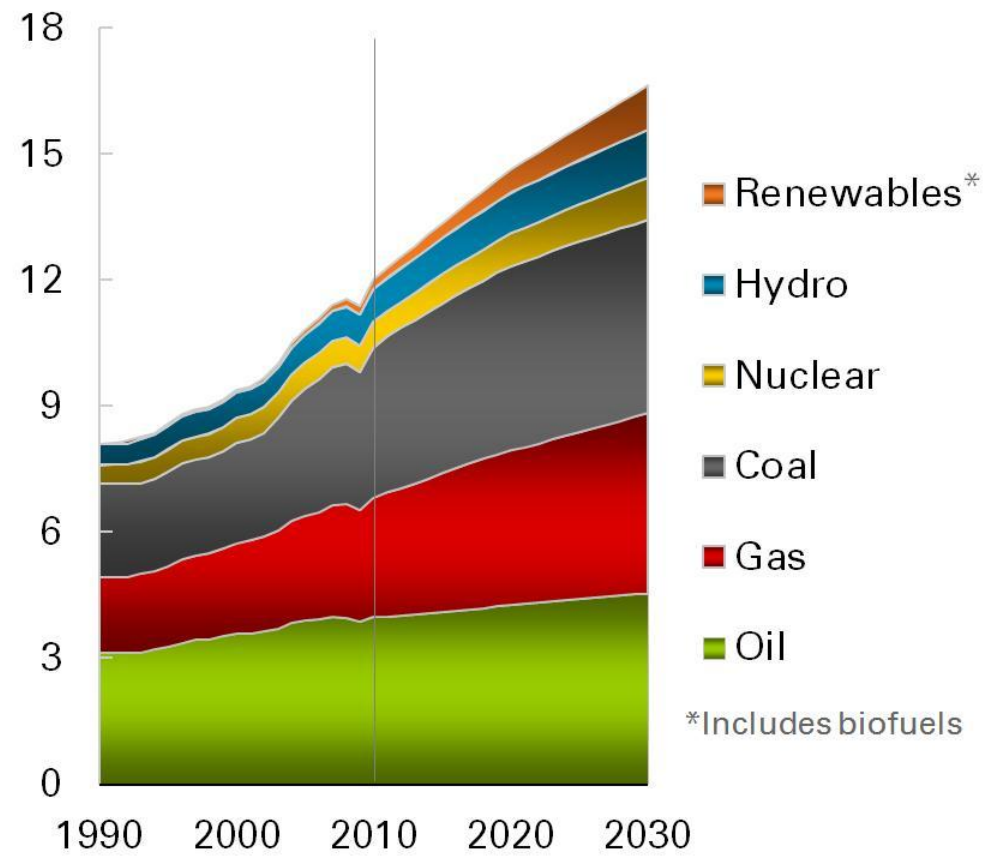
Risks and unknowns

# Non-OECD economies continue to drive consumption growth

Billion toe



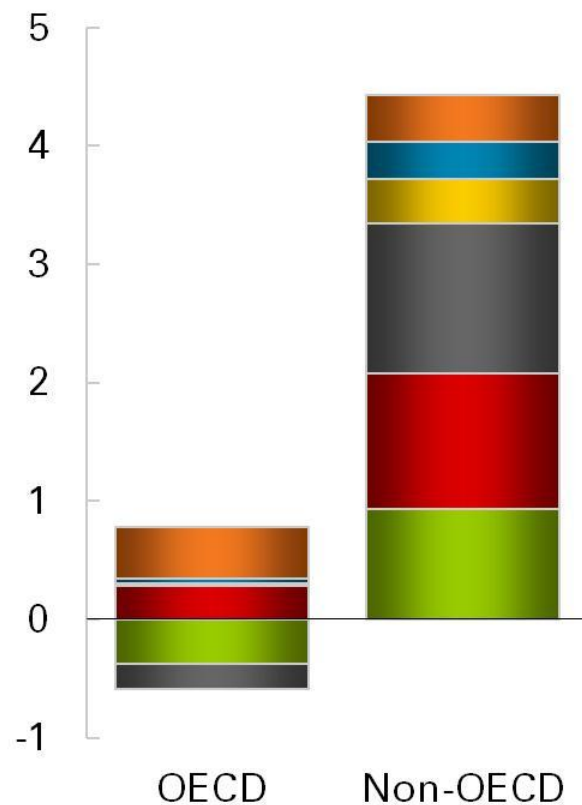
Billion toe



# Fuel substitution is the main story in the OECD

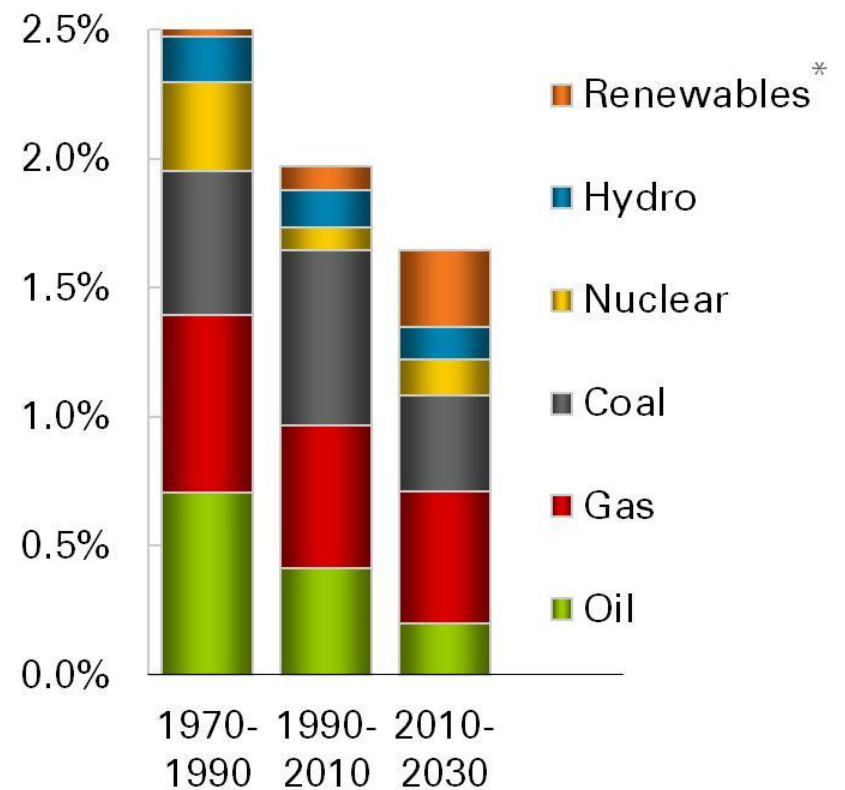
## By fuel and country grouping

Change 2010 to 2030, Billion toe



## Contributions to global growth

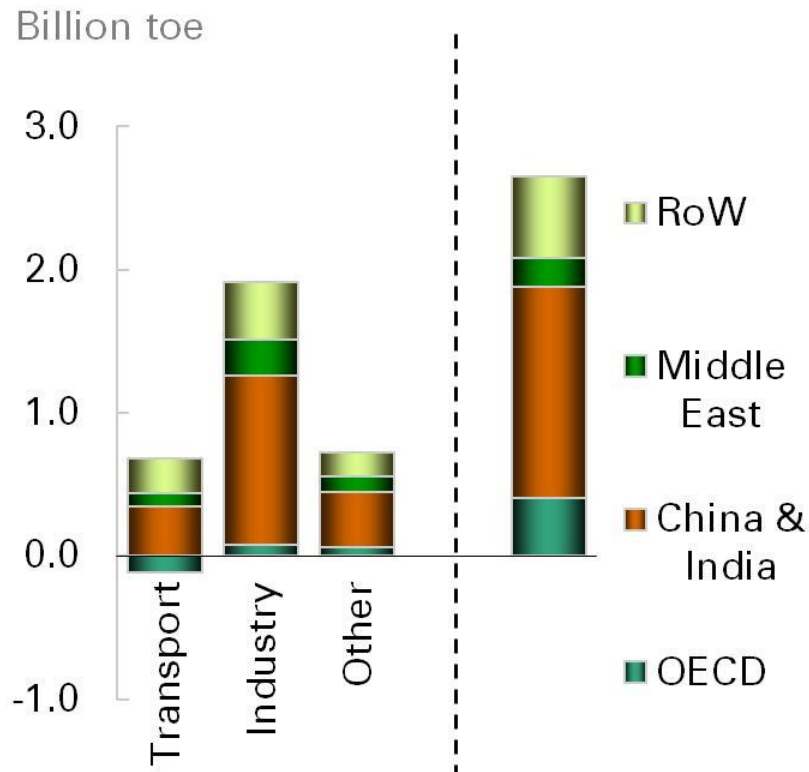
% p.a.



\*Includes biofuels

# Energy consumption growth by sector

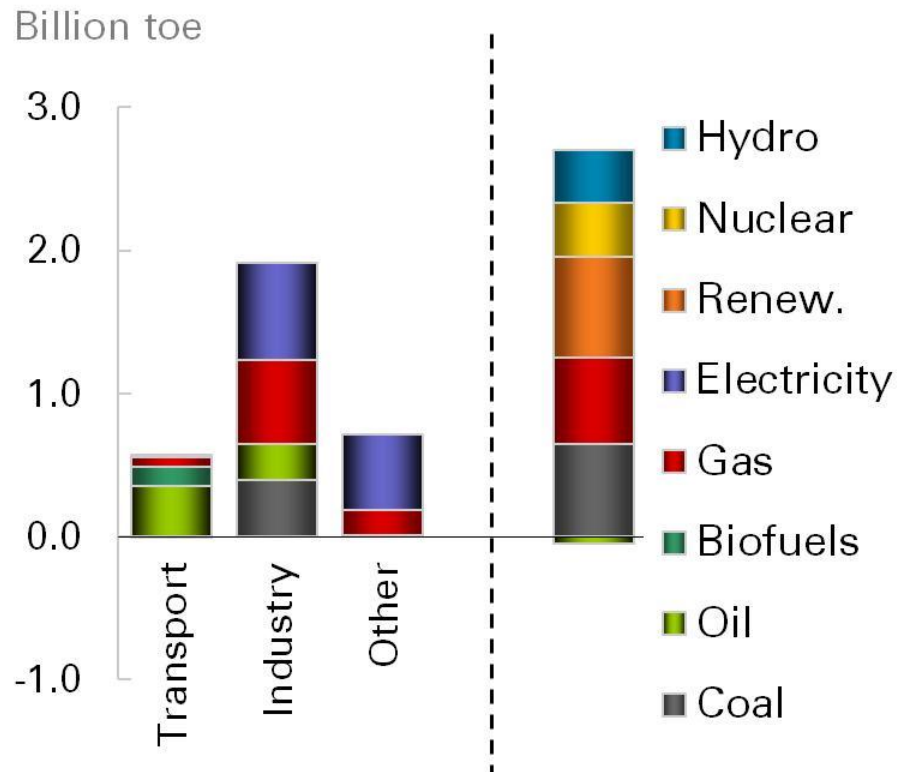
By sector and region to 2030



Final energy use

Inputs to power

By sector and fuel to 2030



Final energy use

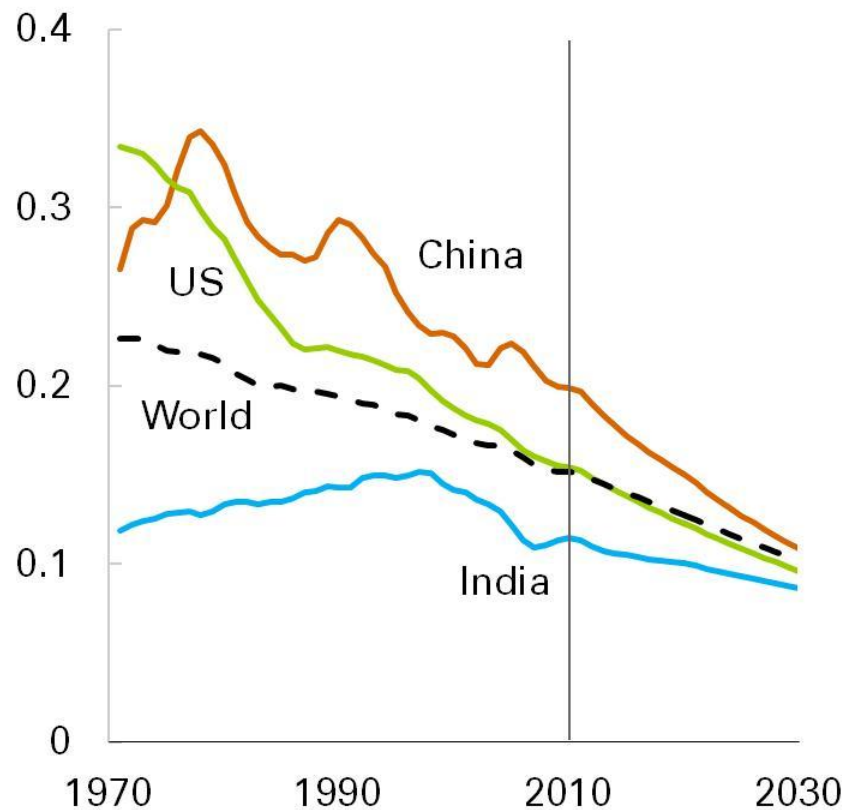
Inputs to power



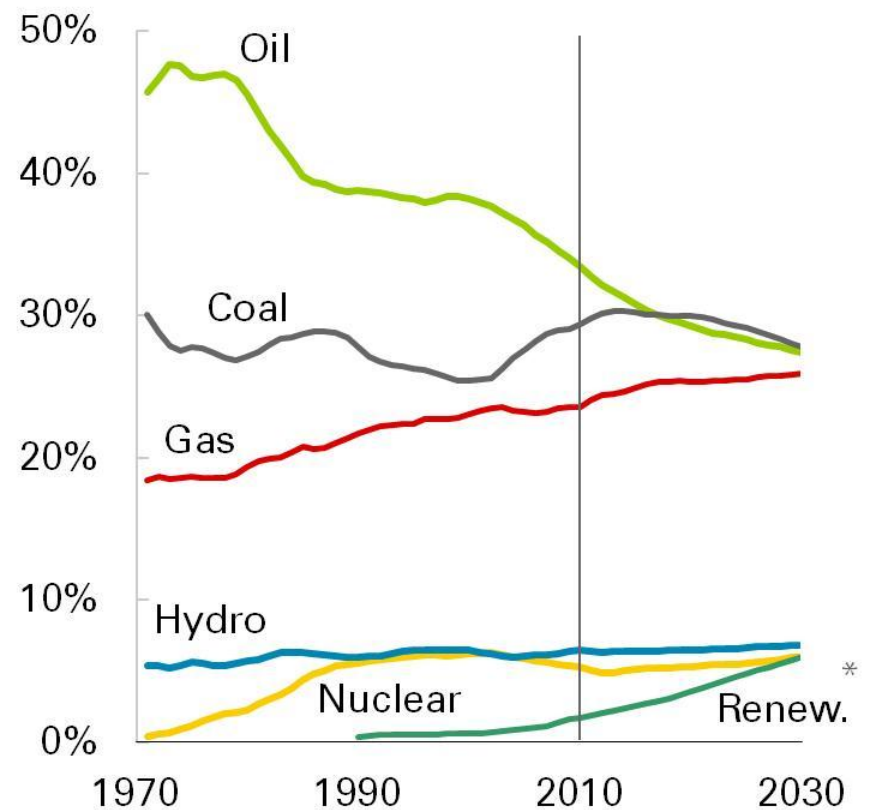
# Convergence of energy intensity and fuel shares

