



International
Energy Agency
1974•2014

Oil and Gas : Short & Medium Term Outlook and Long Term Uncertainty

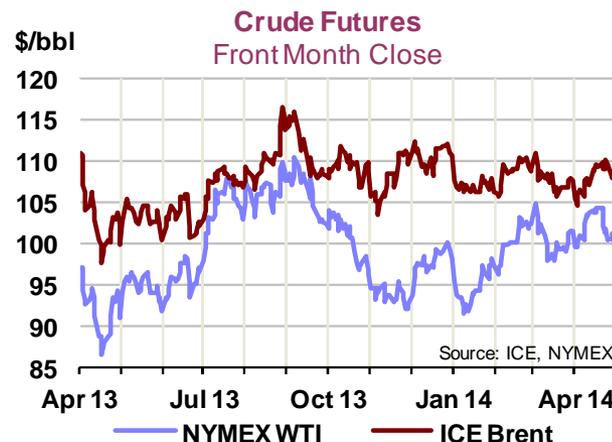
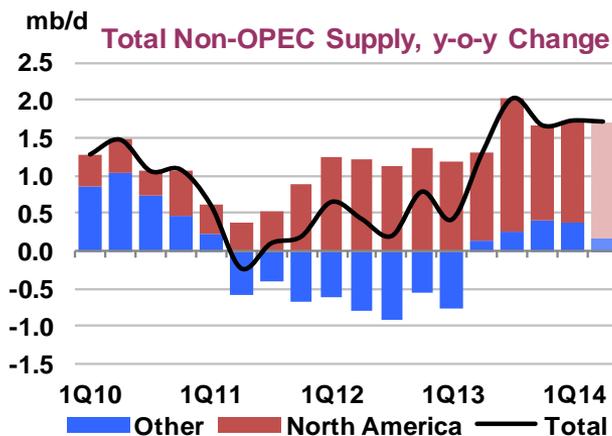
Keisuke Sadamori, Director, IEA

IEEJ, 30 May 2014

The new oil paradox: High supply, high prices

OIL

Medium-Term
Market Report
2014

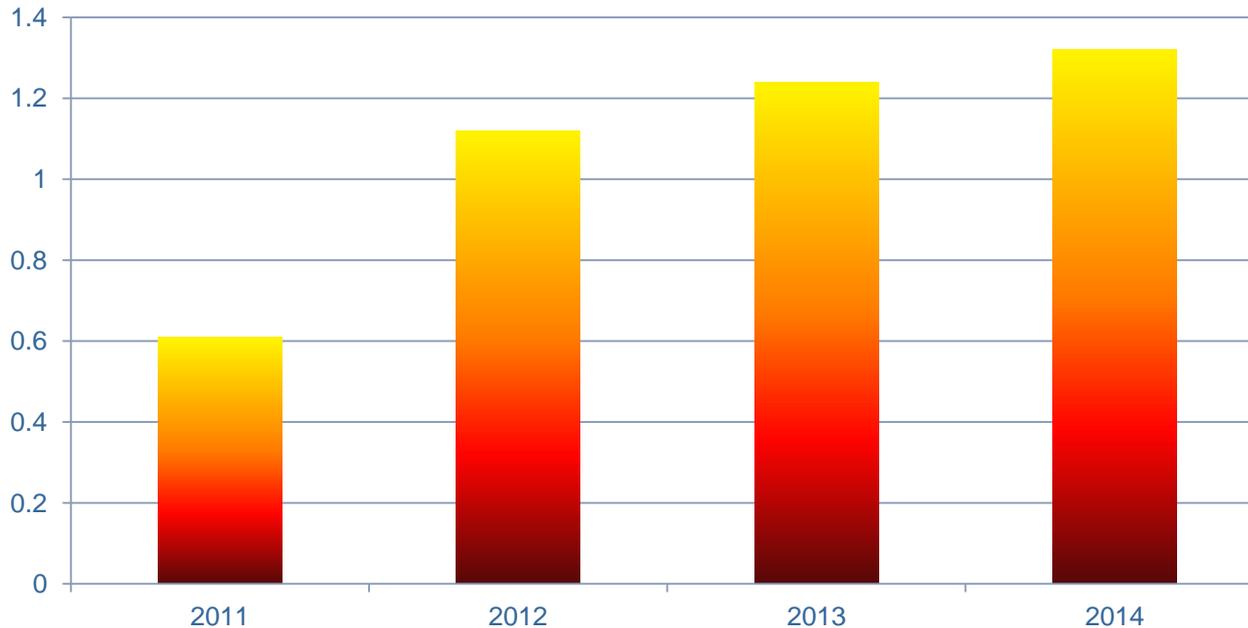


- **Non-OPEC Supply remains exceptionally high**
 - Annual growth of 1.8 mb/d in 1Q14 and April
 - Forecast growth of 1.5 mb/d for 2014 as a whole
 - US crude supply to exceed 8 mb/d in 2014 reaching 8.6 mb/d in 4Q14
 - US NGL supply to exceed 2.8 mb/d in 4Q14
 - Total US liquids (exc. biofuels & processing gains) 11.3 mb/d April 2014
 - Total US liquids >11 mb/d for the first time since at least the 1980s
- Yet oil prices also remain exceptionally elevated

Global demand inches upwards...

Medium-Term
Market Report
2014

Global demand growth
(mb/d)

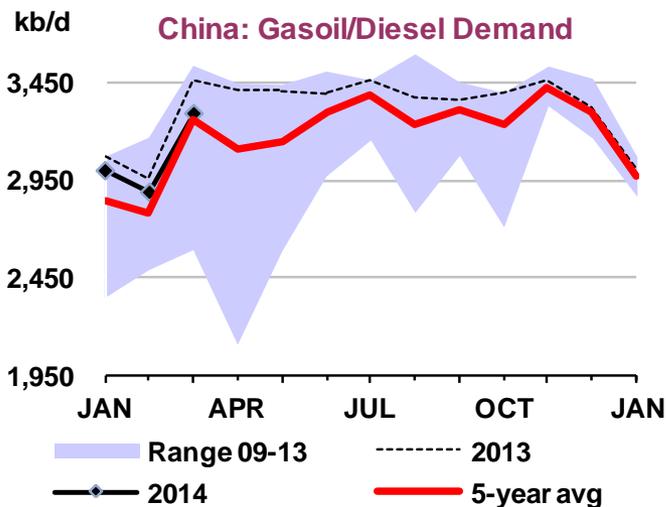


- ***Global oil demand grows as the economic recovery gains momentum***
- ***But inter-fuel competition rises, including in the transport sector***

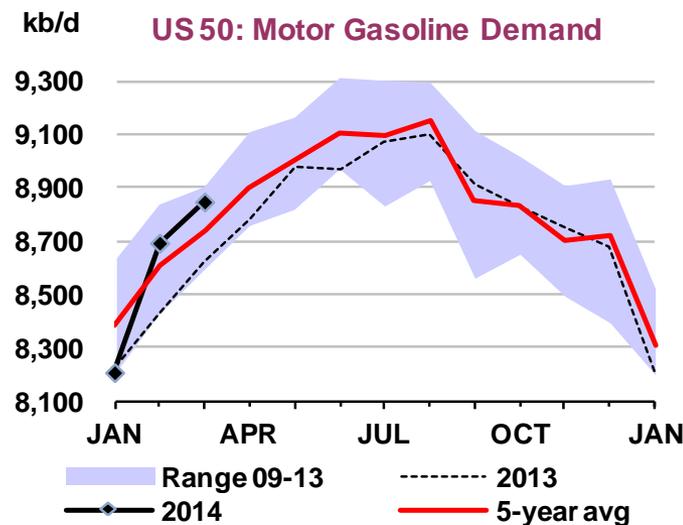
... and rebalances across regions

US resilience offsets China slowdown

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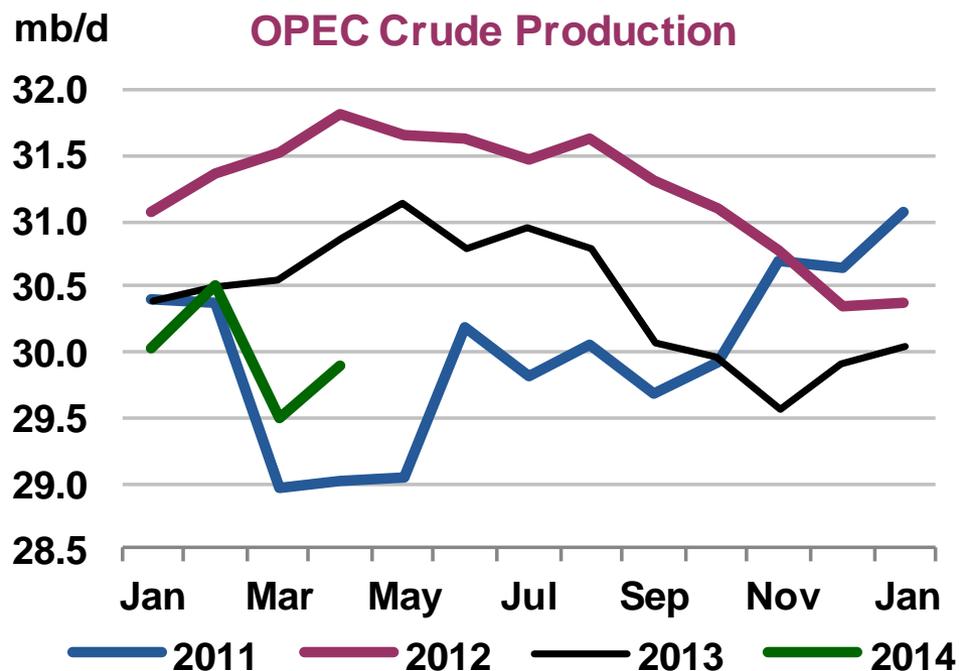


- Chinese economic slowdown dampens demand
- Fuel switching out of oil
- But from a high base
- Chinese demand up 2% y-o-y to 10.2 mb/d in March



- OECD demand swung back into growth in 2013
- US demand grew by 1.3% y-o-y to 19 mb/d in February
- Demand also rising in other non-OECD economies