## Energy intensity

Toe per thousand \$2010 GDP



## Shares of world primary energy



\* Includes biofuels

# Outline

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Global energy trends

Outlook 2030: Fuel by fuel

- Liquid fuels

- Natural gas

- Coal

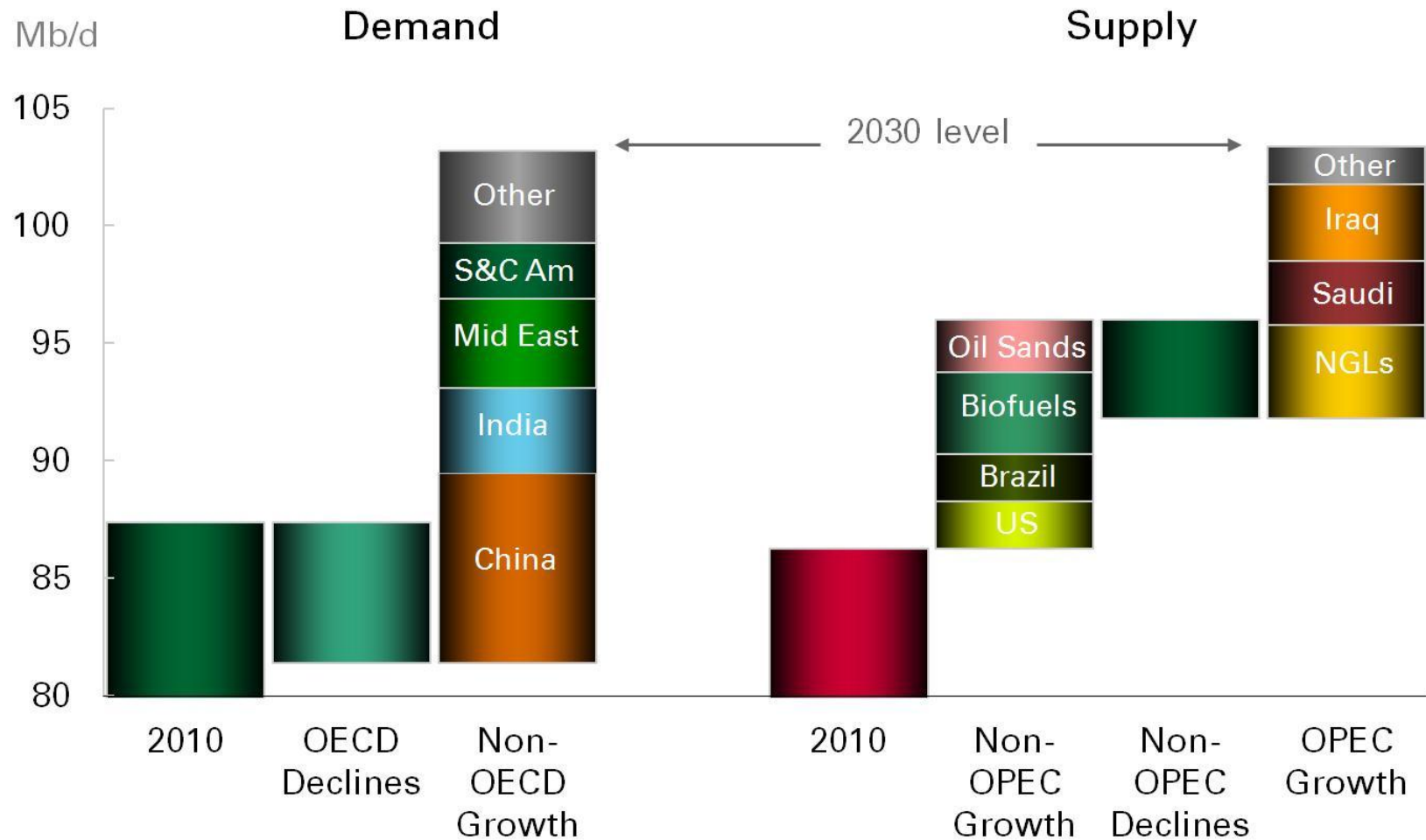
- Non-fossil fuels

Key determinants

Risks and unknowns

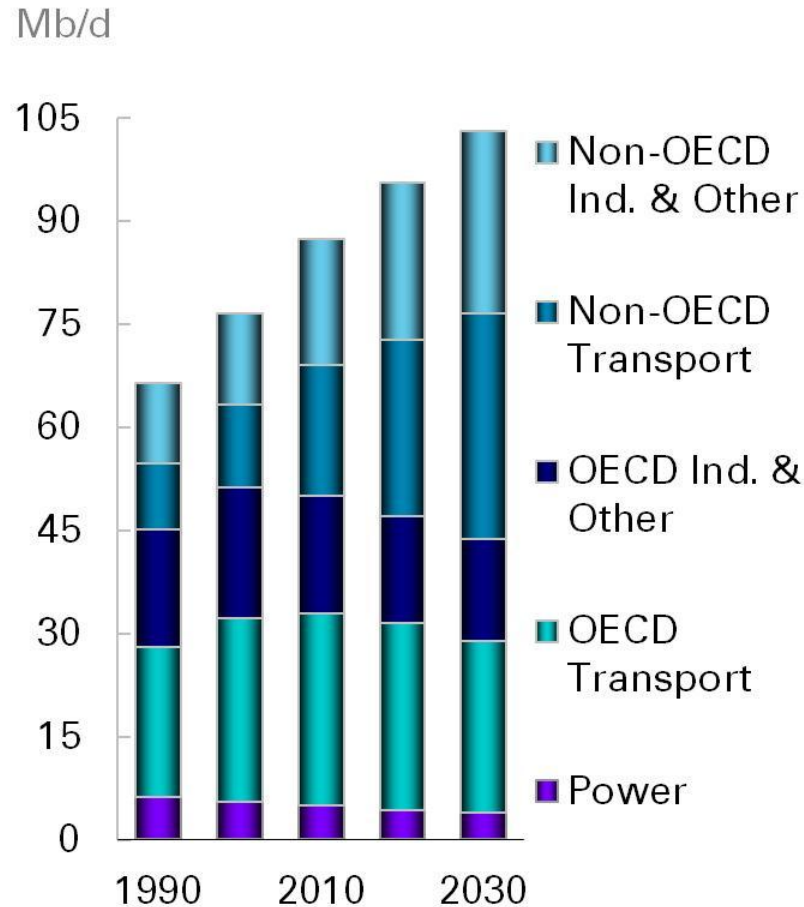


# Global liquids – demand and supply

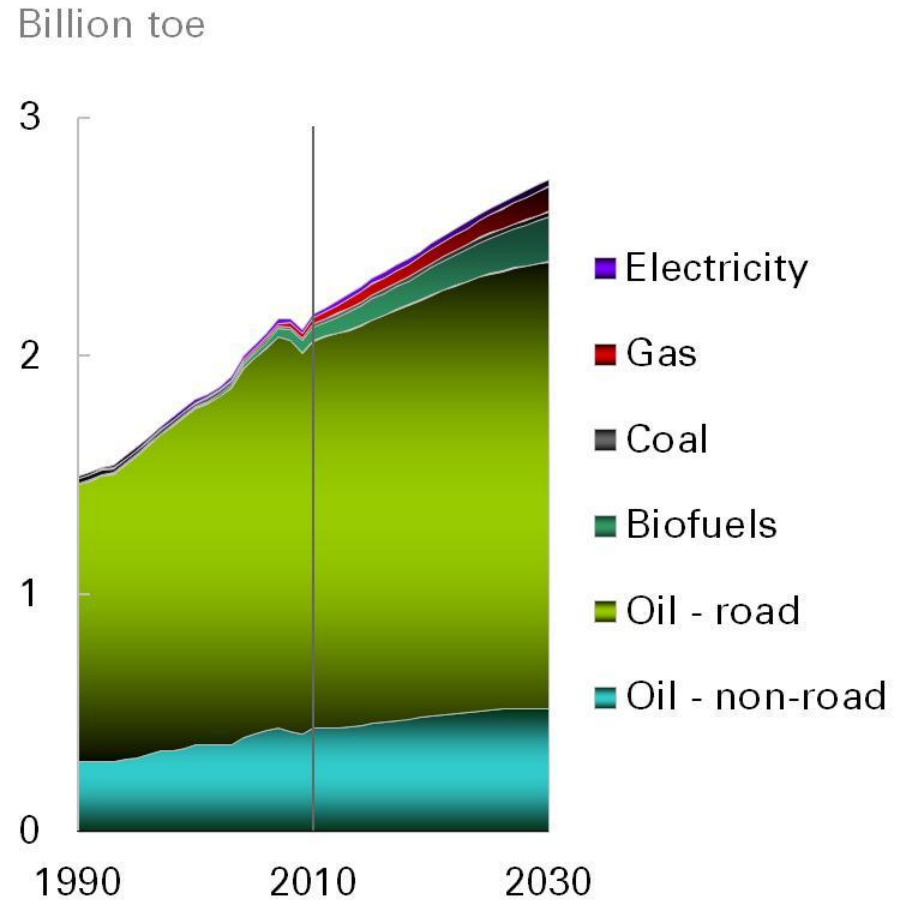


# Liquids demand growth is driven by non-OECD transport

## Liquids demand by sector

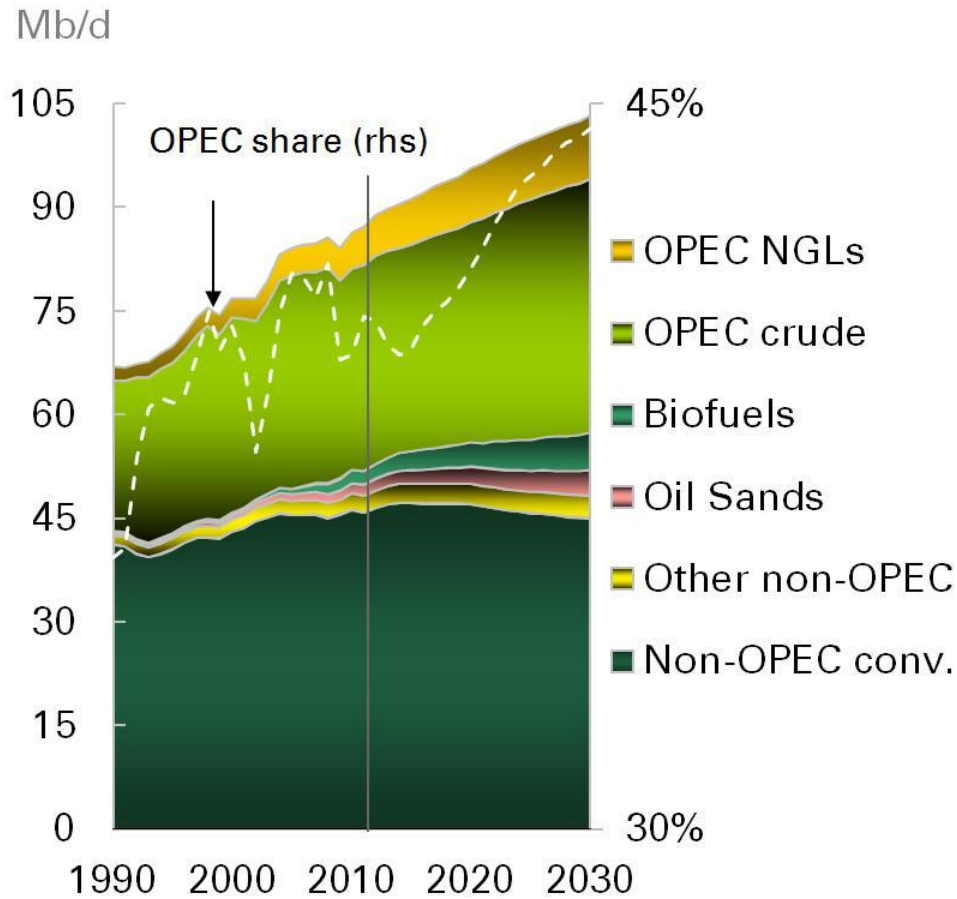