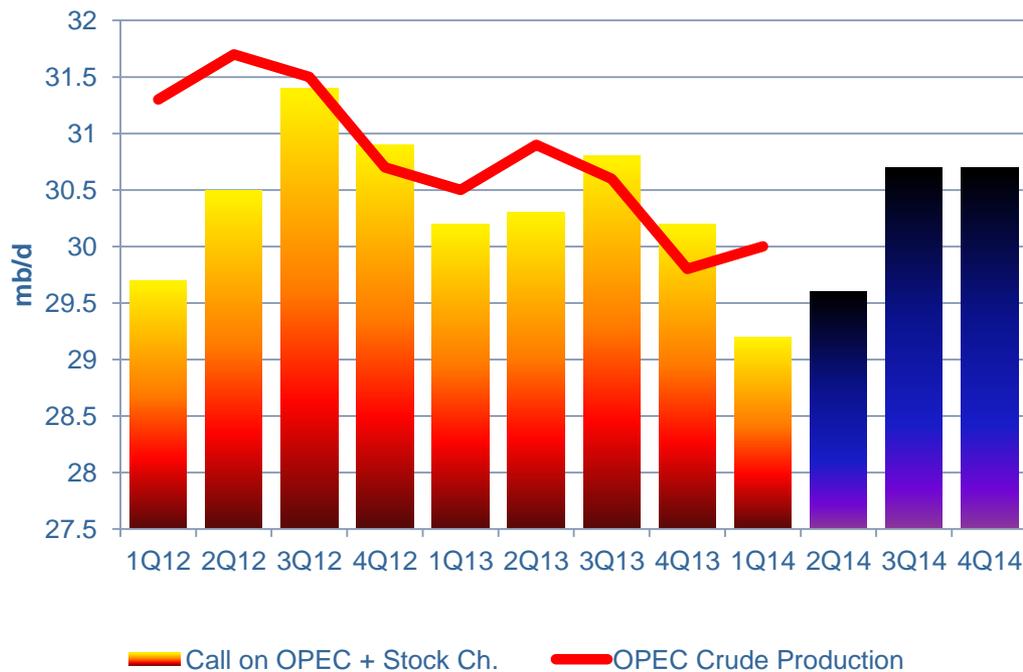
OPEC faces production hurdles...



- *OPEC's real production challenges are internal not external (shale)*
- *Production back near 30 mb/d in April, up 405 kb/d*
- *But supply down nearly 1 mb/d on the year*
- *Libyan production still at 220 kb/d in April*

... but must ramp up production to meet demand

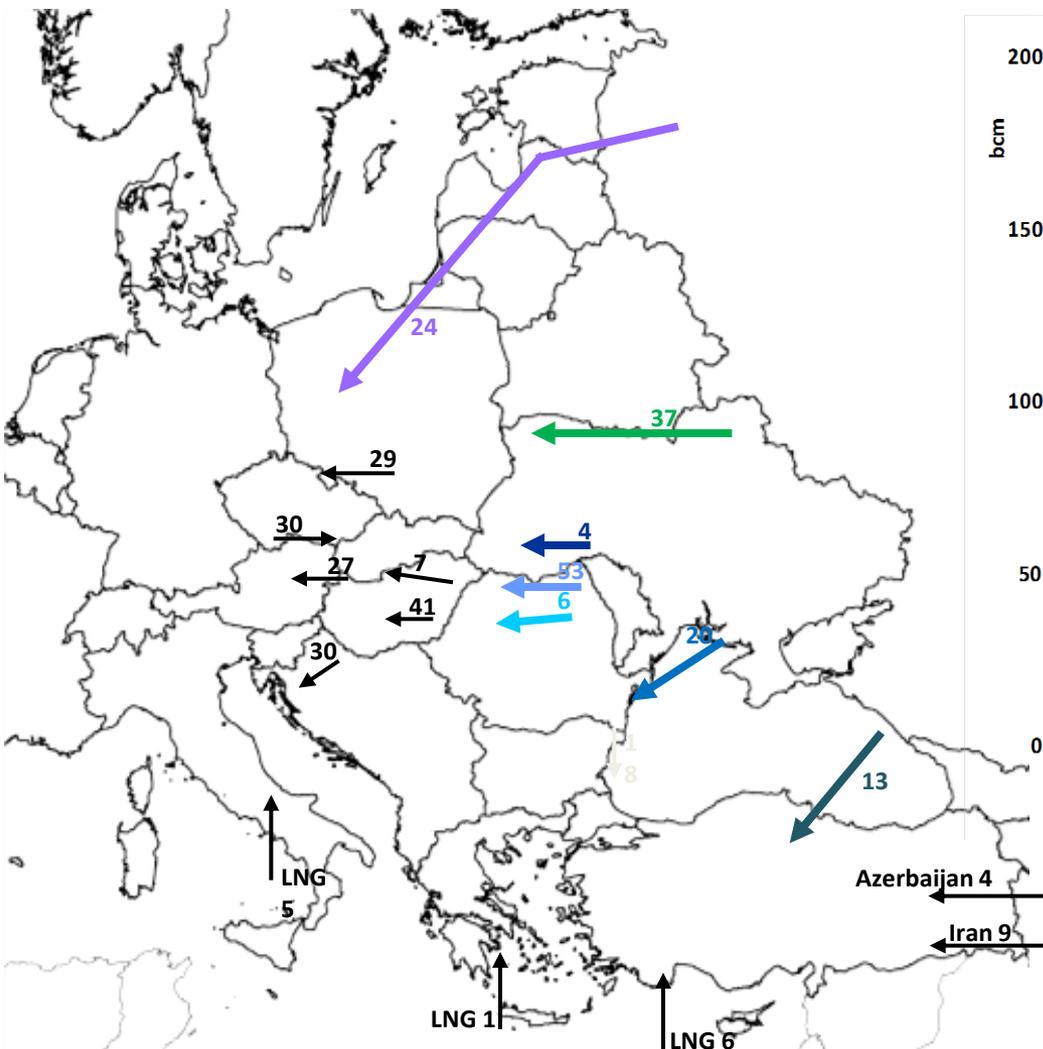
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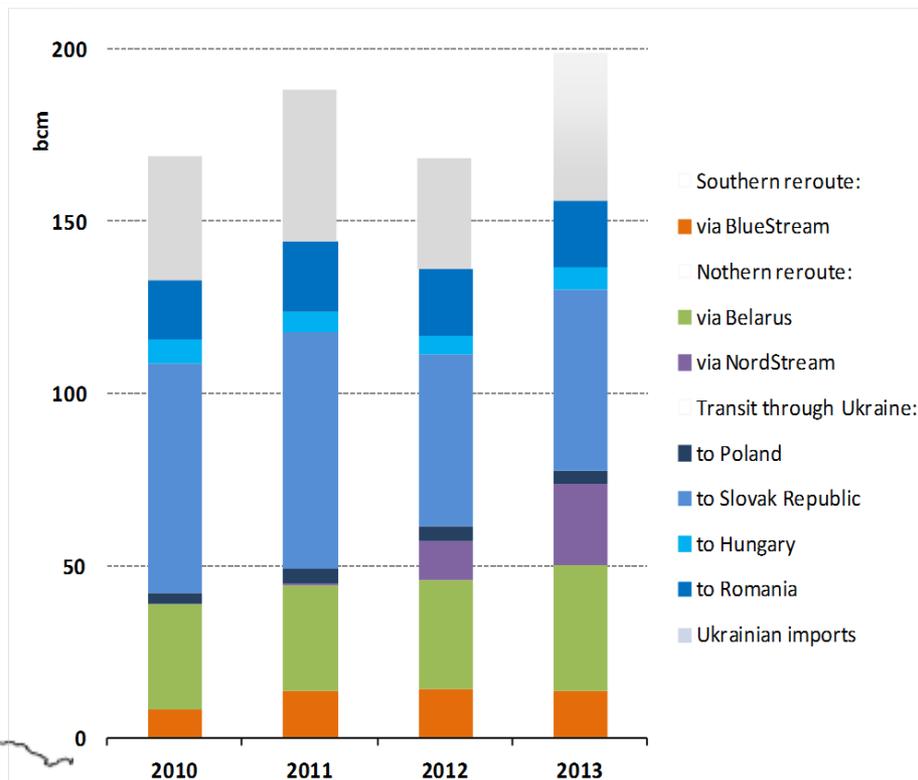
	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13	1Q14	2Q14	3Q14	4Q14
World Demand	89.3	89.5	90.7	91.3	90.4	90.8	92.1	92.4	91.3	92.1	93.6	94
Non-OPEC Supply	53.5	52.9	53	54.2	53.9	54.2	55	55.8	55.7	56.1	56.3	56.8
OPEC NGLs	6.1	6.1	6.2	6.2	6.3	6.3	6.4	6.3	6.4	6.4	6.6	6.6
OPEC Crude	31.3	31.7	31.5	30.7	30.5	30.9	30.6	29.8	30			
Stock Ch. & Misc.	1.6	1.2	0	-0.2	0.3	0.6	-0.2	-0.4	0.8			
Call on OPEC + Stock Ch.	29.7	30.5	31.4	30.9	30.2	30.3	30.8	30.2	29.2	29.6	30.7	30.7

Ukraine gas transit still vital – Nord Stream only alternative with excess capacity