## Transport demand

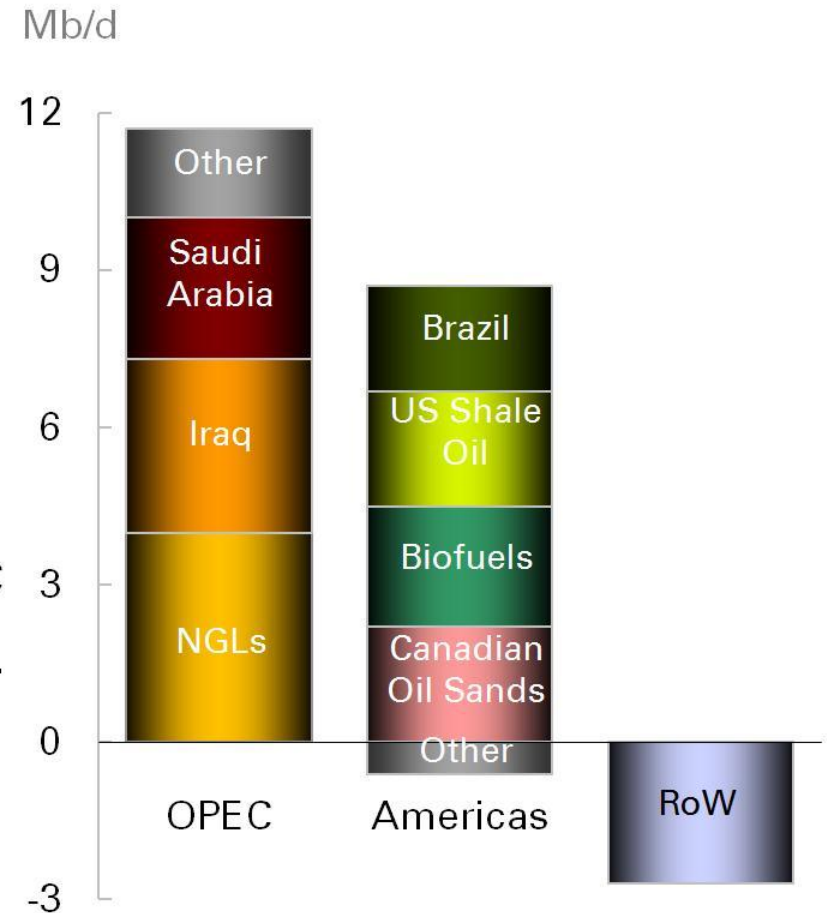


# Liquids supply growth - OPEC and North America

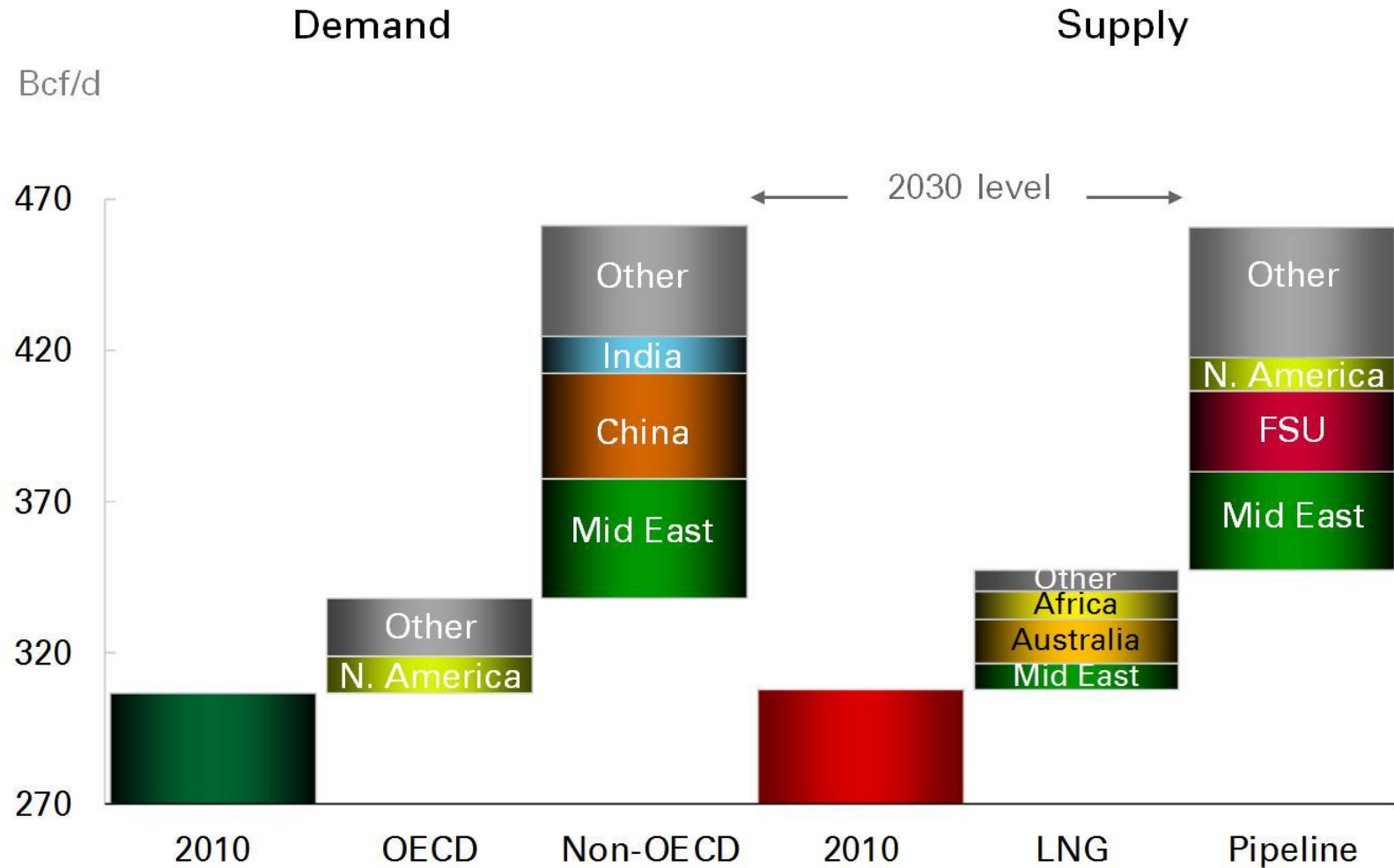
Liquids supply by type



Growth from 2010 to 2030

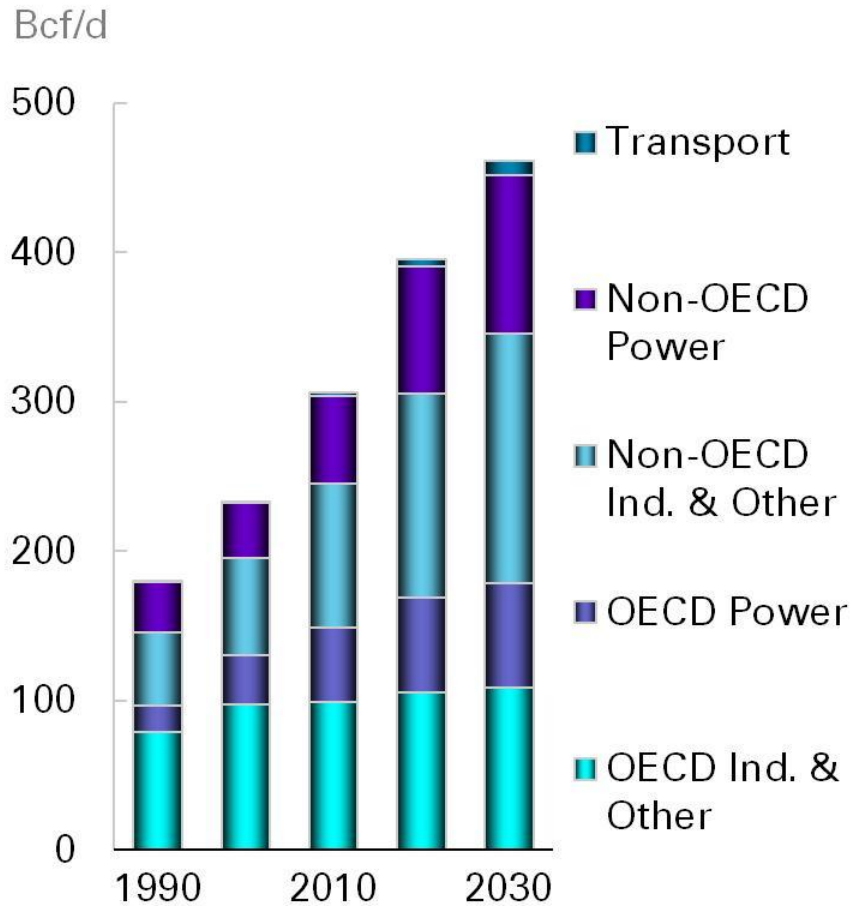


# Natural gas demand growth is concentrated in the non-OECD

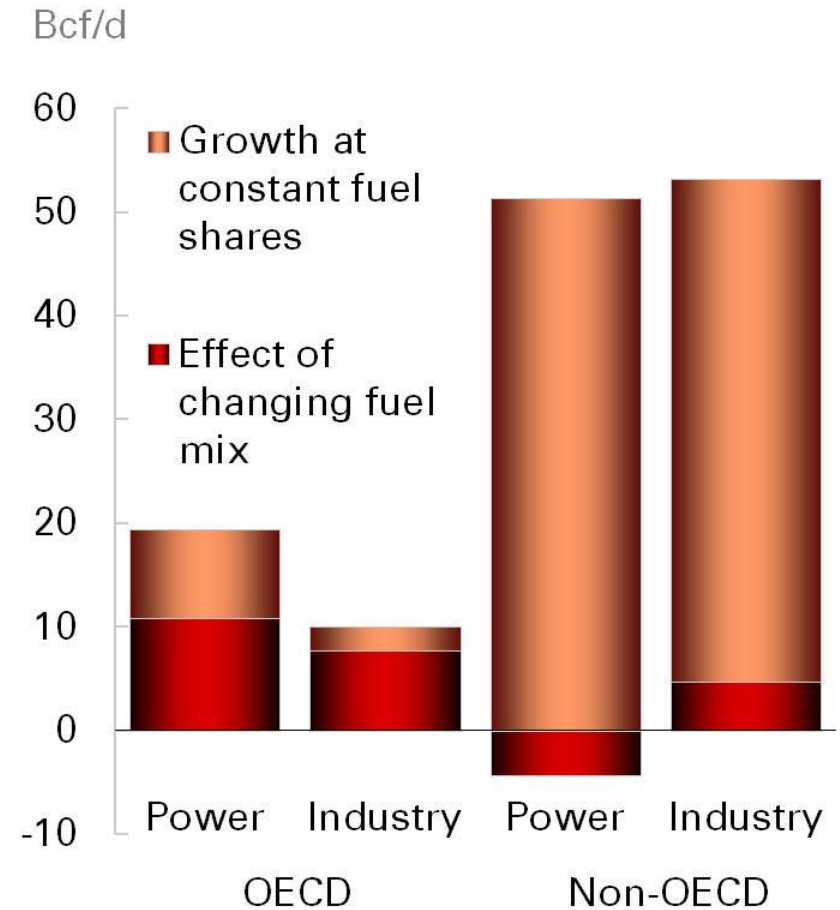


# Fuel substitution in power and industry

Demand by sector

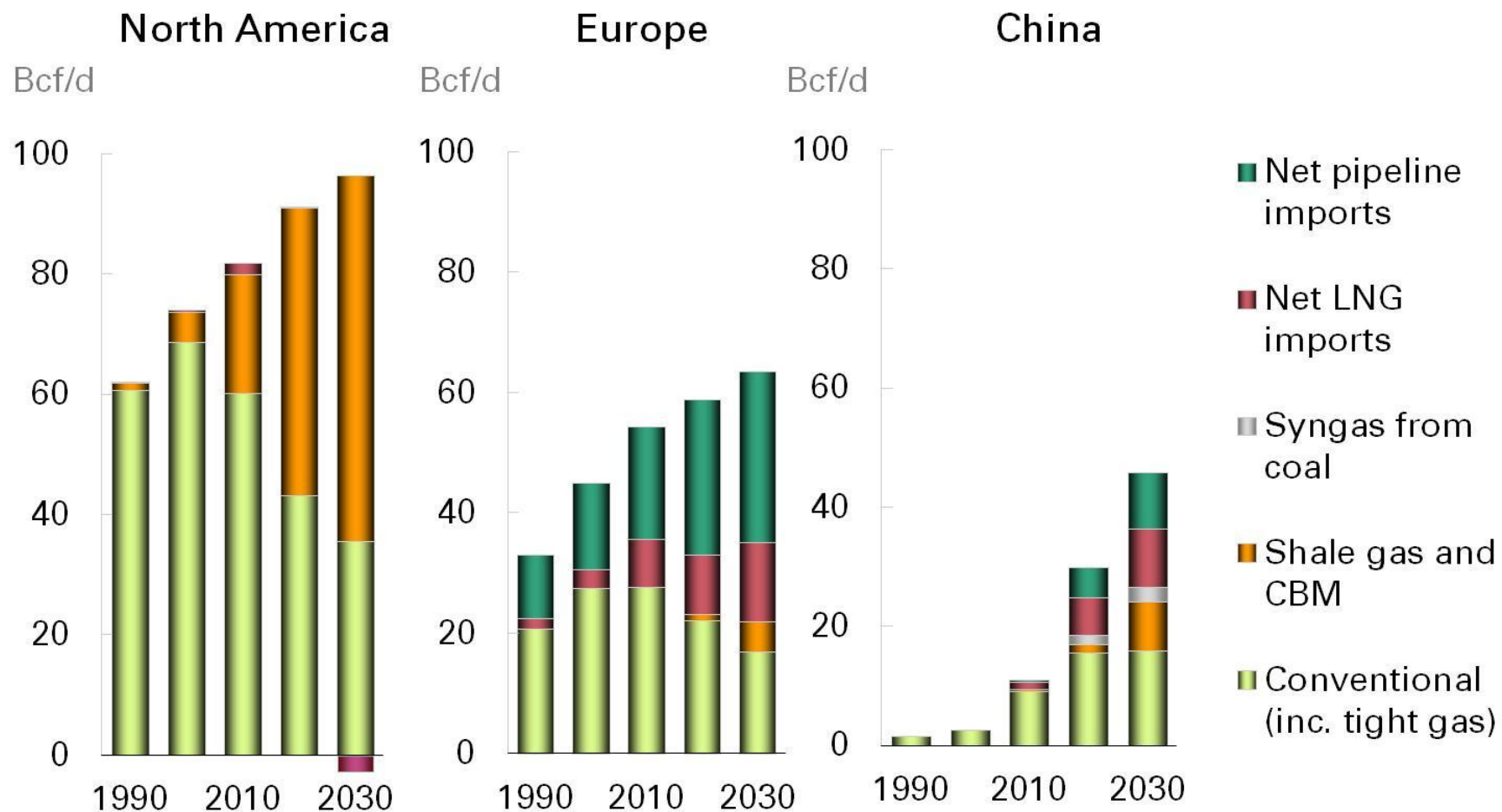


Gas demand growth 2010-30



# Unconventional gas will play a growing role

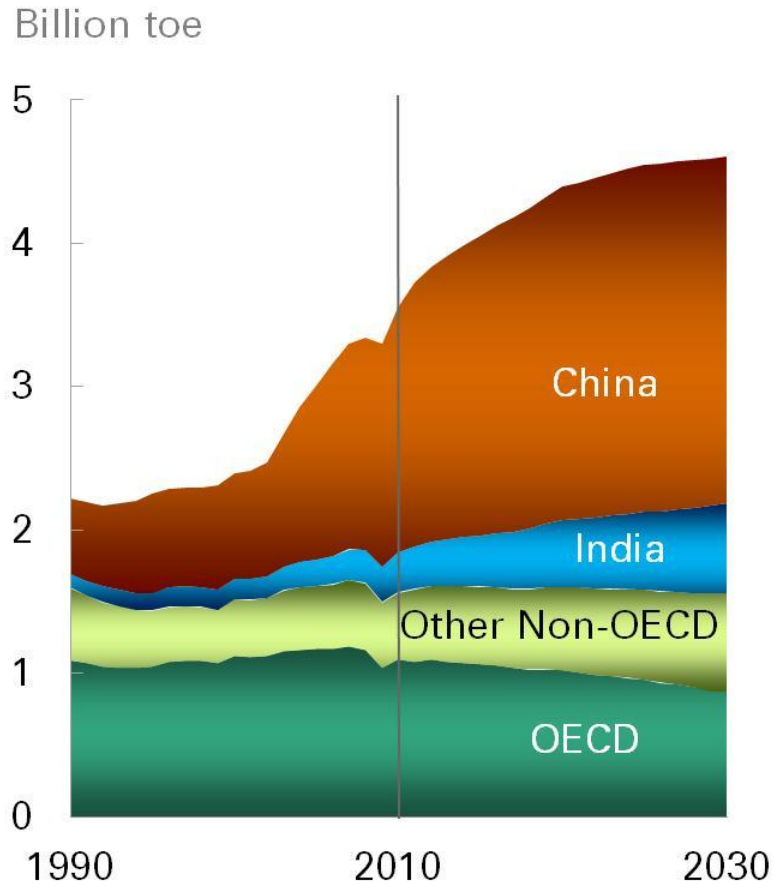
## Gas supply by region



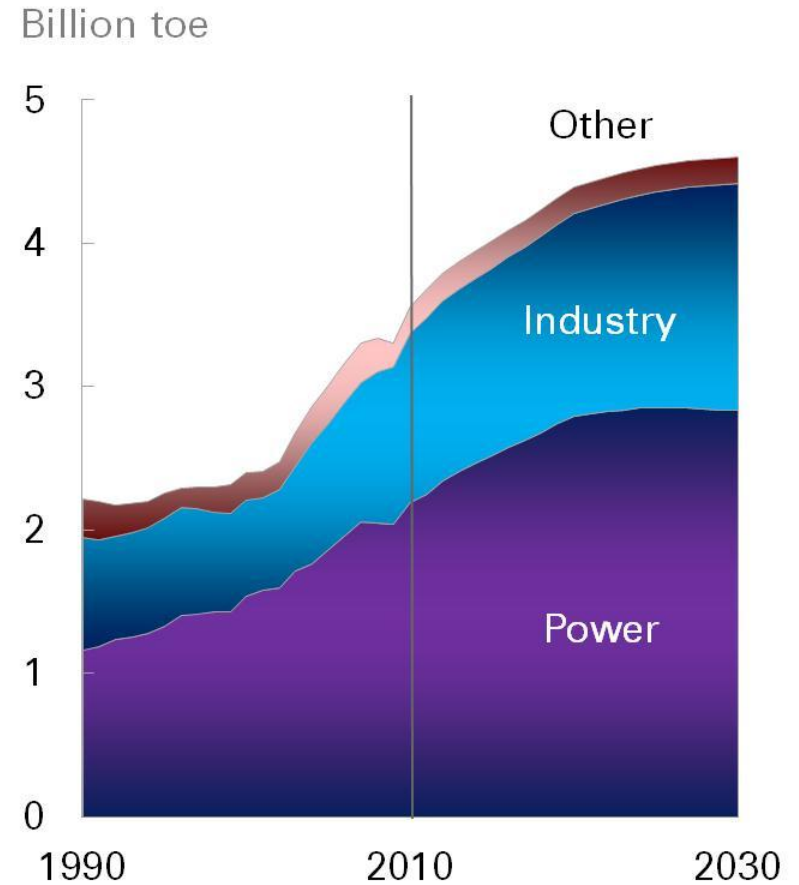