Major physical flows in 2013 in bcm

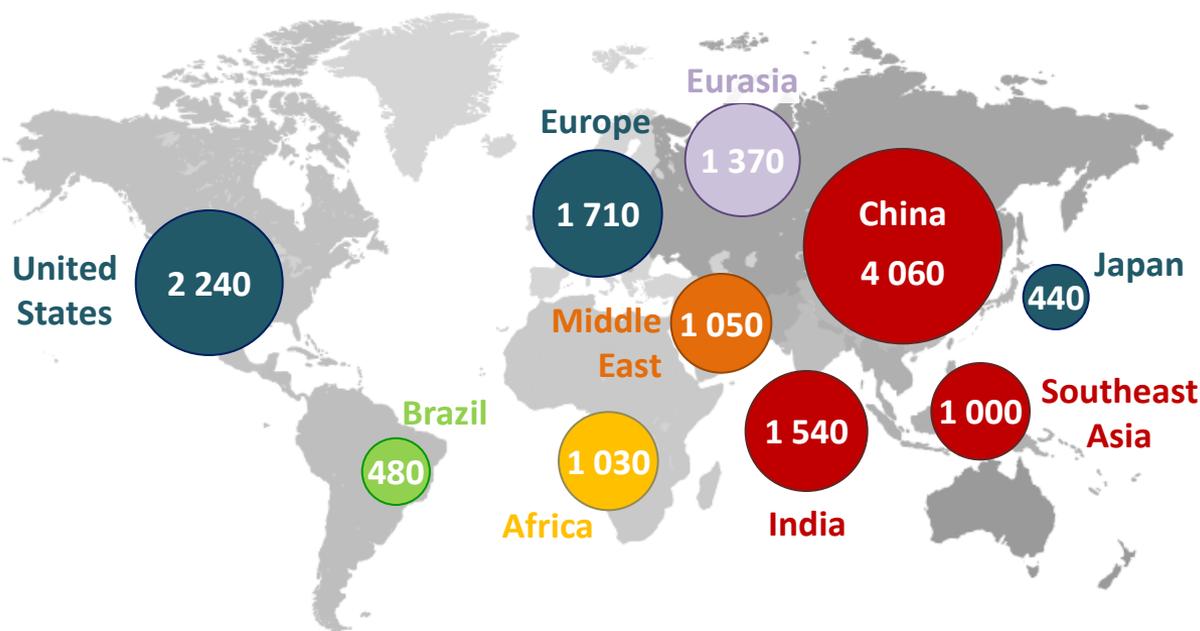


Russian gas exports to Europe

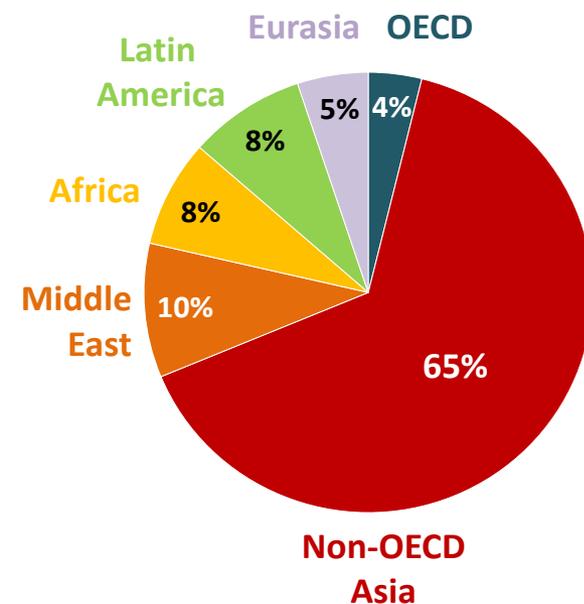


The engine of energy demand growth moves to South Asia

Primary energy demand, 2035 (Mtoe)



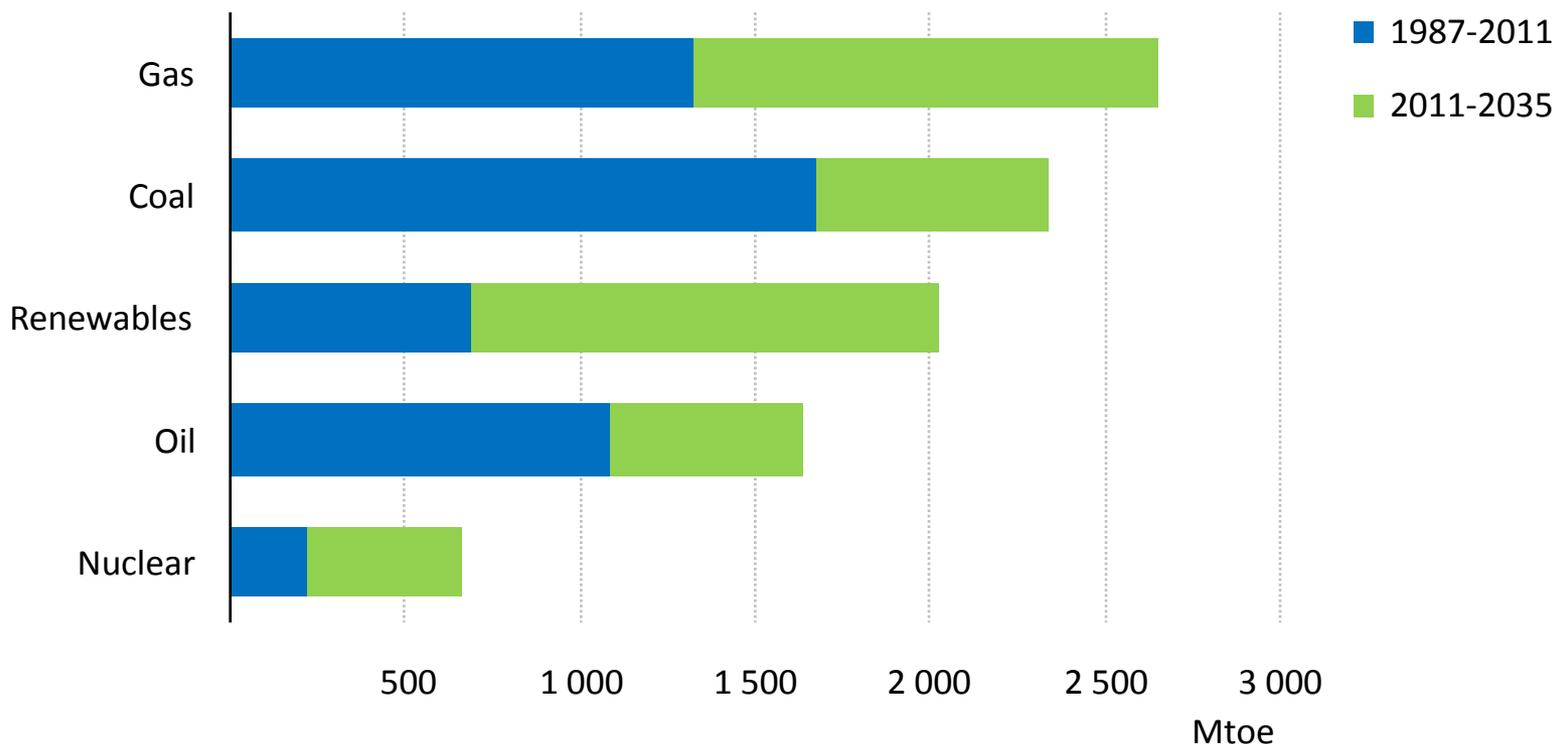
Share of global growth 2012-2035



China is the main driver of increasing energy demand in the current decade, but India takes over in the 2020s as the principal source of growth

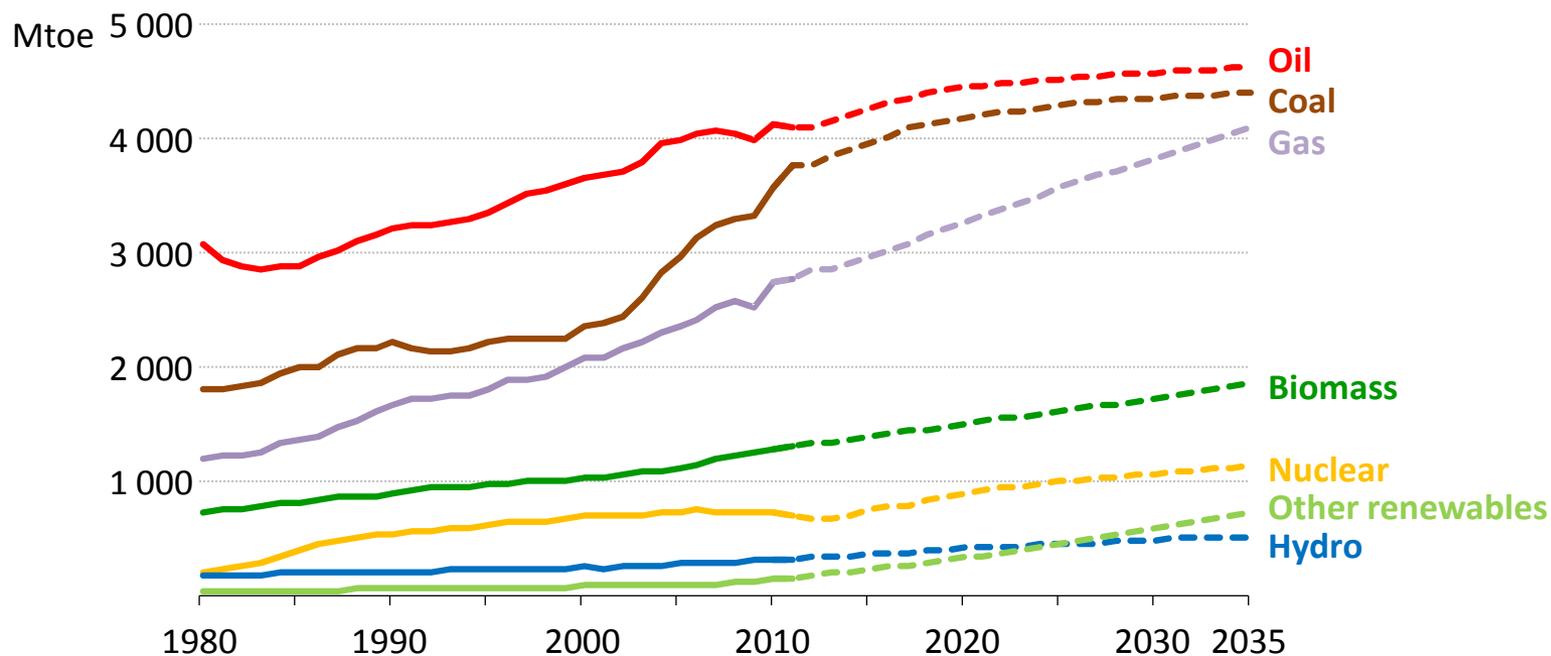
A mix that is slow to change

Growth in total primary energy demand



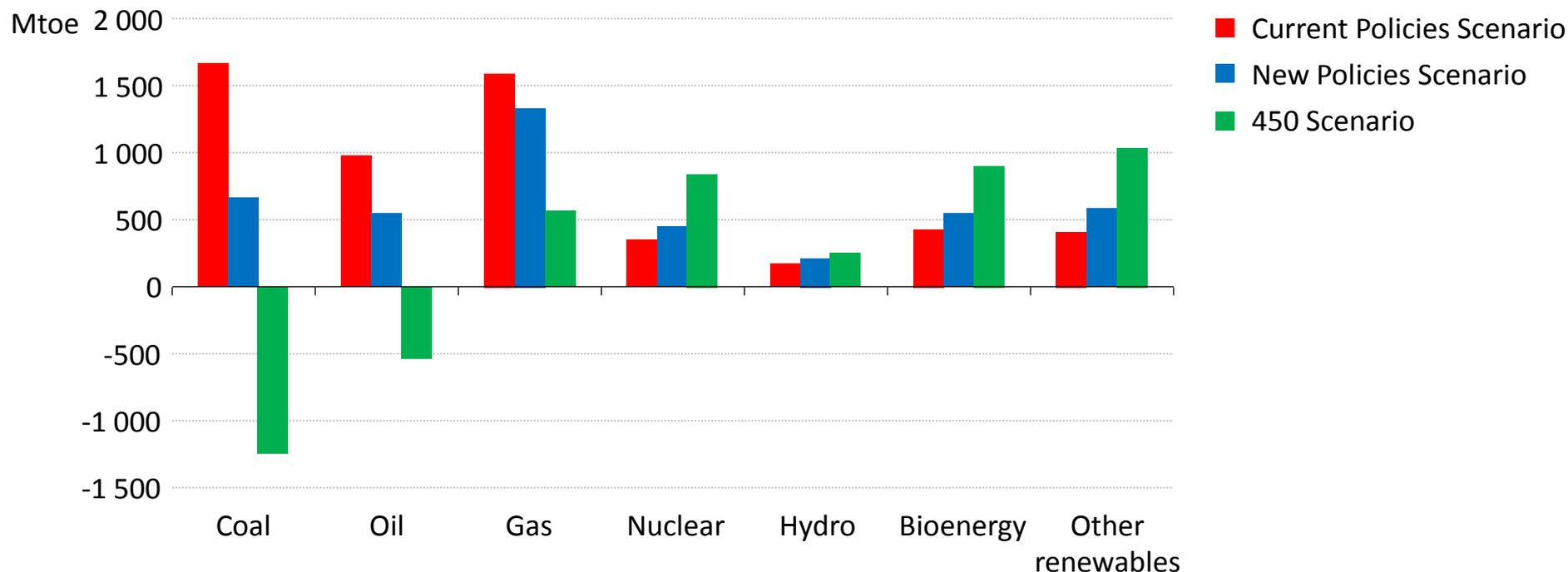
Today's share of fossil fuels in the global mix, at 82%, is the same as it was 25 years ago; the strong rise of renewables only reduces this to around 75% in 2035

World energy demand by fuel



Demand increases for all forms of energy, with gas growing the most; the share of fossil fuels in the world's energy mix falls from 82% to 76% in 2035

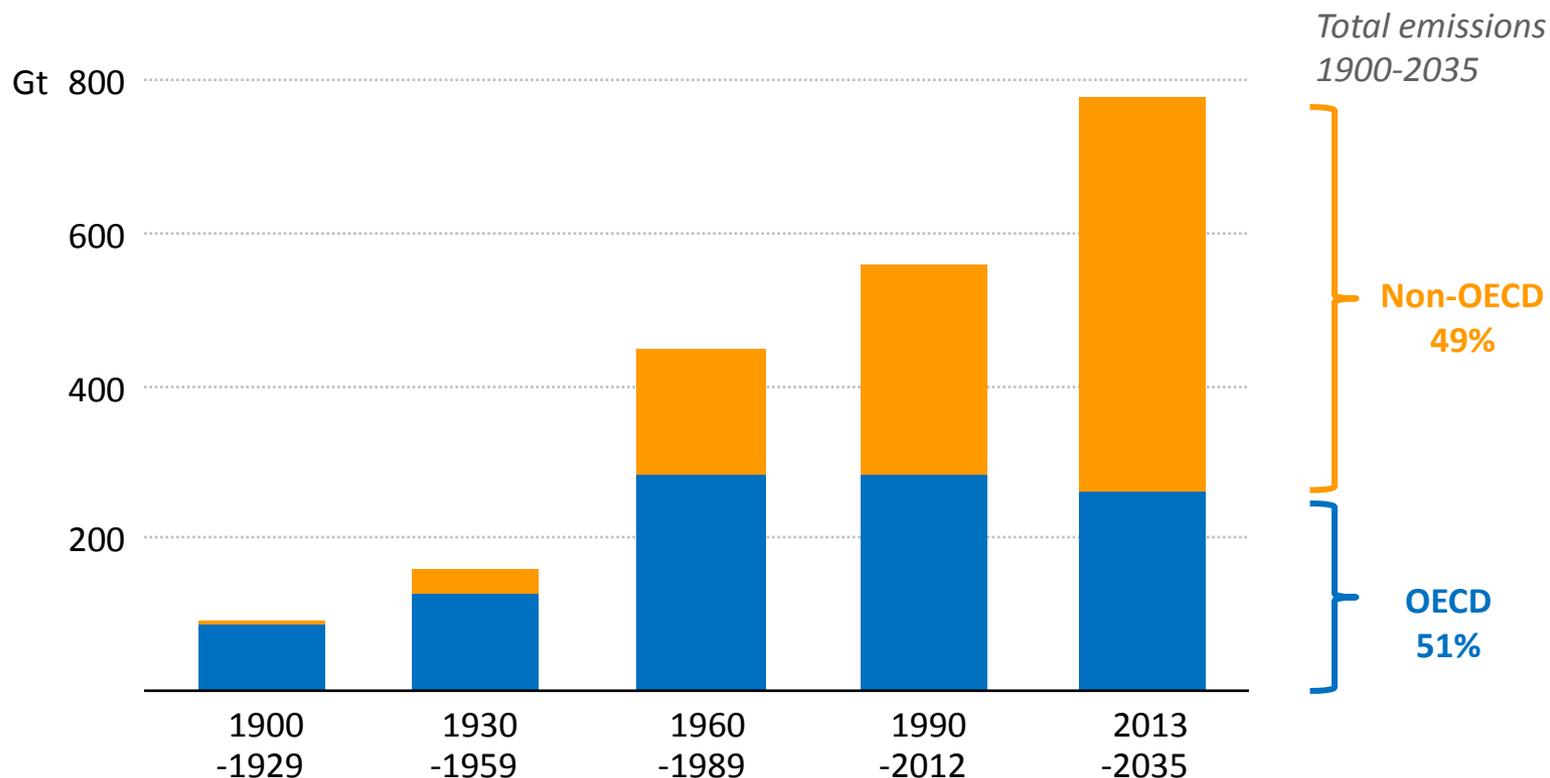
Change in world energy demand by fuel & scenario, 2011-2035



There are striking differences in demand for fossil fuels across scenarios, while global demand for renewable energy increases strongly in all cases

Emissions off track in the run-up to the 2015 climate summit in France

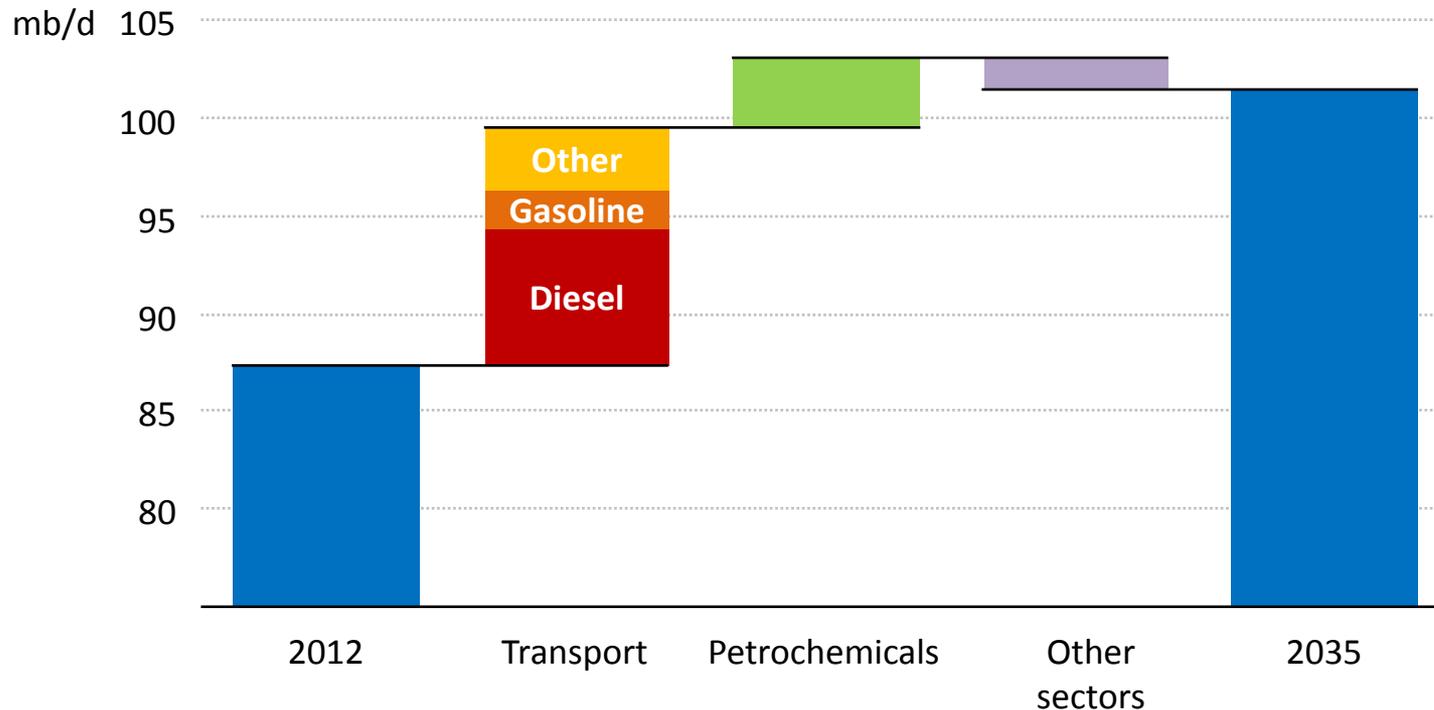
Cumulative energy-related CO₂ emissions



Non-OECD countries account for a rising share of emissions, although 2035 per capita levels are only half of OECD