## Coal consumption levels off after 2020

### Coal demand by region

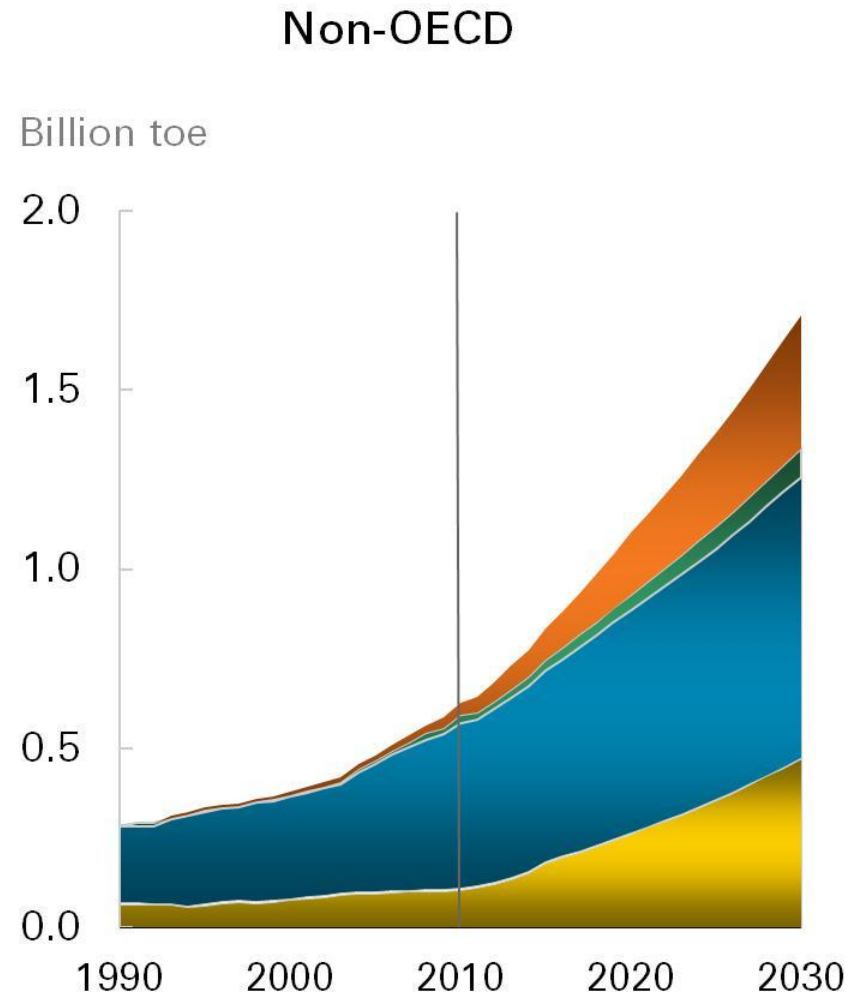
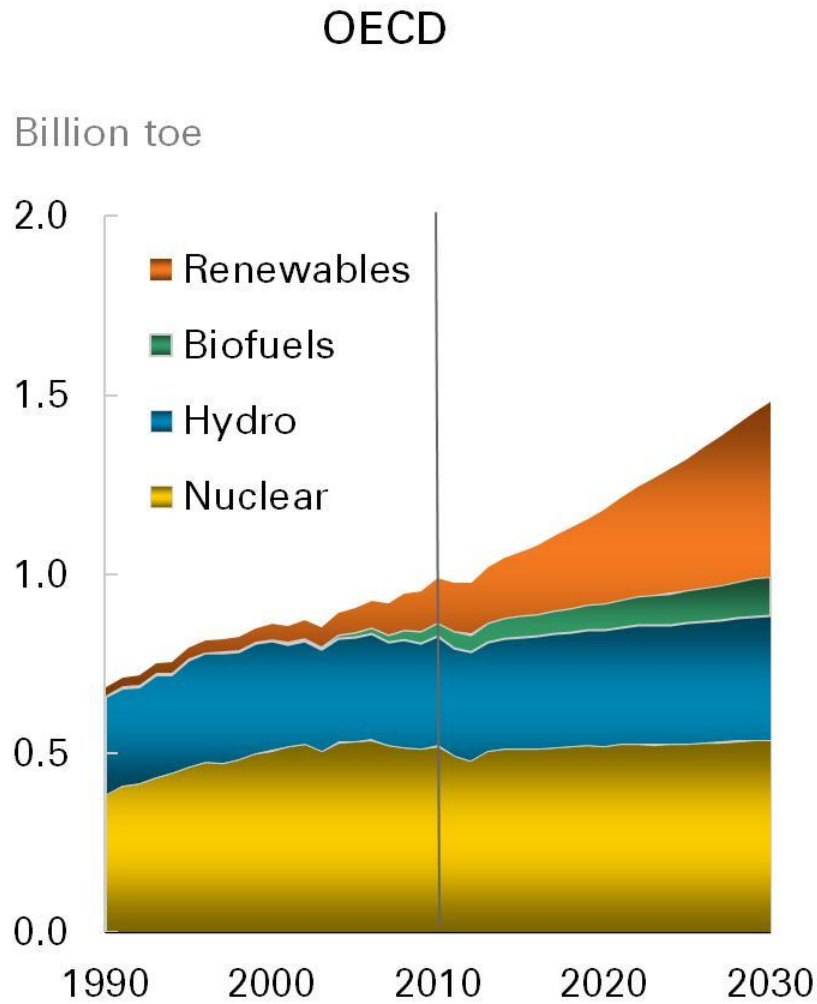


### Coal demand by sector





# Non-fossil fuels growth is led by renewables in the OECD



# Outline

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Global energy trends

Outlook 2030: Fuel by fuel

**Key determinants**

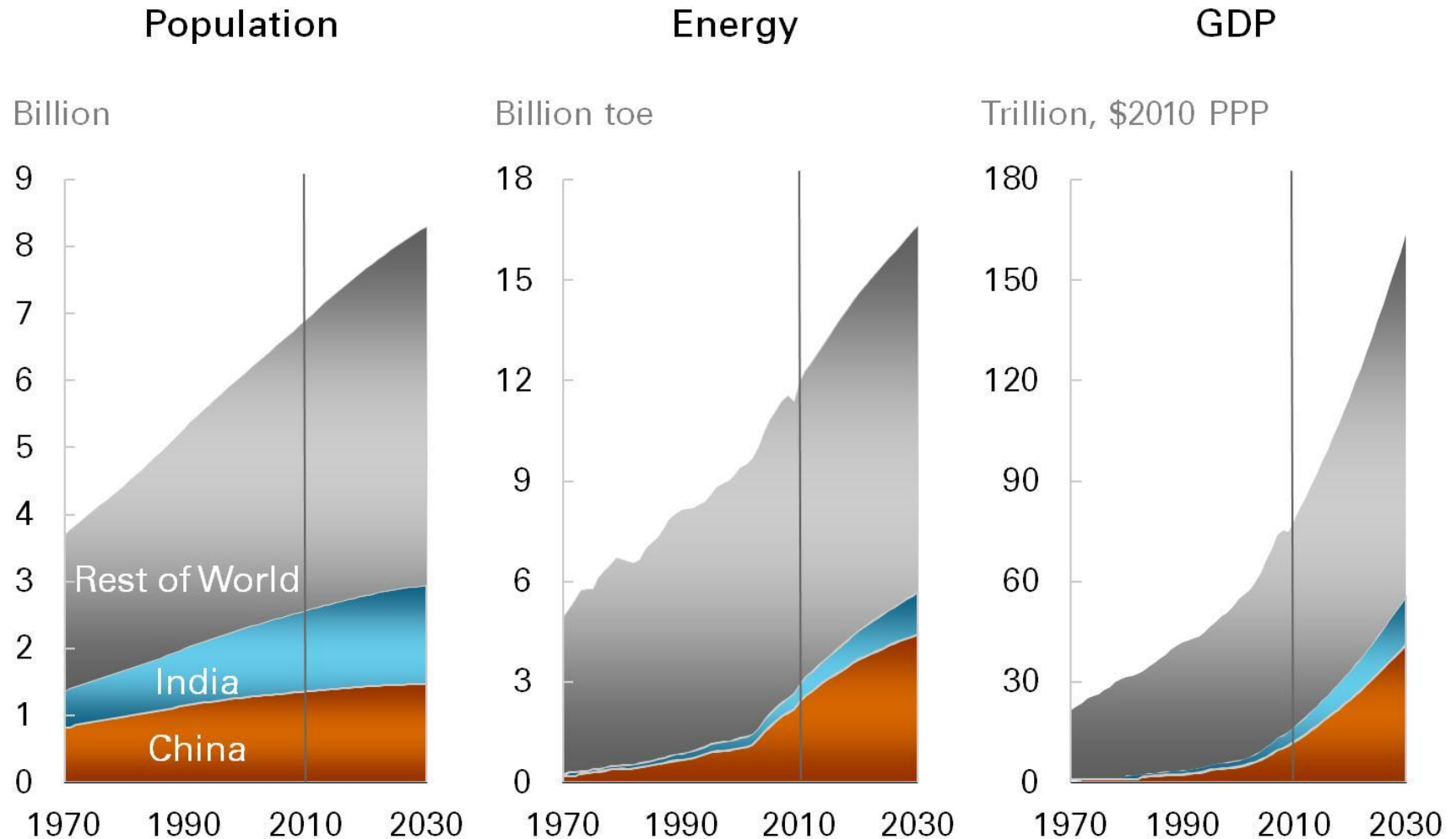
**China and India**

Middle East

Transport

Risks and unknowns

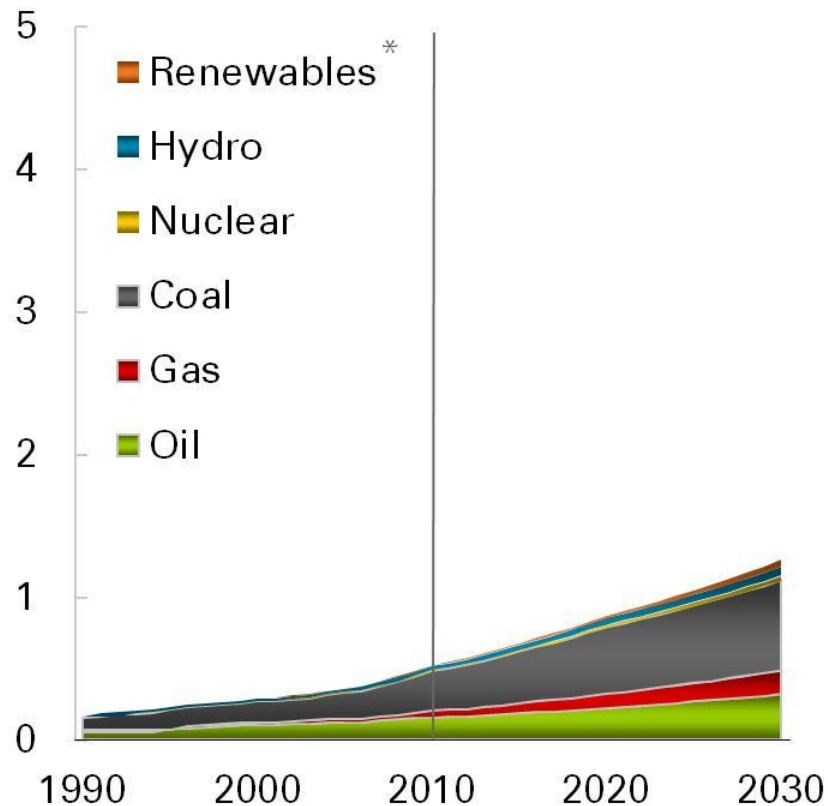
# Pace and scale of development in India and China