Oil use grows, but in a narrowing set of markets

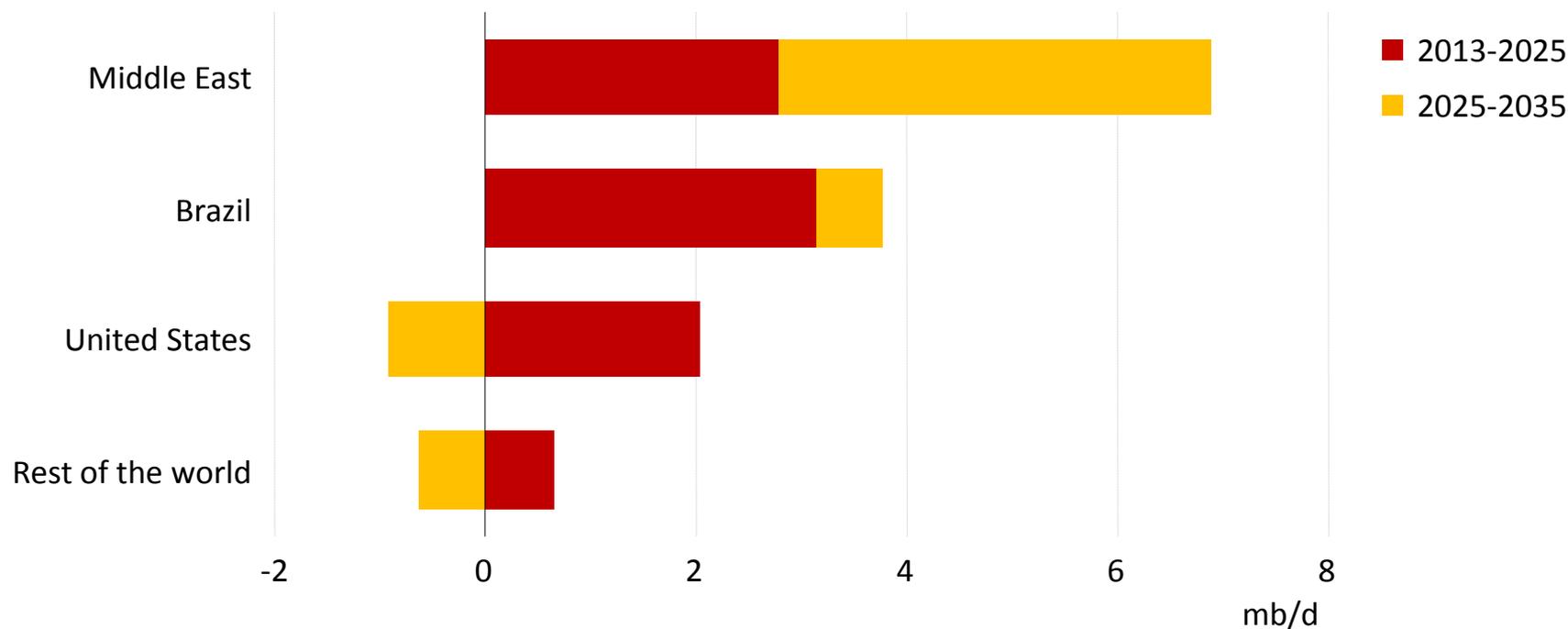
Oil demand by sector



China becomes the largest consumer of oil by 2030, as OECD oil use drops; demand is concentrated in transport, where diesel use surges by 5.5 mb/d, & petrochemicals

Two chapters to the oil production story

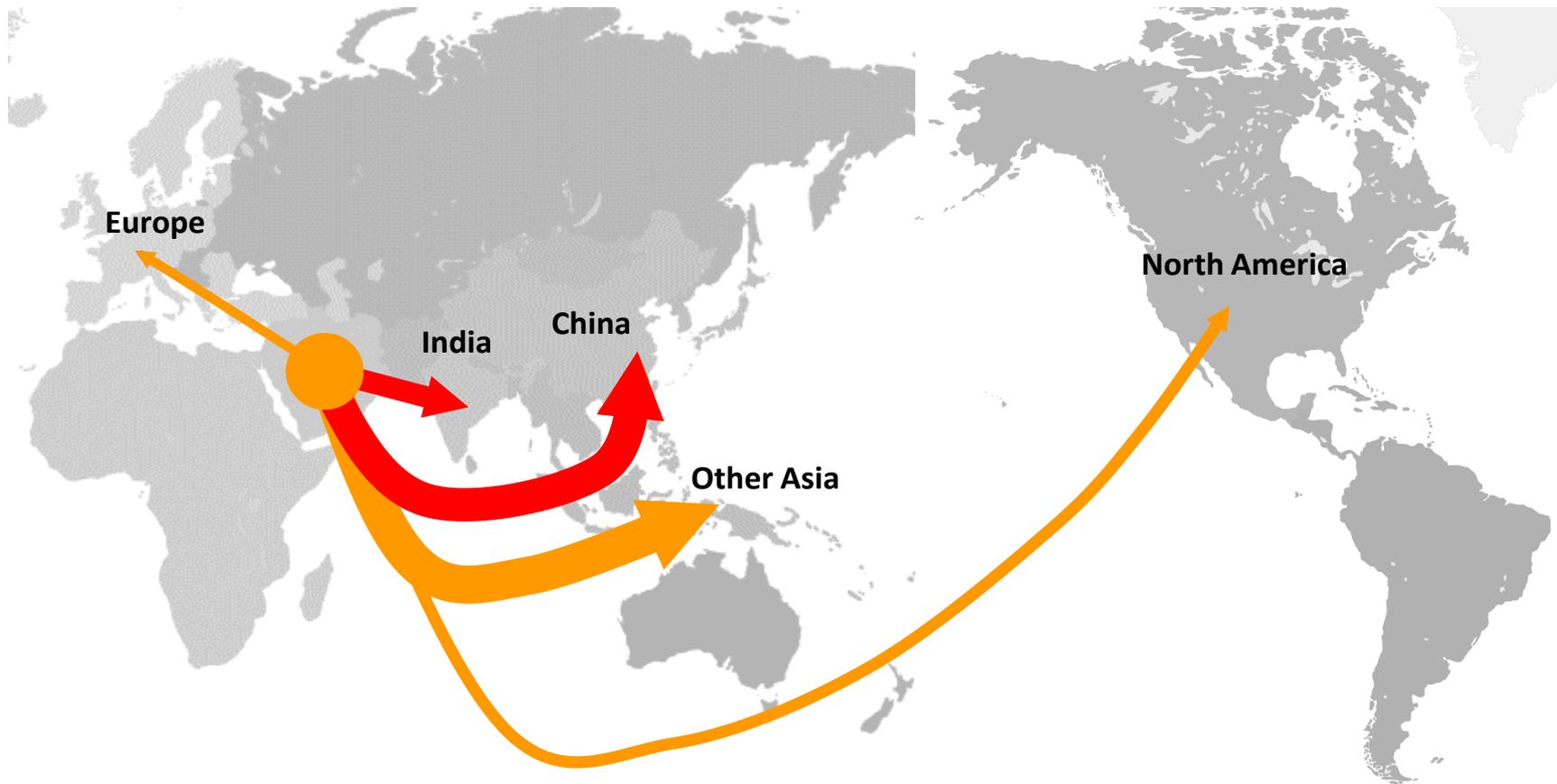
Contributions to global oil production growth



The United States (light tight oil) & Brazil (deepwater) step up until the mid-2020s, but the Middle East is critical to the longer-term oil outlook

Ever-growing crude trade between the Middle East & Asia

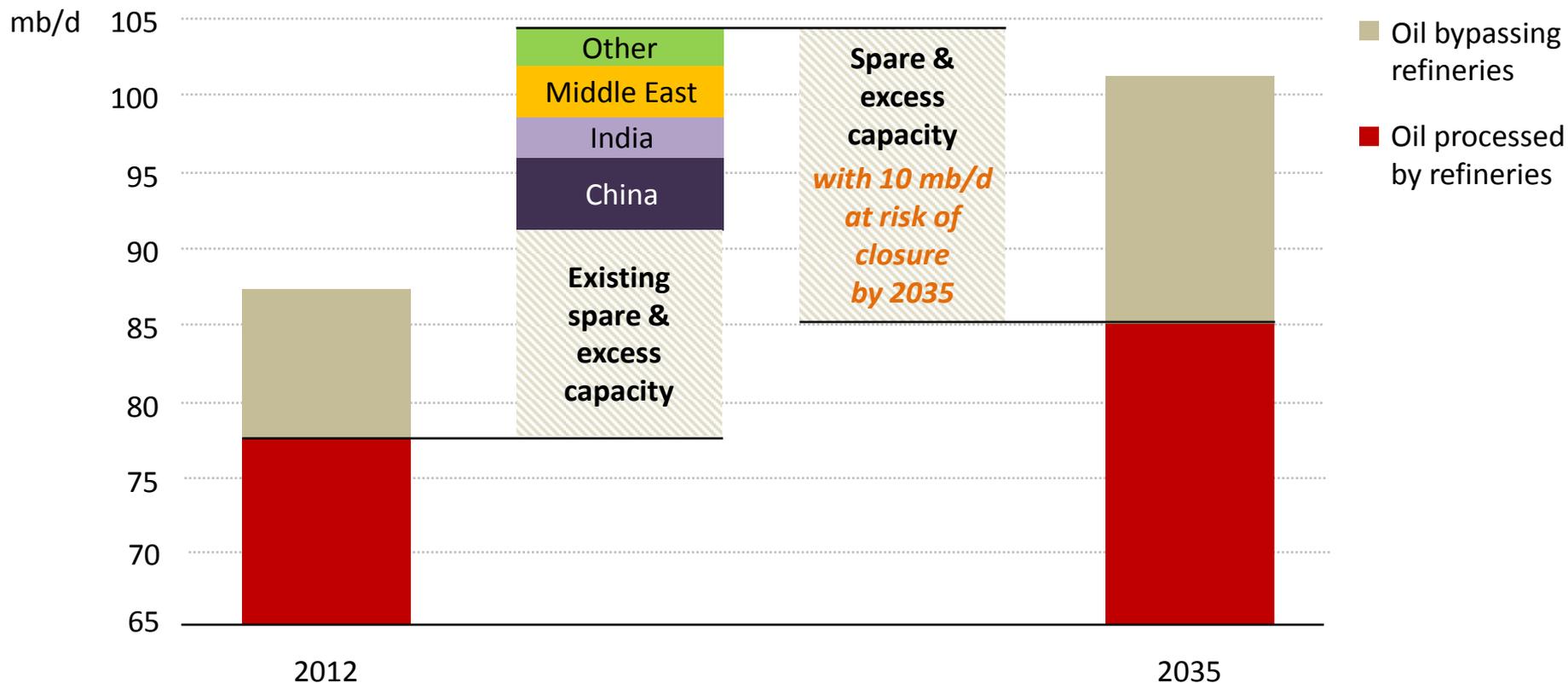
2035 Middle East crude oil exports by destination