# Energy consumption growth in India and China

India

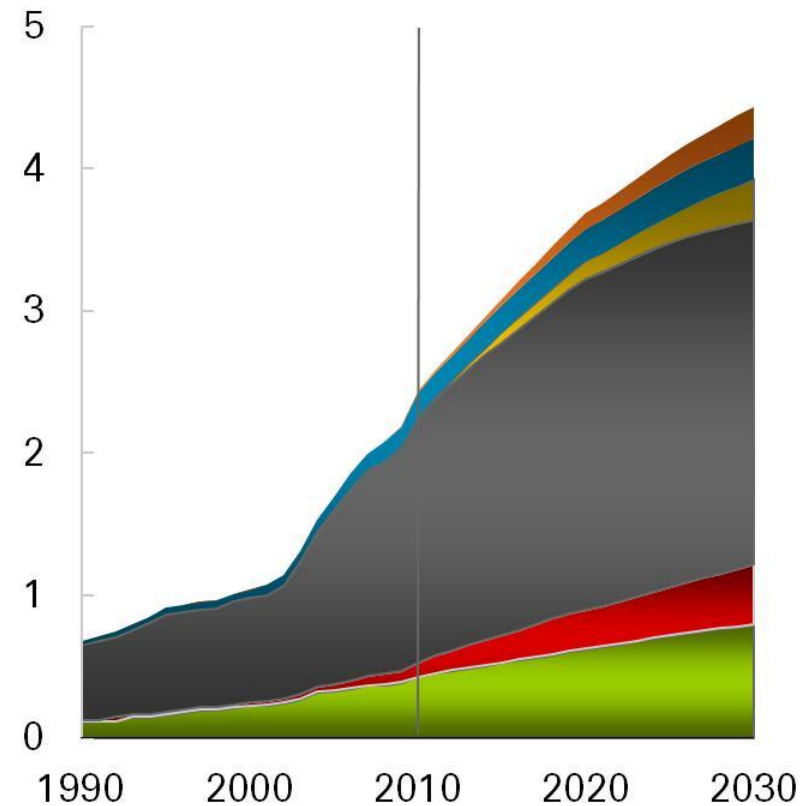
Billion toe



\*Includes biofuels

China

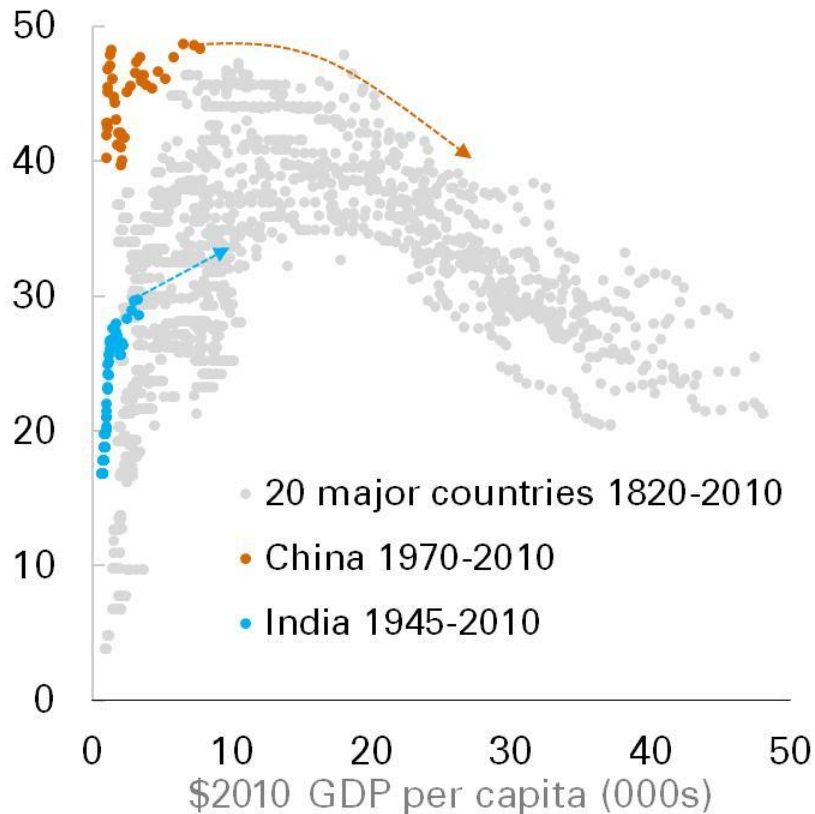
Billion toe



# Patterns of development

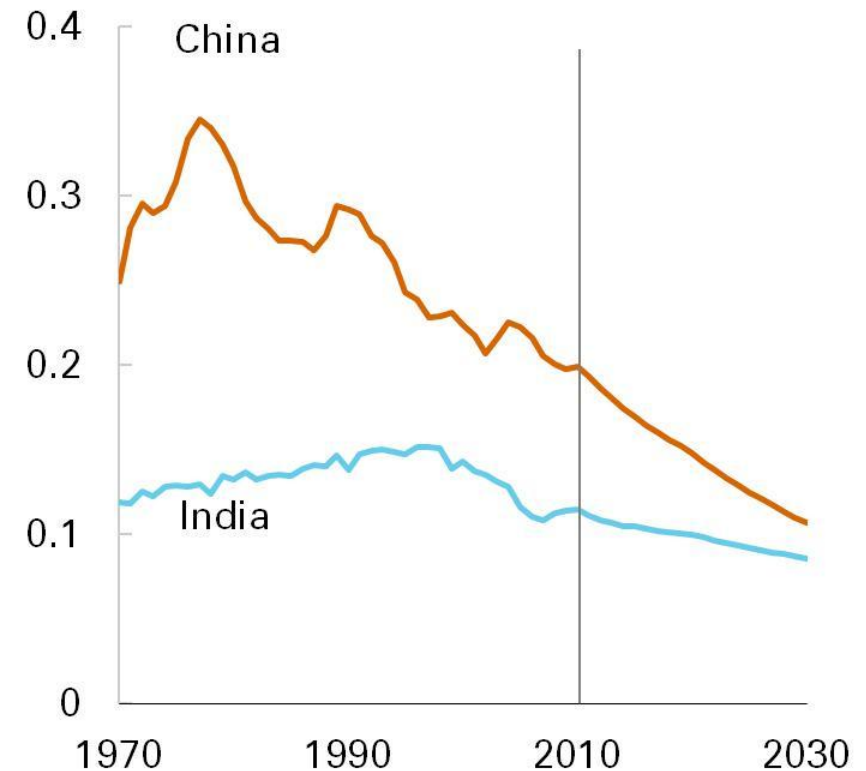
## Industrialisation

Industry as %GDP



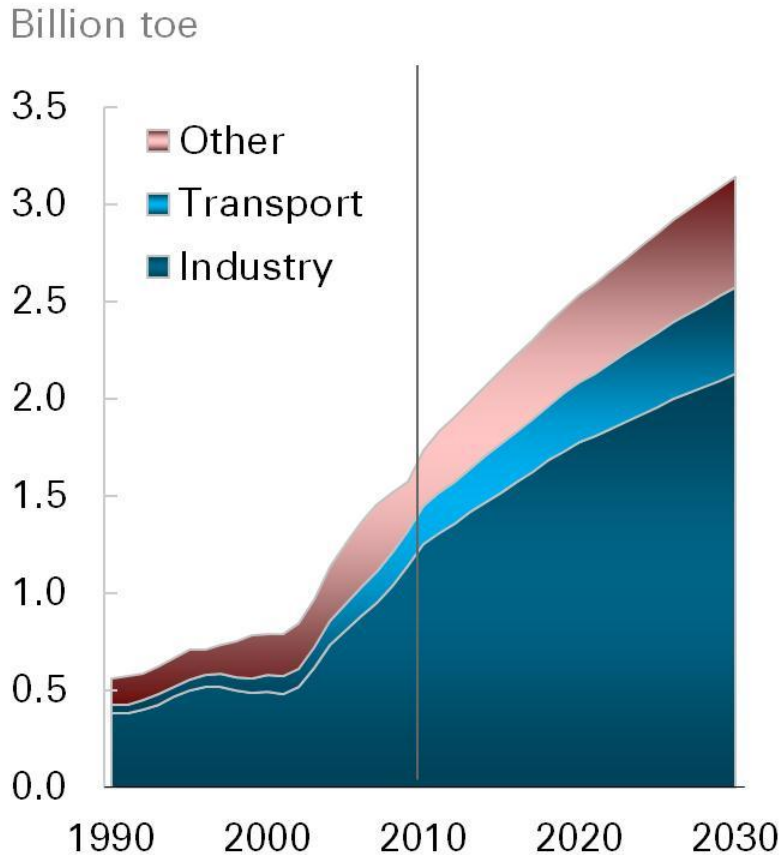
## Energy intensity

Toe per thousand \$2010 GDP

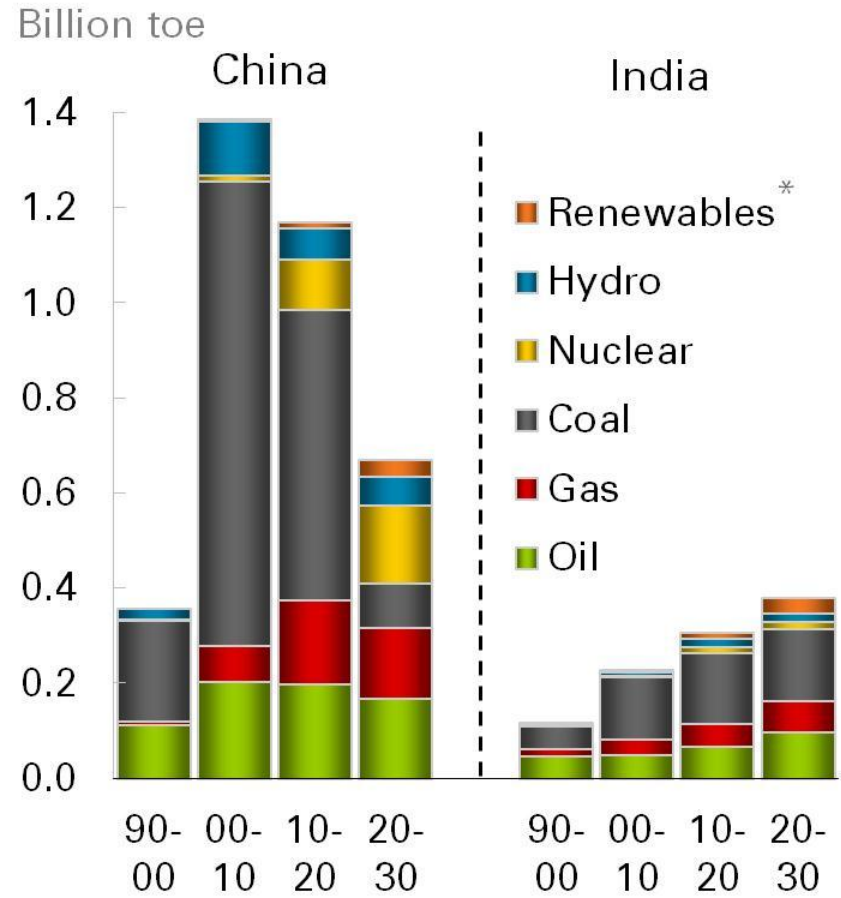


## Industry causes energy demand to decelerate

China: final energy demand by sector



Primary energy growth by fuel



\*Includes biofuels

# Outline

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Global energy trends

Outlook 2030: Fuel by fuel

Key determinants

China and India

**Middle East**

Transport

Risks and unknowns



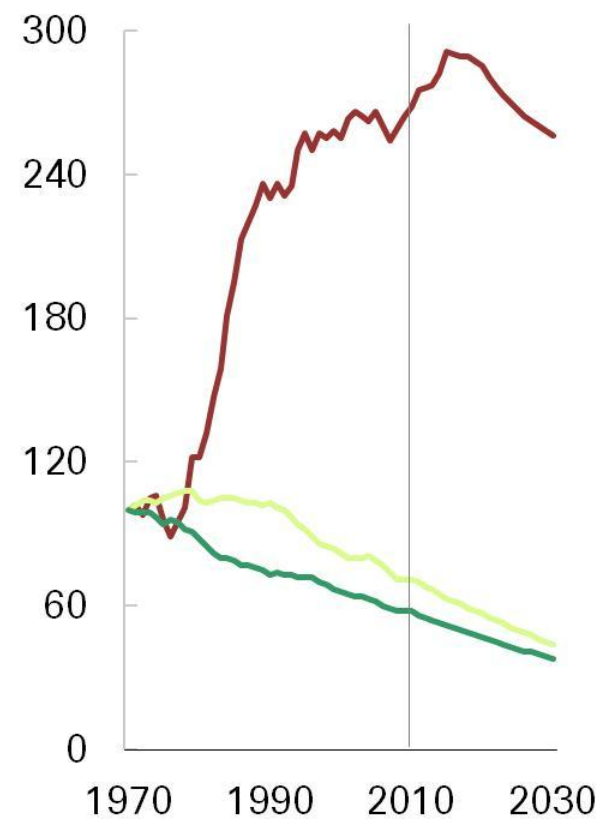
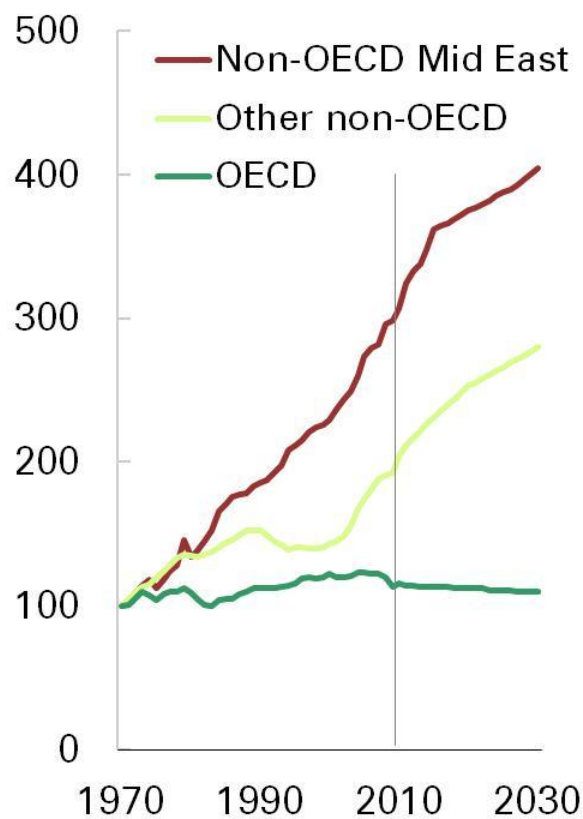
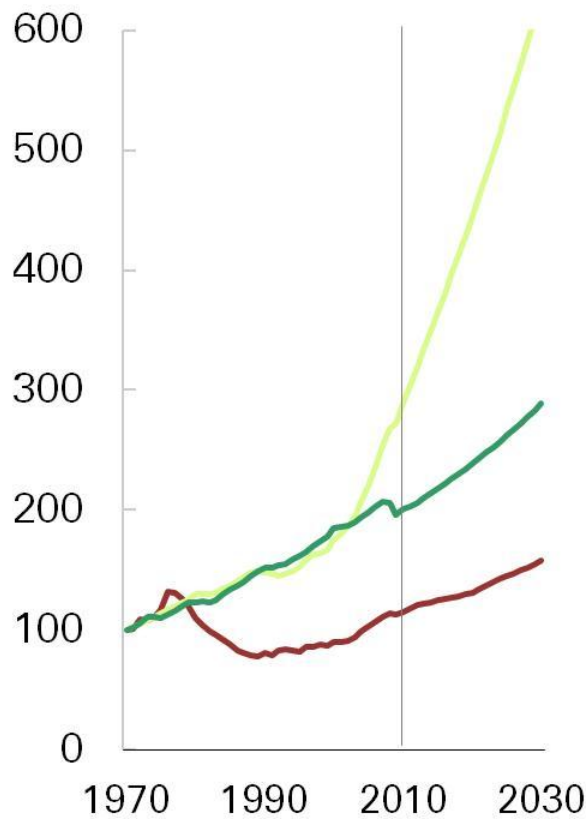
# Resource availability defines the Middle East

GDP per capita

Energy per capita

Energy intensity

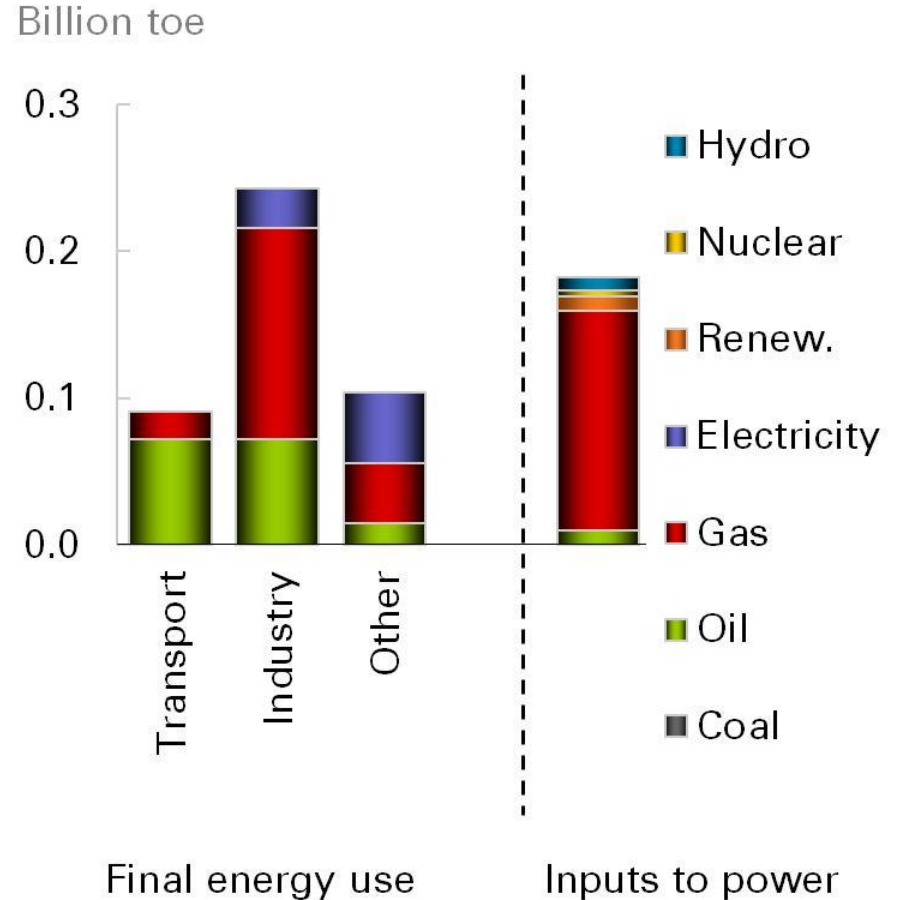
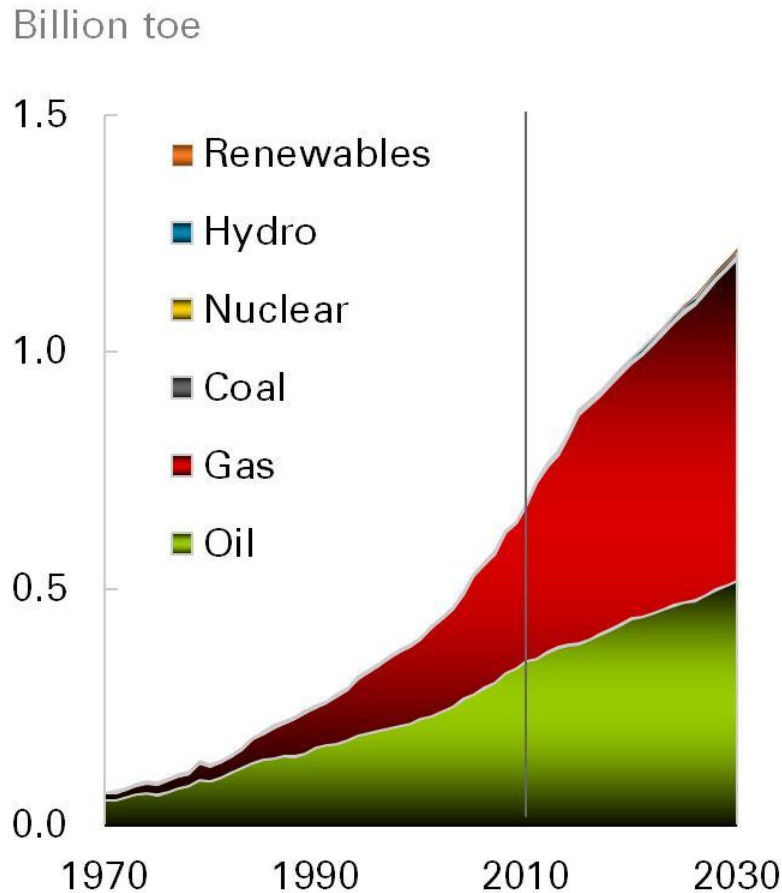
Index (1970=100)



## Gas will play a key role in domestic demand

Regional demand by fuel

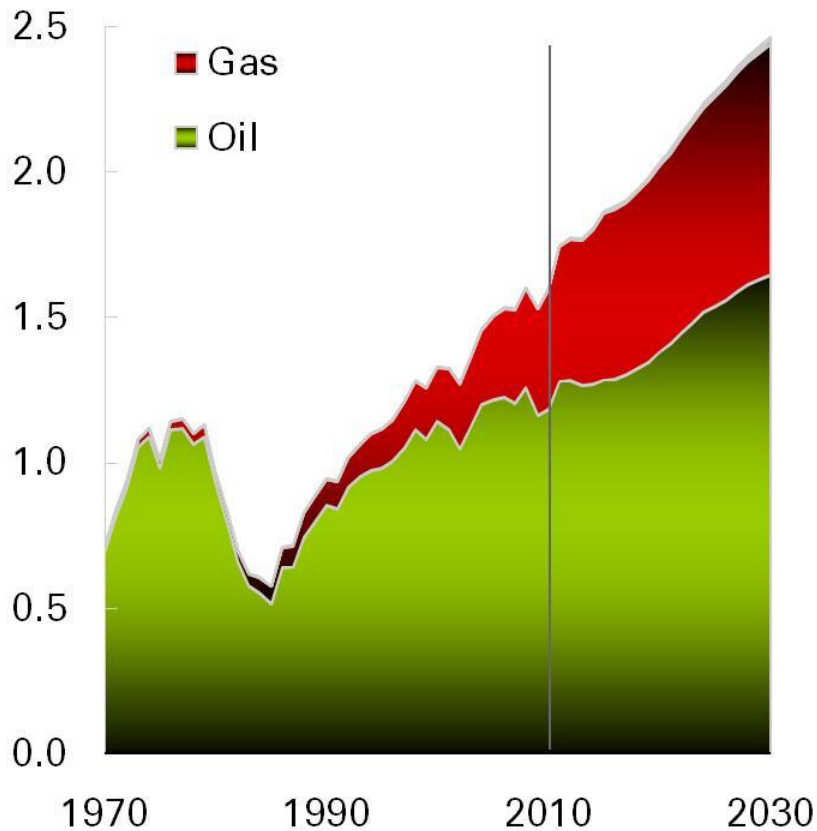
2010-30 growth by sector and fuel



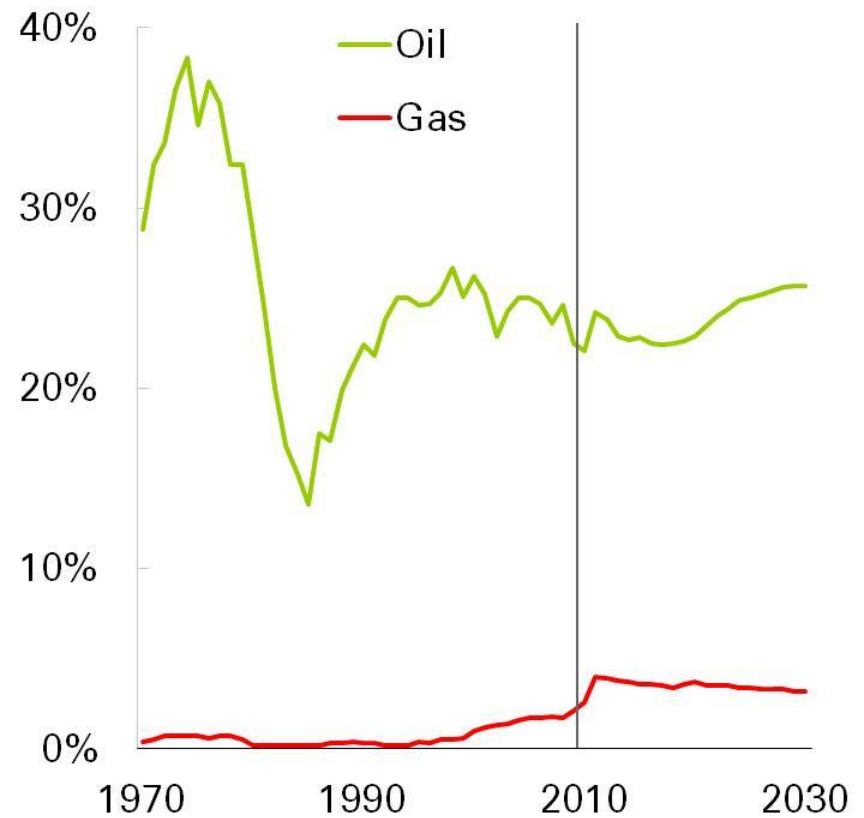
# The region's role in global oil markets will continue

Supply by fuel

Billion toe



Exports as share of global demand (excl. Mid East)



# Outline

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Global energy trends

Outlook 2030: Fuel by fuel

Key determinants

- China and India

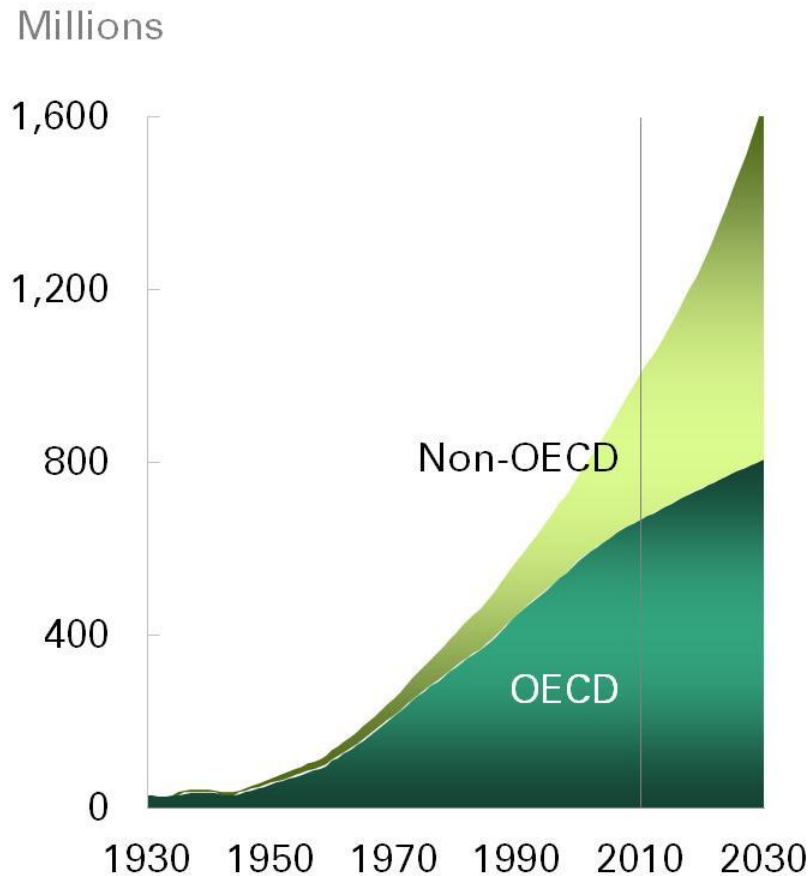
- Middle East

- Transport**

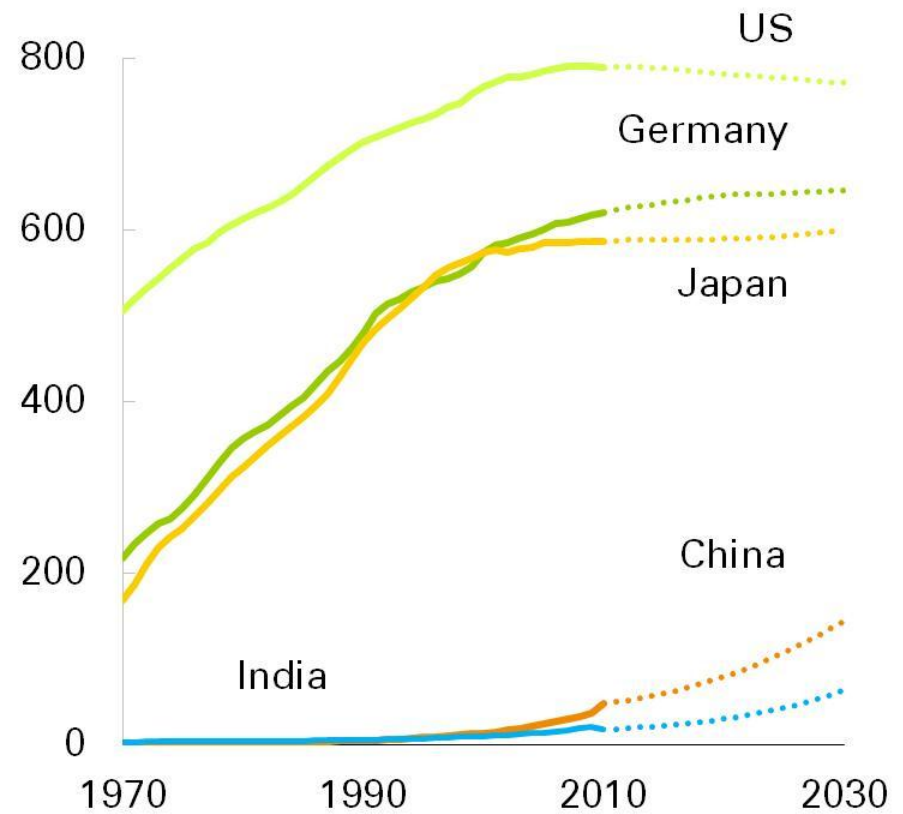
Risks and unknowns

## Vehicle numbers are set to grow rapidly in the Non-OECD

Total number of vehicles



Vehicles per thousand people

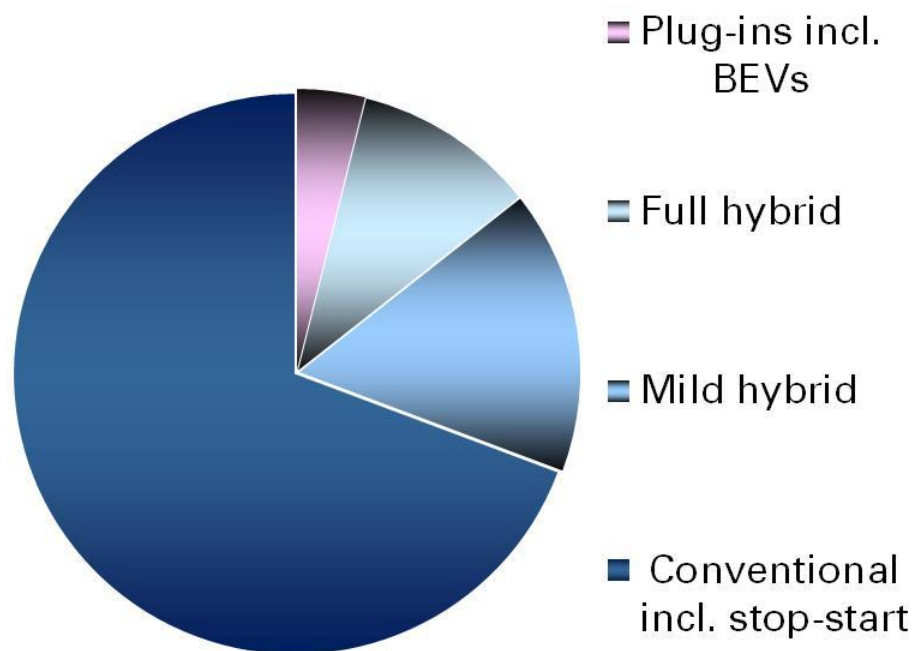
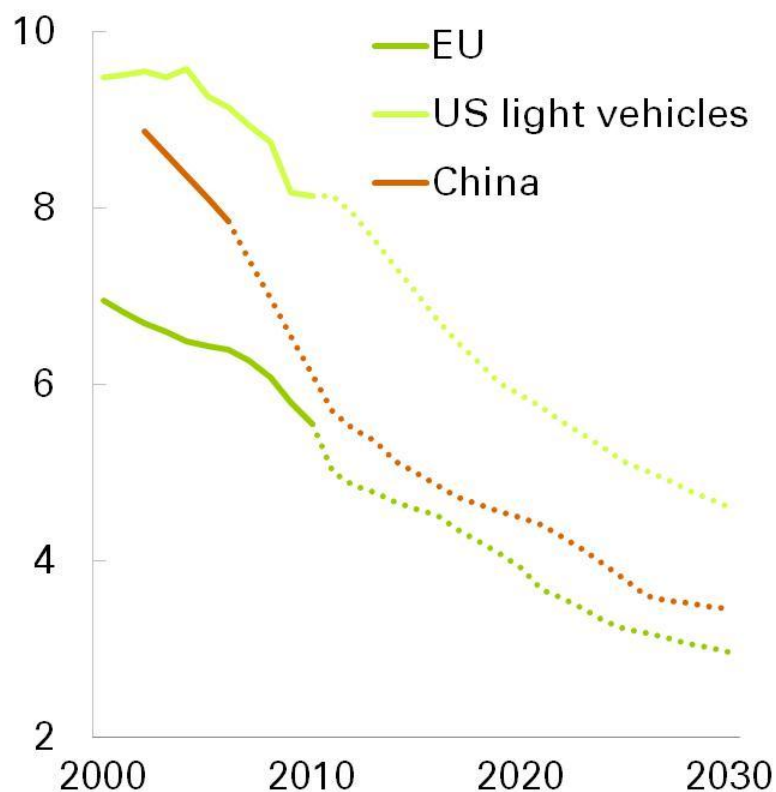


# Policy and technology enable efficiency improvements

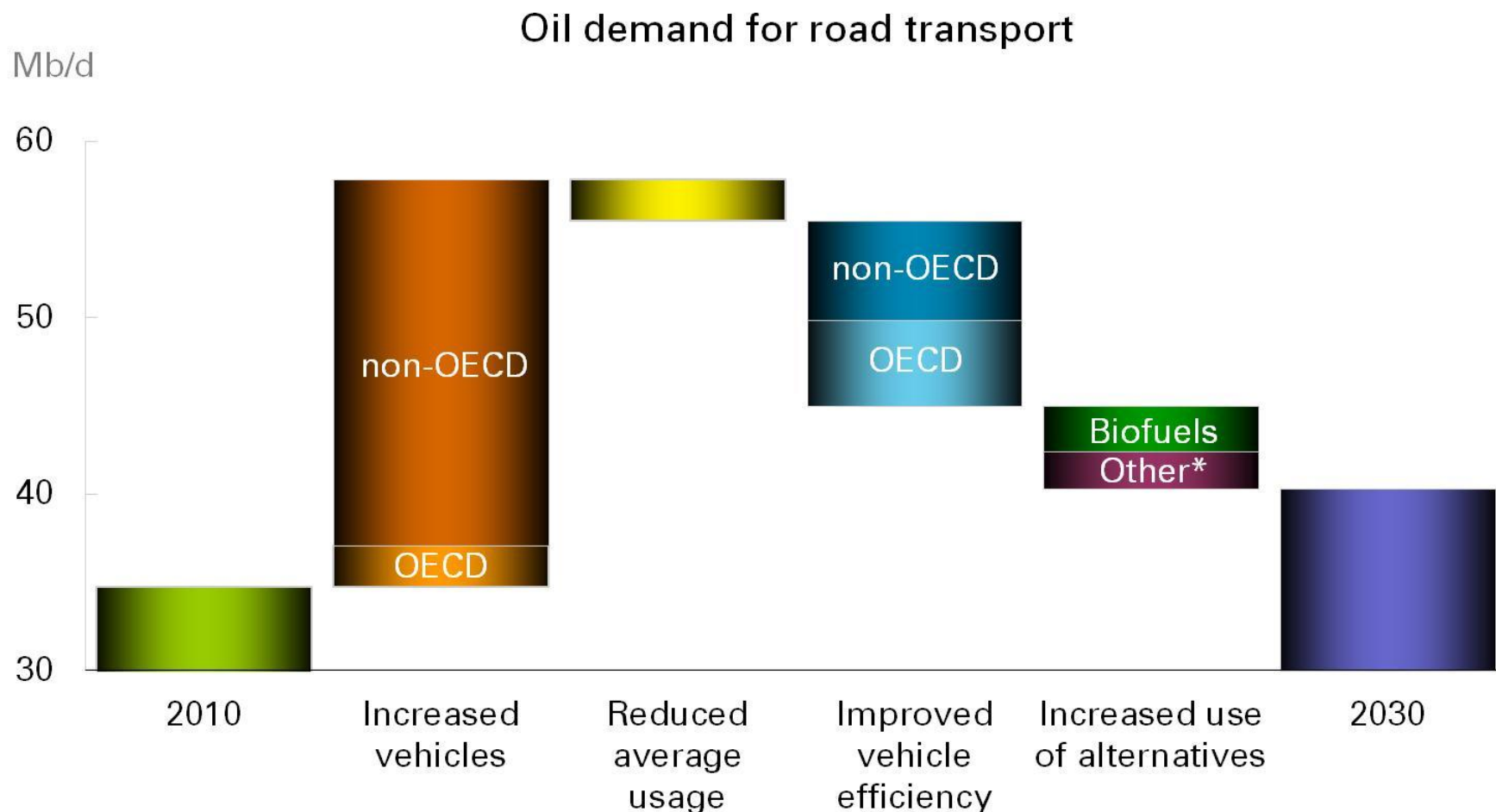
Projected car efficiency

Global vehicle fleet in 2030

Litres per 100 km



# Efficiency gains have the biggest impact on oil demand



\* Includes GTL, CTL, CNG, LNG and electricity



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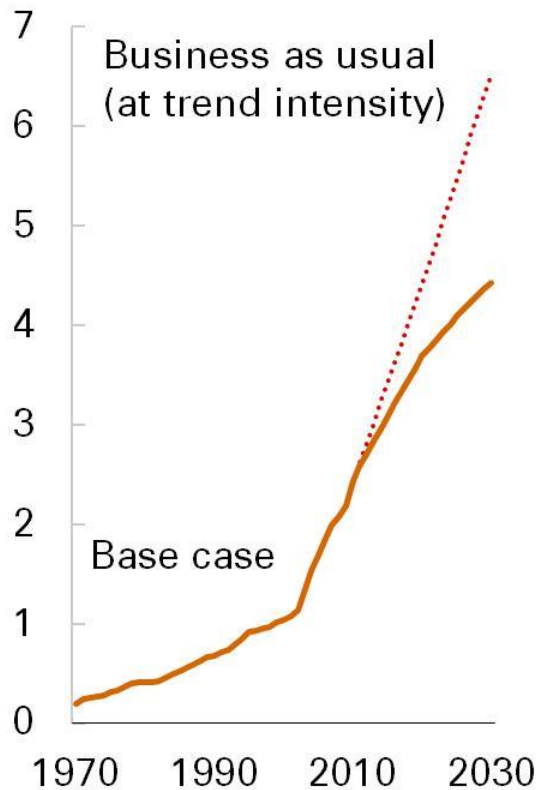
**Risks and unknowns**