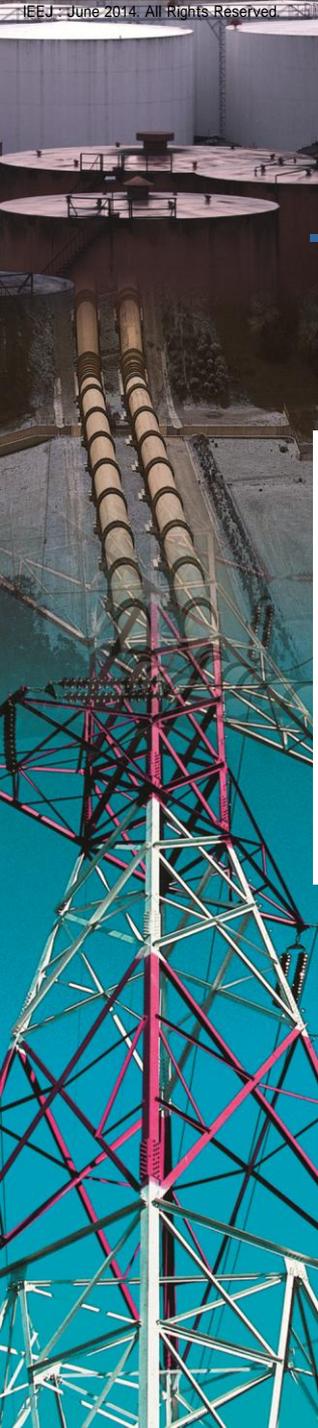
N. America's imports diminish as it becomes more self-sufficient, Europe's decrease with falling demand, and Middle East exports are drawn increasingly to Asia

Turbulent times for the refining sector

Refinery capacity and operation



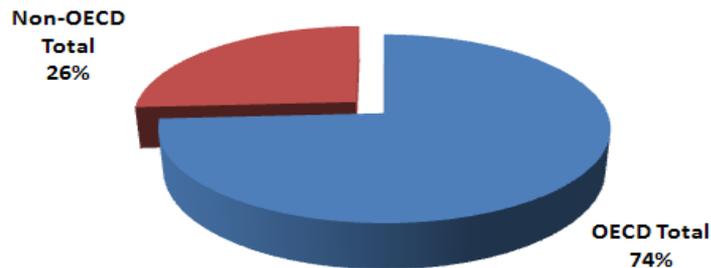
More oil bypassing the refining system and new capacity in growing non-OECD markets piles pressure on existing refiners, especially in Europe



Non-OECD oil demand increasing

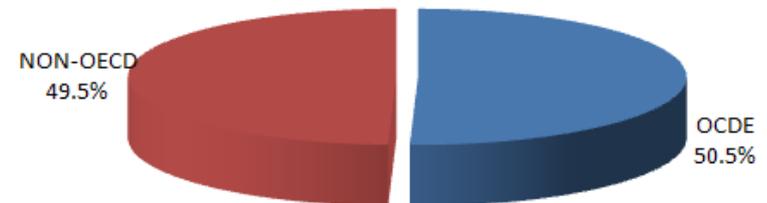
Growing importance of consuming countries outside IEA

World Oil Demand in 1973



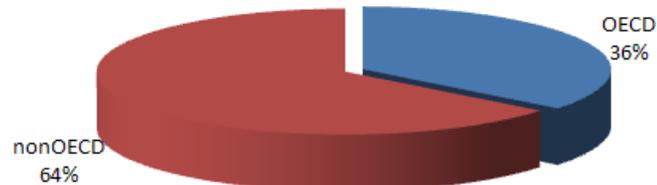
57.2 million barrels per day

World Oil Demand 2013



91.3 million barrels per day

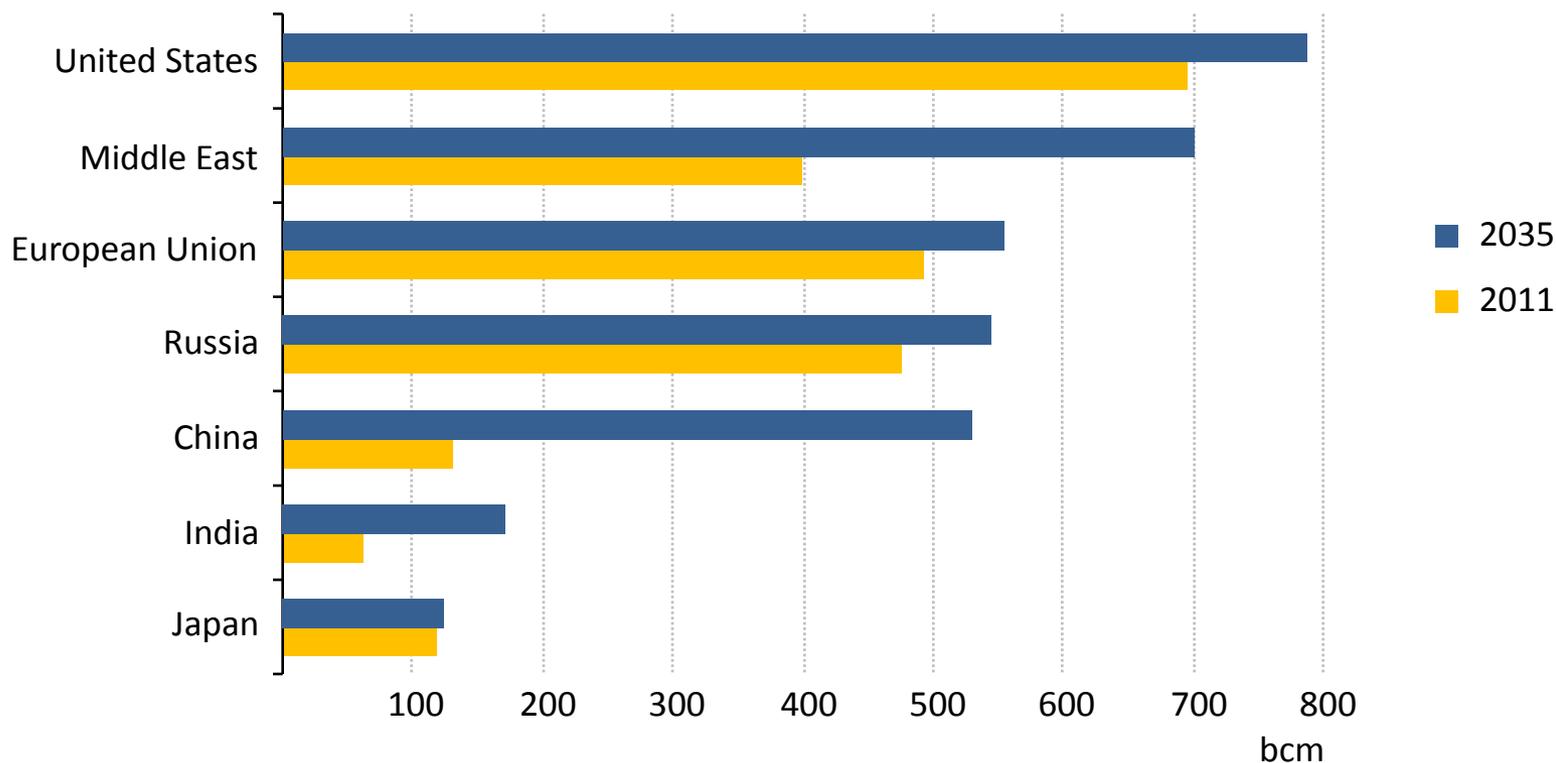
World Oil Demand 2035



101.4 million barrels per day

Gas growth strongest in emerging markets

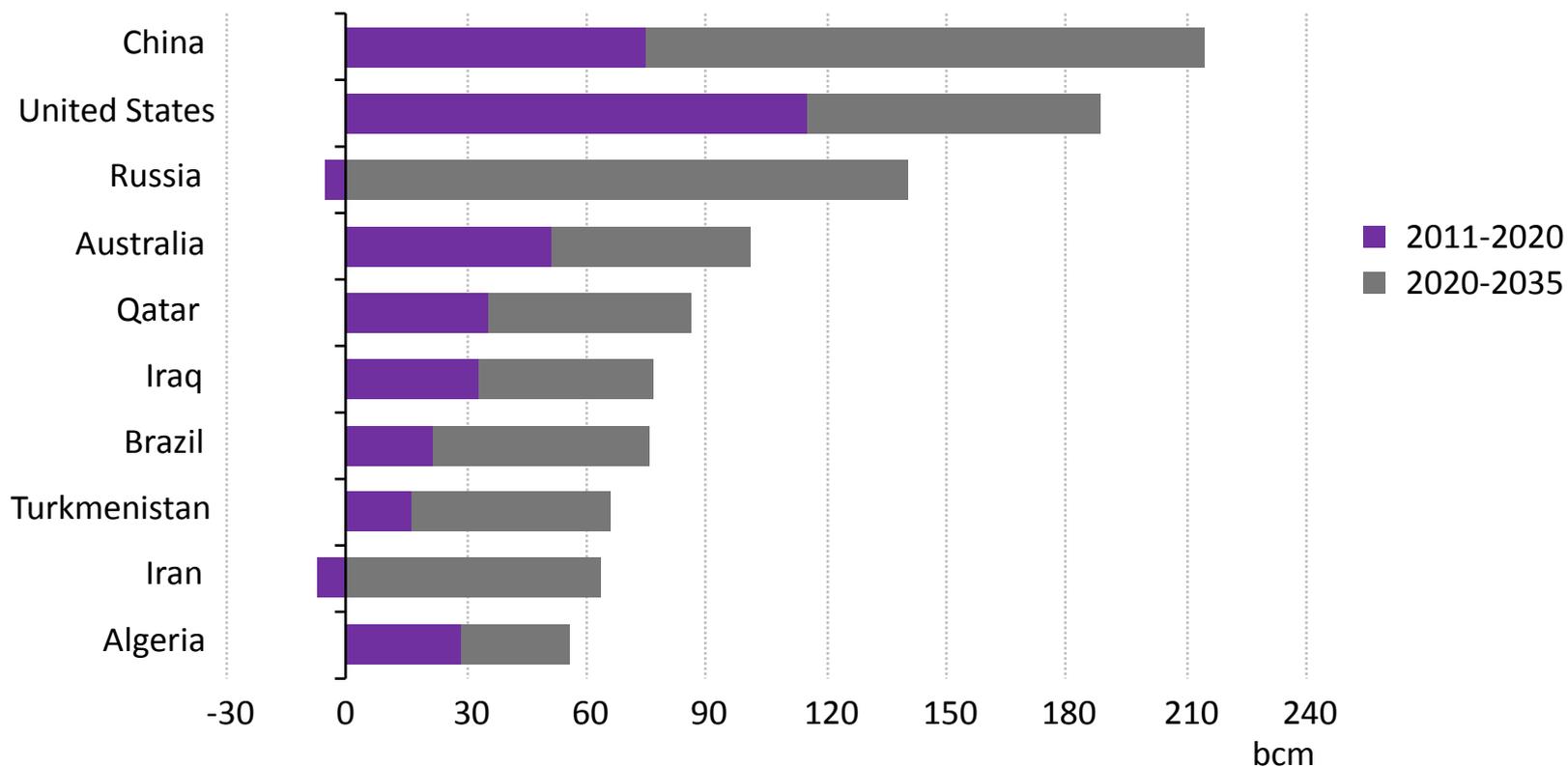
Natural gas demand



The biggest absolute increases in demand are in China & the Middle East, where gas use overtakes that of the European Union before 2020