# The impact of "business as usual"

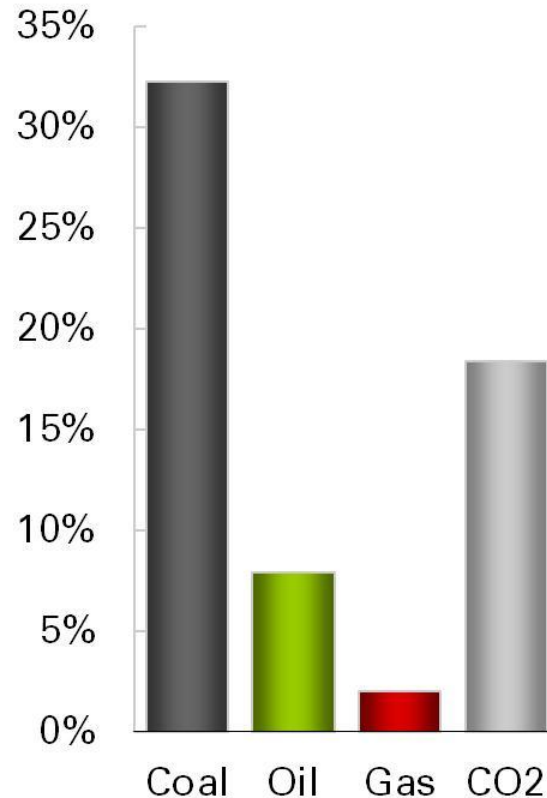
...for China, and its global fuel impact

...and in oil markets

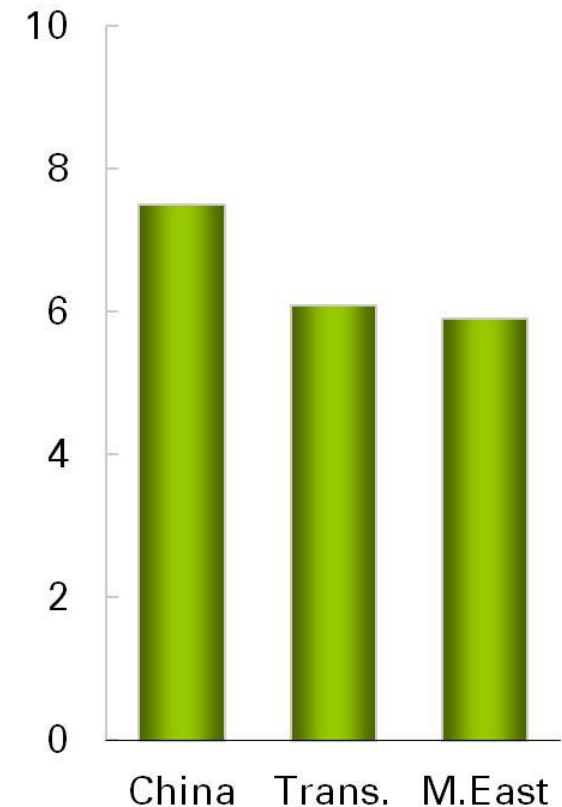
Billion toe



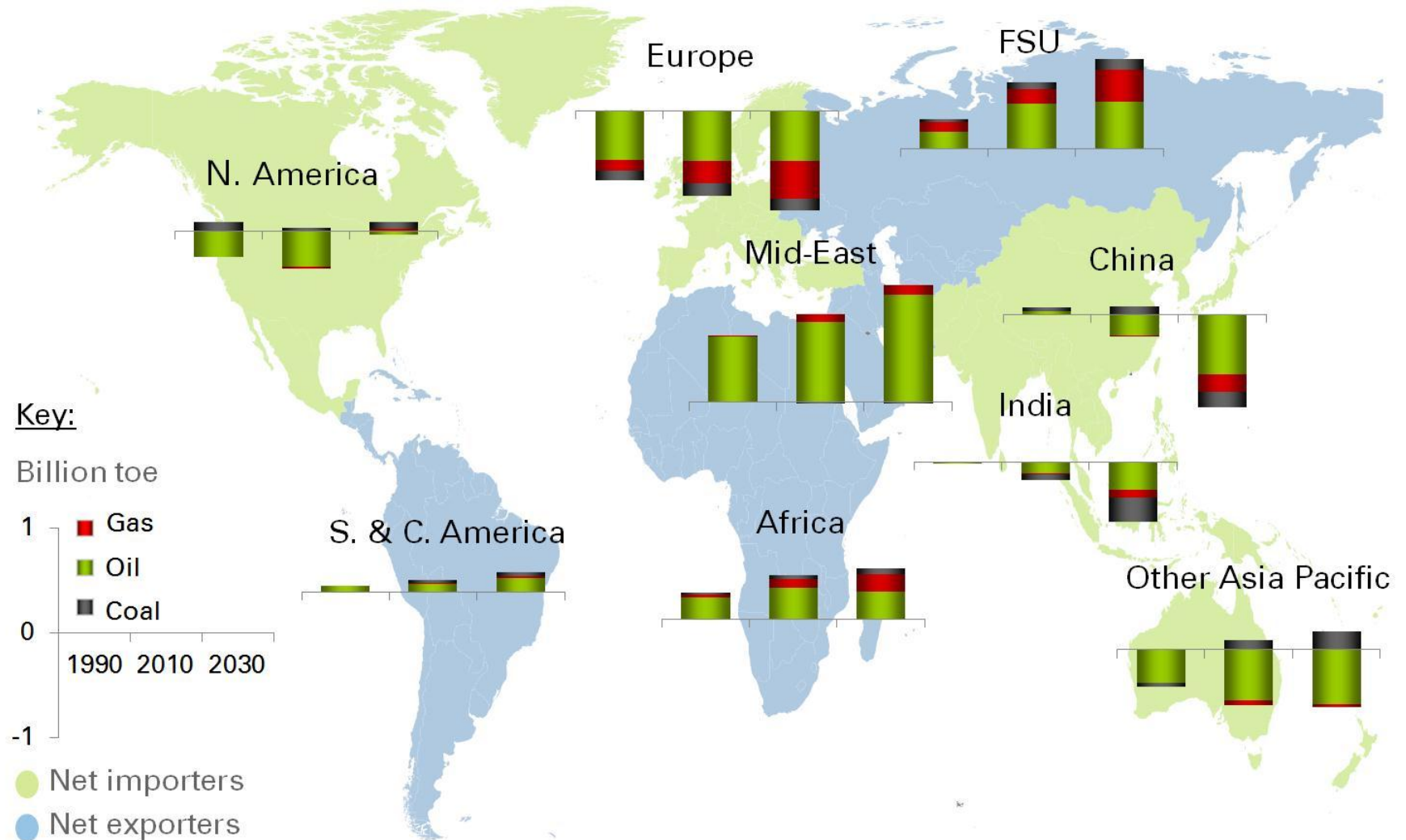
% of world demand in 2030



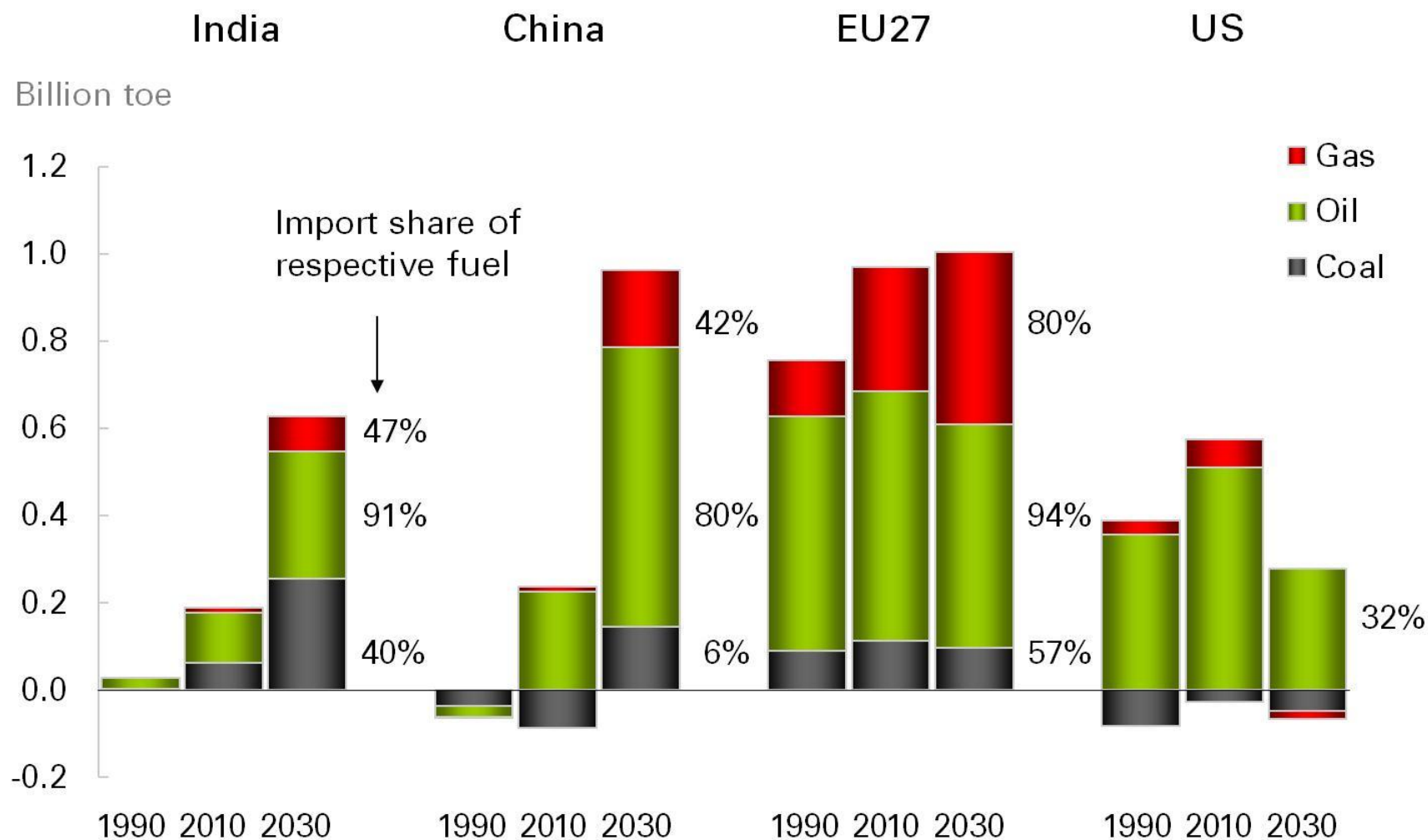
Mb/d in 2030



# Energy imbalances improve in the Americas



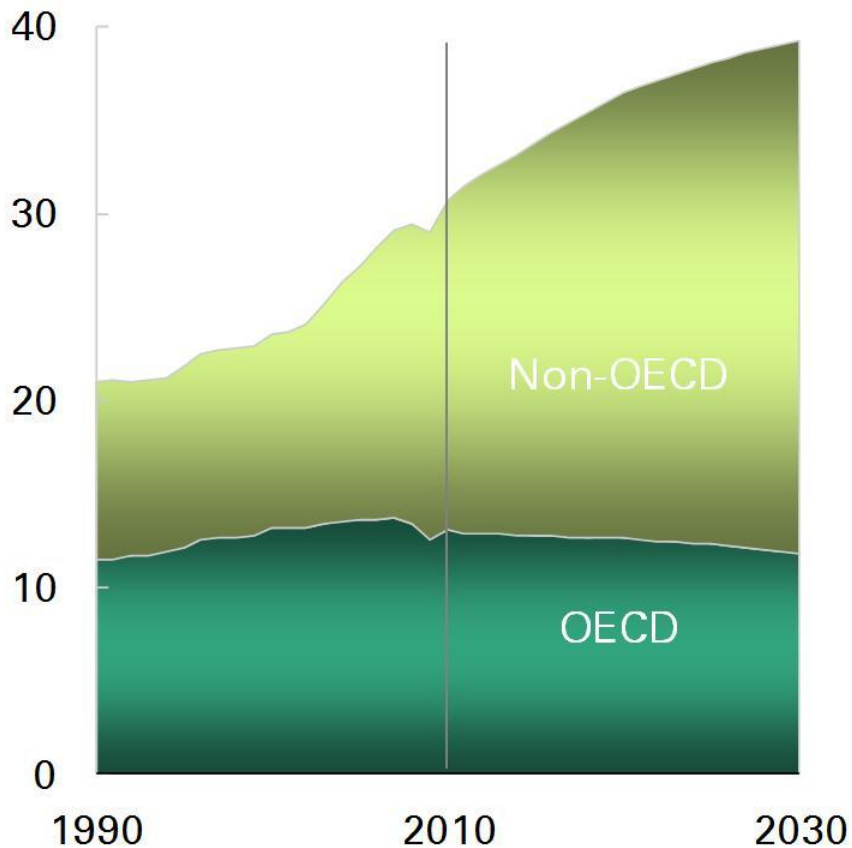
## Import dependency rises in Asia and Europe



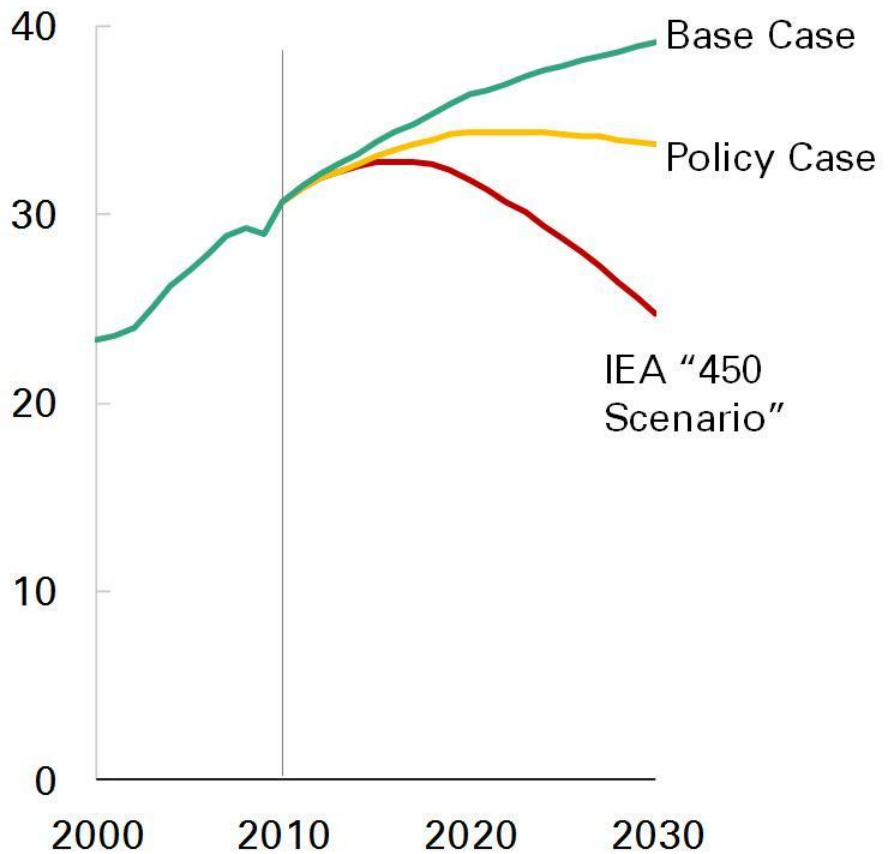
# Carbon emission growth slows, but more action is needed

## Global CO<sub>2</sub> emissions from energy use

Billion tonnes CO<sub>2</sub>



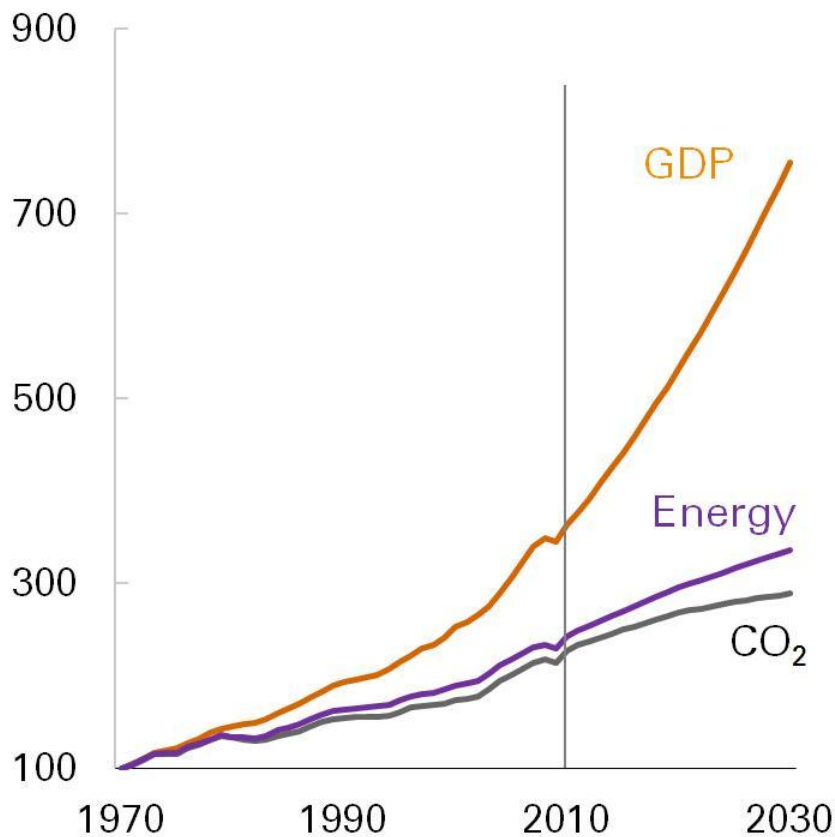
Billion tonnes CO<sub>2</sub>



## Conclusion

### GDP, Energy and CO<sub>2</sub>

Index (1970=100)



- Energy can be available and affordable
  - Competition
  - Innovation
  - Regulation
- Energy security an issue
- CO<sub>2</sub> emissions not on track





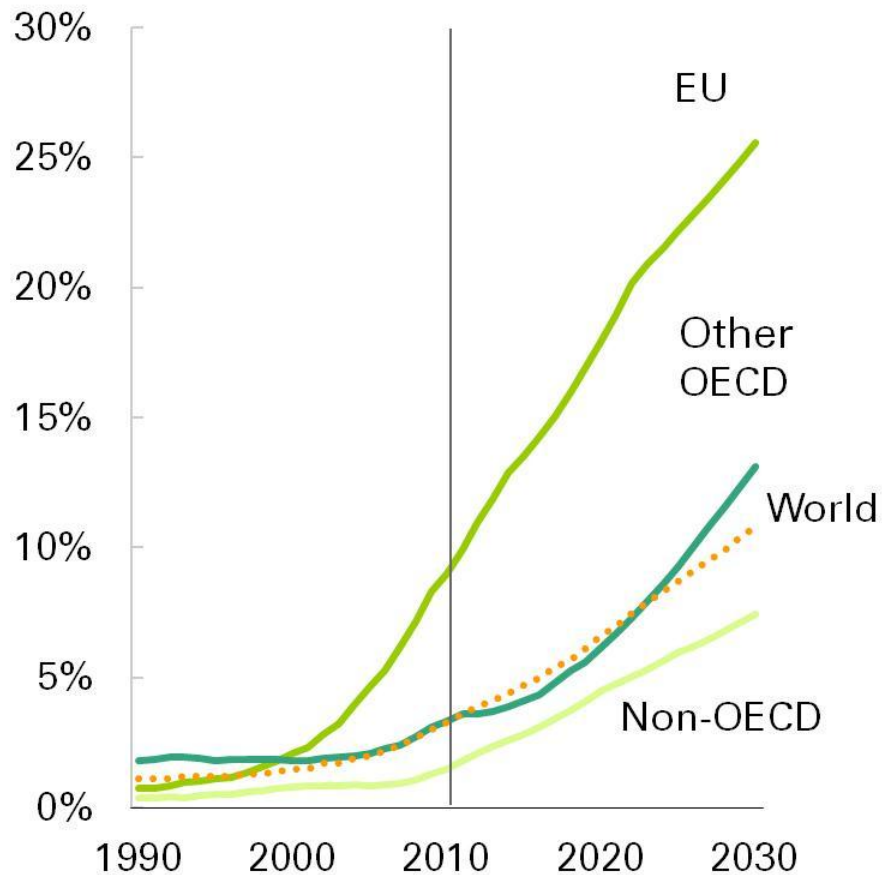
# BP Energy Outlook 2030

<http://www.bp.com/energyoutlook2030>

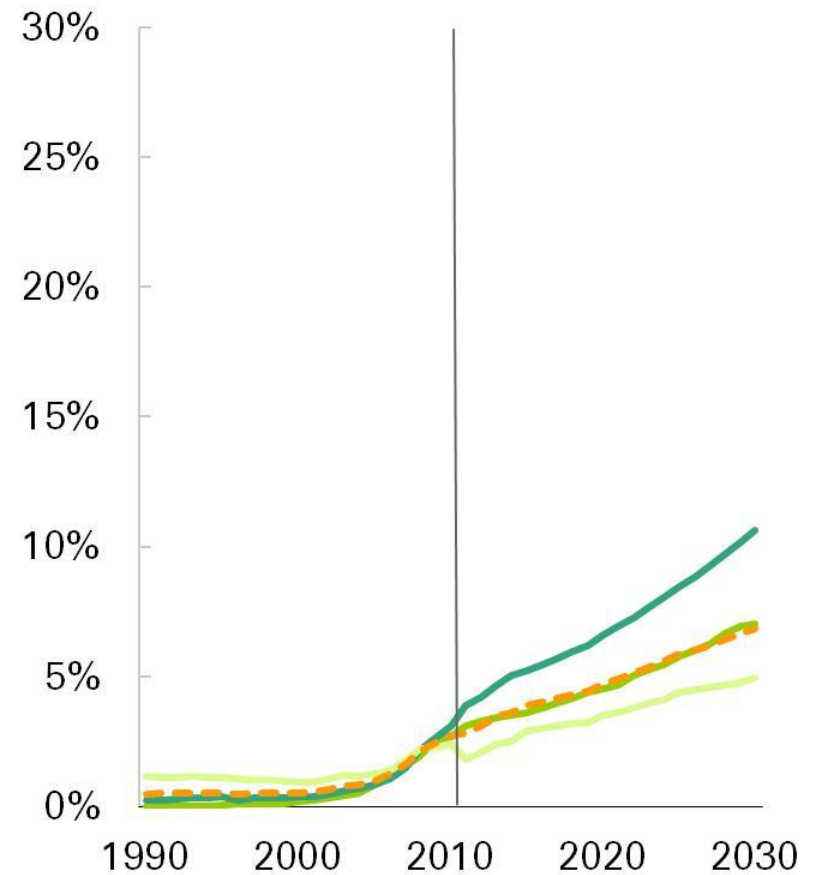


# Renewables increase their share in power and transport

## Share of power generation

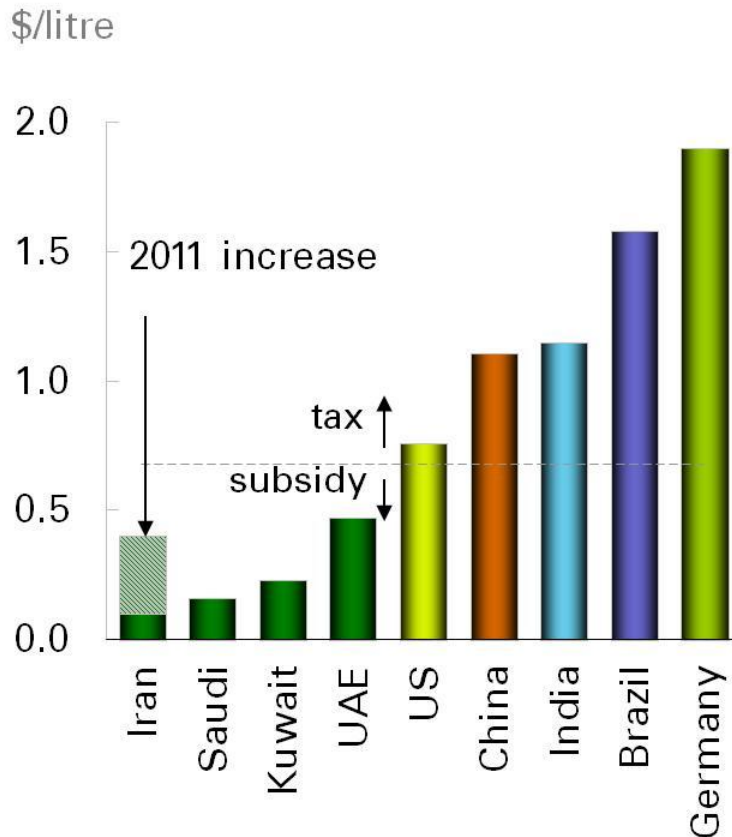


## Share of transport sector

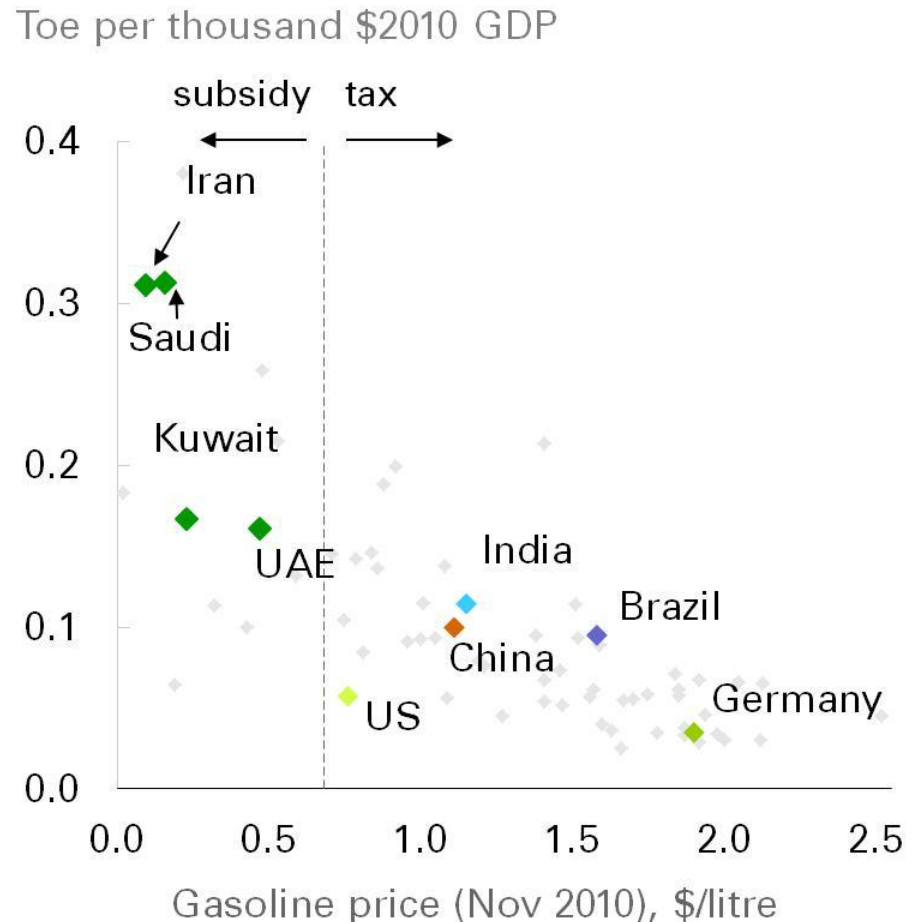


# High subsidies contribute to elevated energy intensity

Retail gasoline prices (Nov 2010)



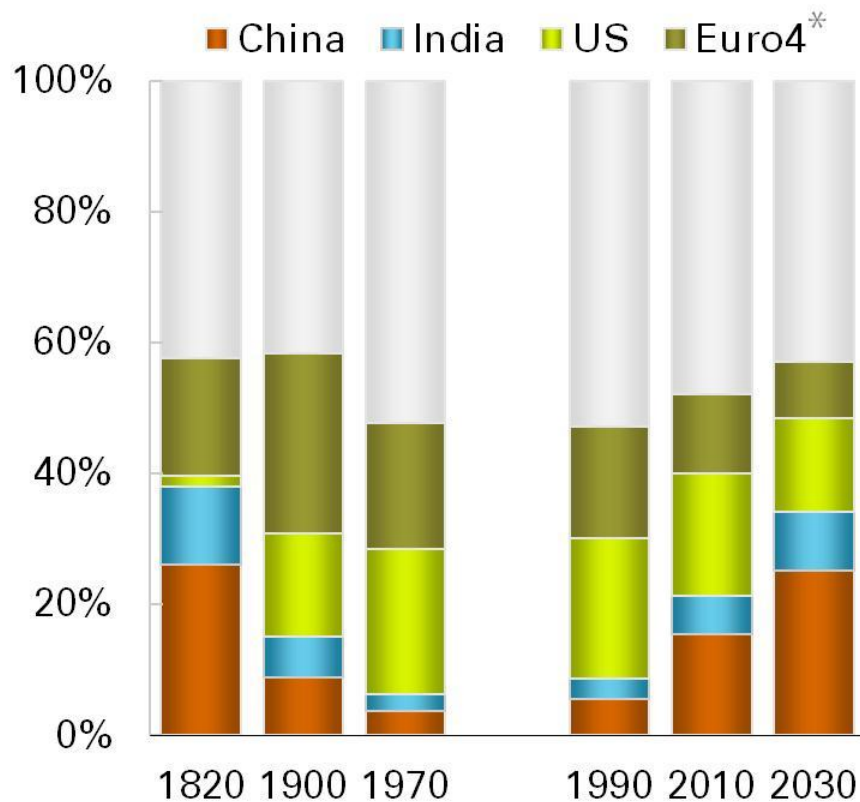
Oil intensity vs prices



## Long-run trends

### World GDP shares

% of world GDP



\*Includes UK, France, Germany, Italy

### World population shares

% of world population