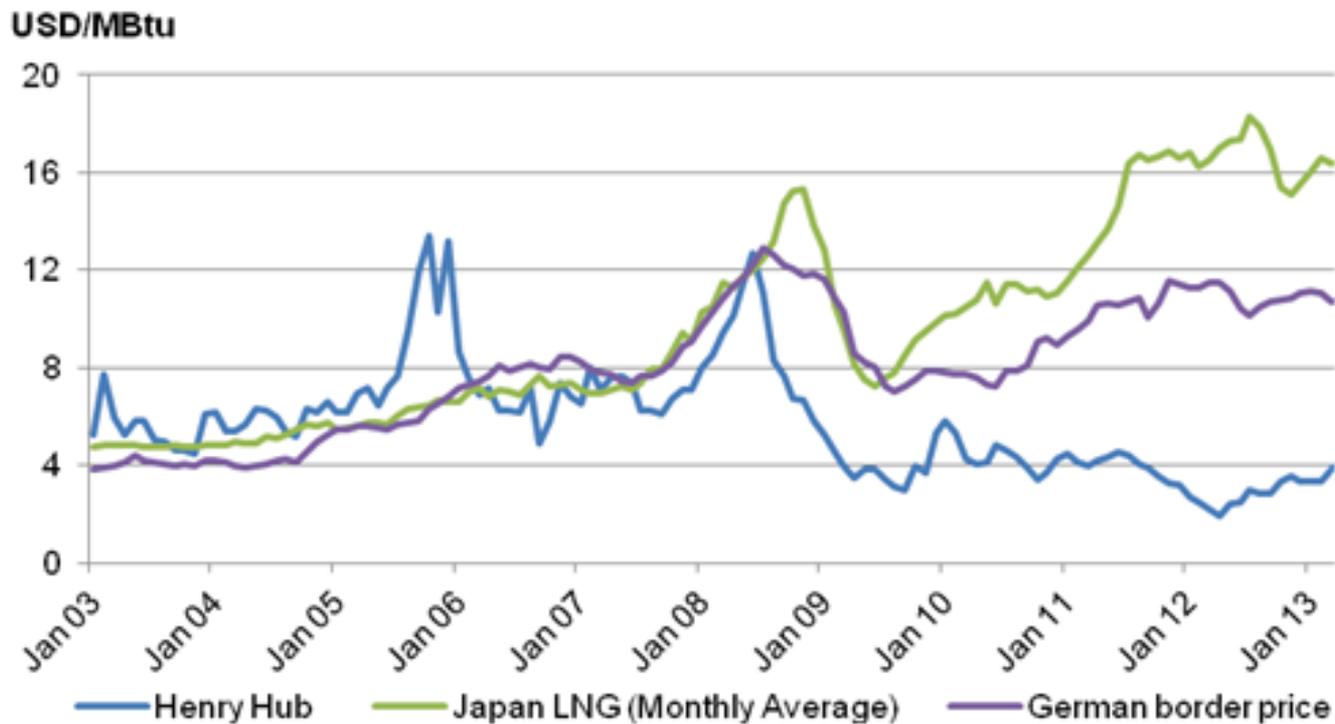
A new diversity in gas supply

Change in annual natural gas production



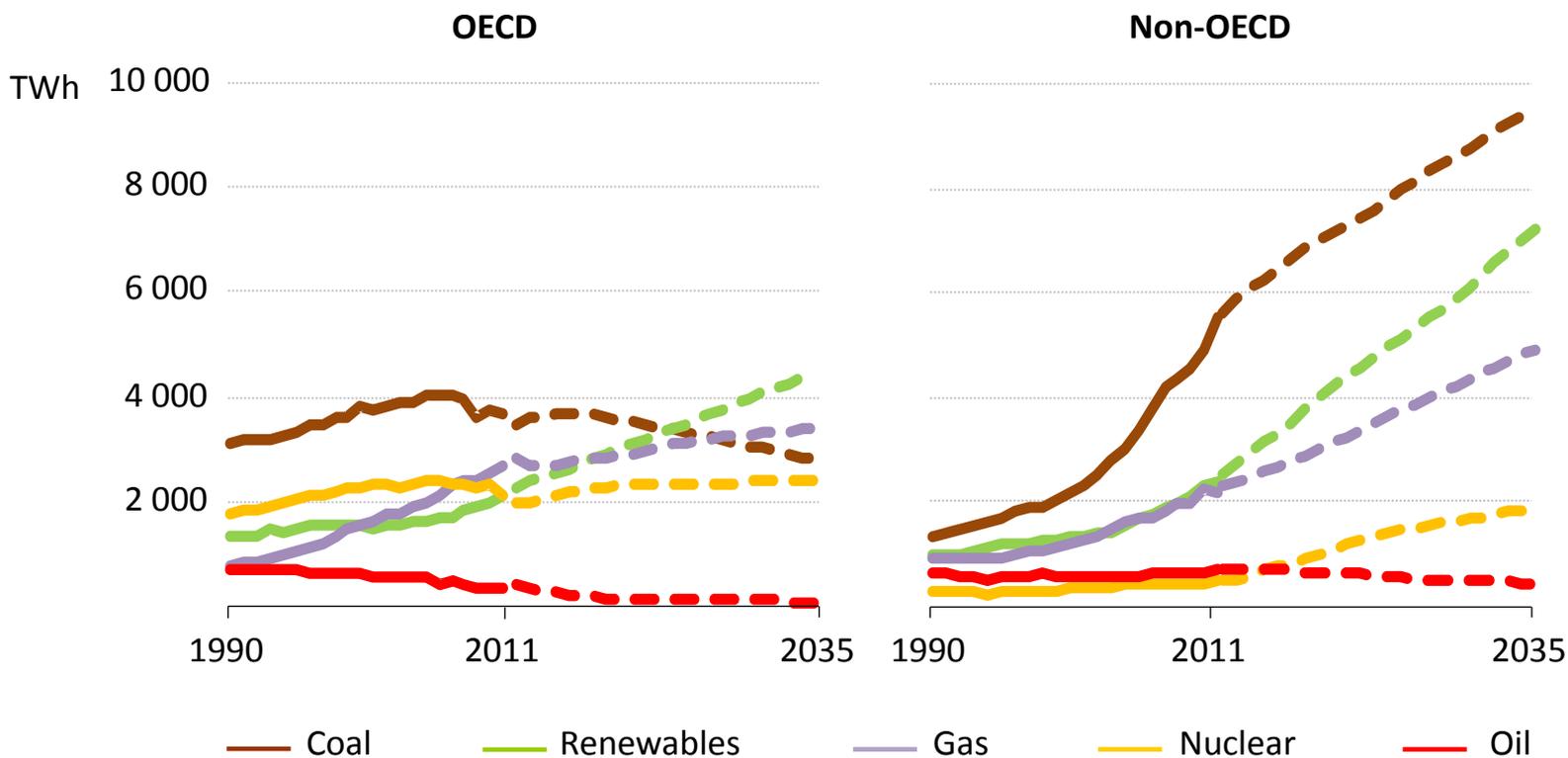
Natural gas production increases in every region of the world between 2011 and 2035, with the exception of Europe

Regional Gas Price Disparity



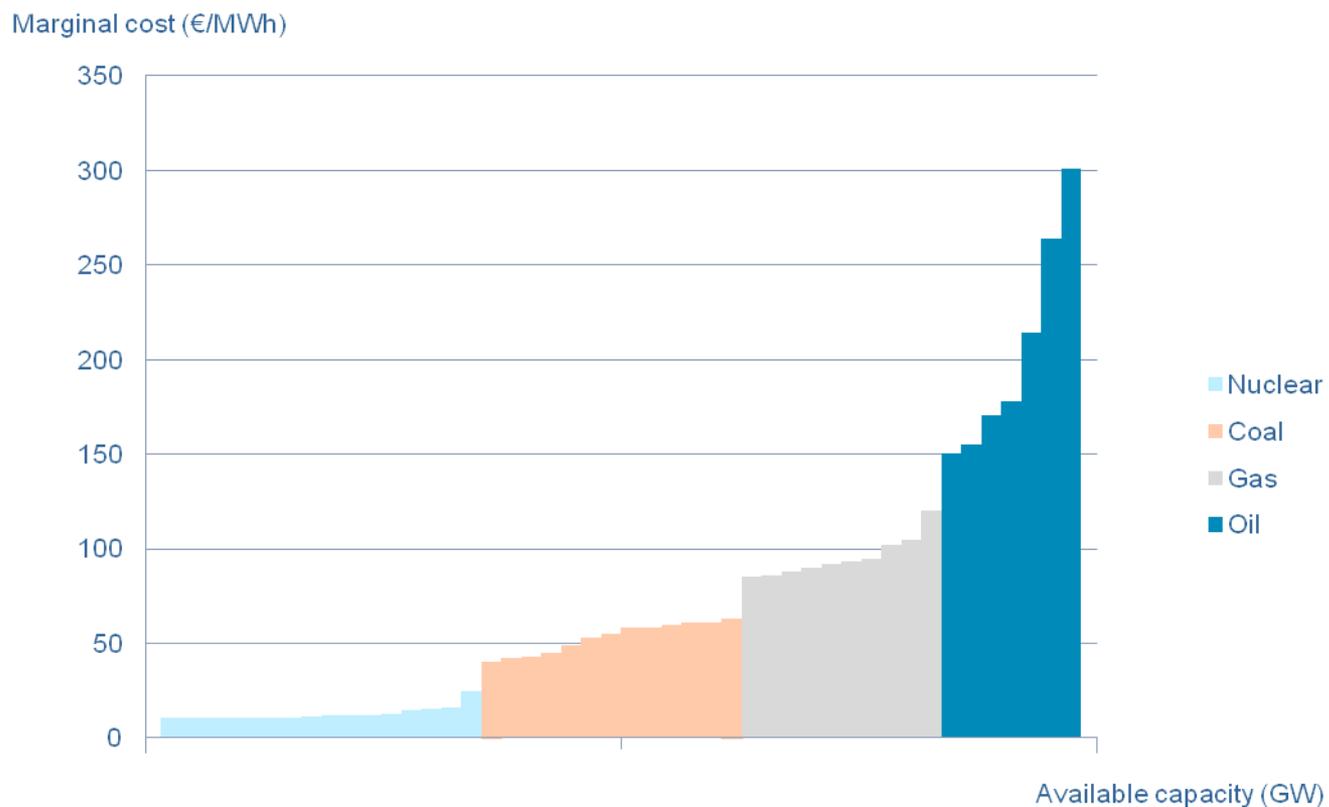
Electricity generation in non-OECD countries has only begun to rise

Electricity generation by source



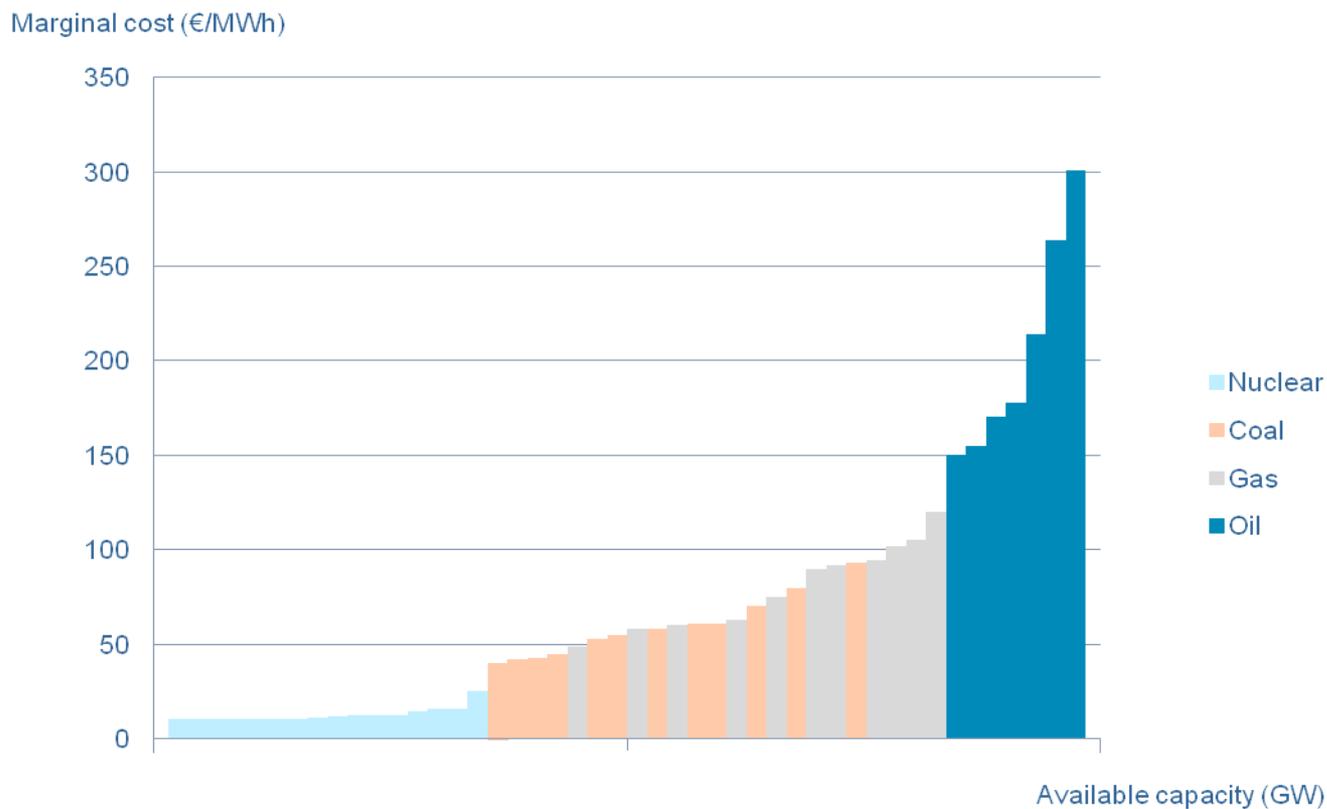
Impact of gas prices increase on the merit order (Europe)

Merit order curve: coal cheaper than gas (illustrative)



Impact of gas prices increase on the merit order (US)

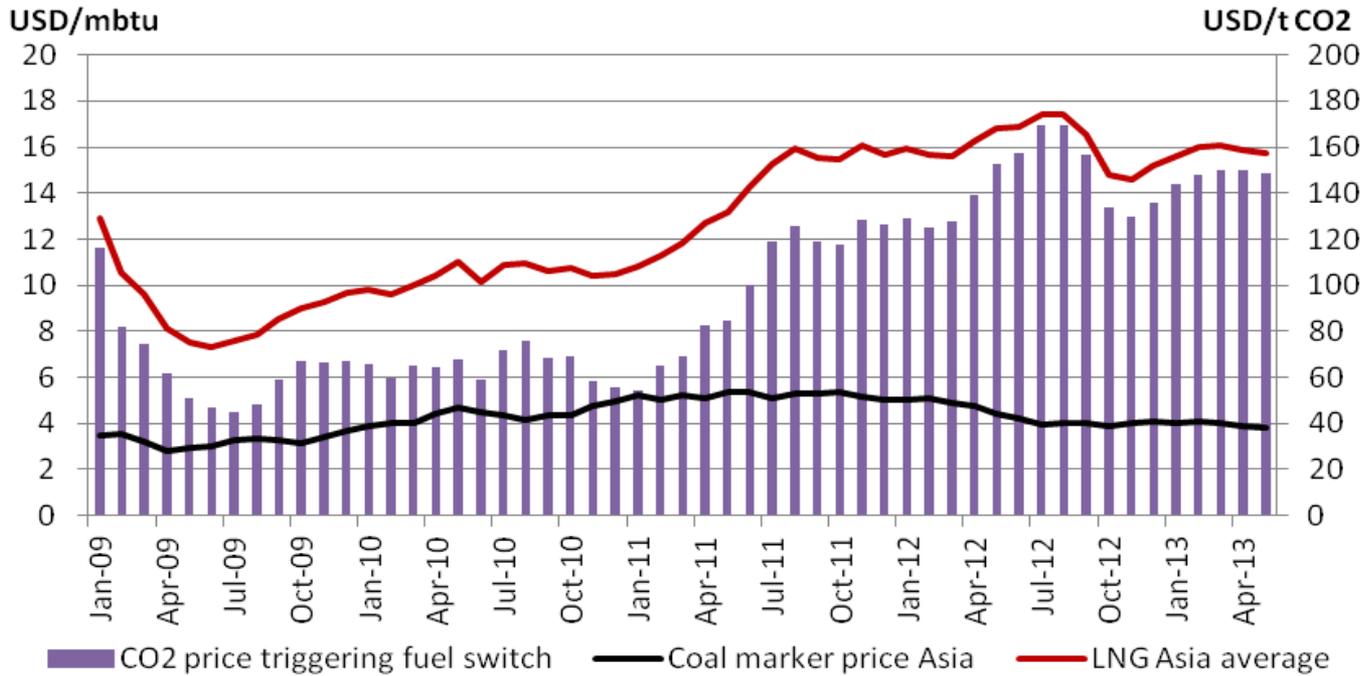
Merit order curve: gas and coal mixed (illustrative)





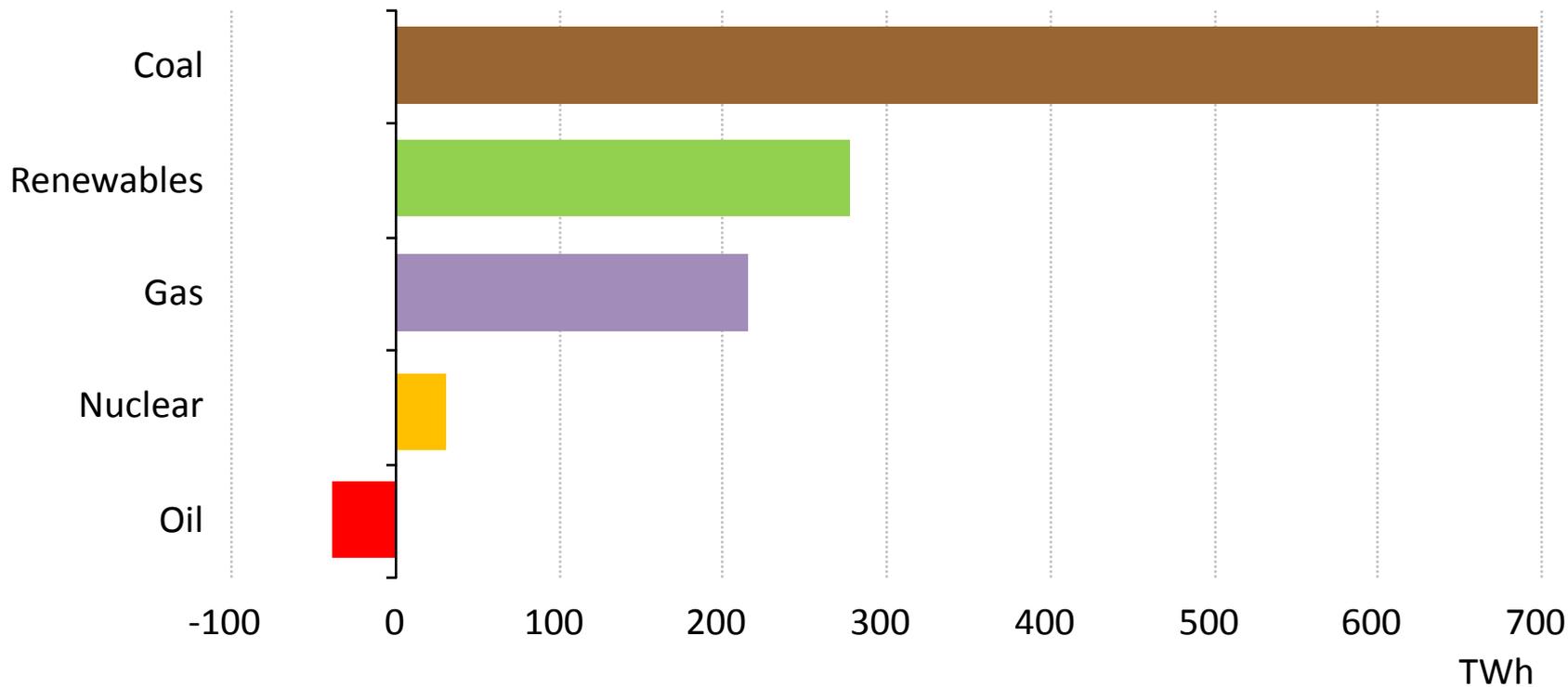
Displacing coal in Asia will not be that easy

COAL AND GAS PRICES. IMPLIED CO2 PRICE TO TRIGGER FUEL SWITCHING



The power sector is fundamental to the energy outlook of Southeast Asia

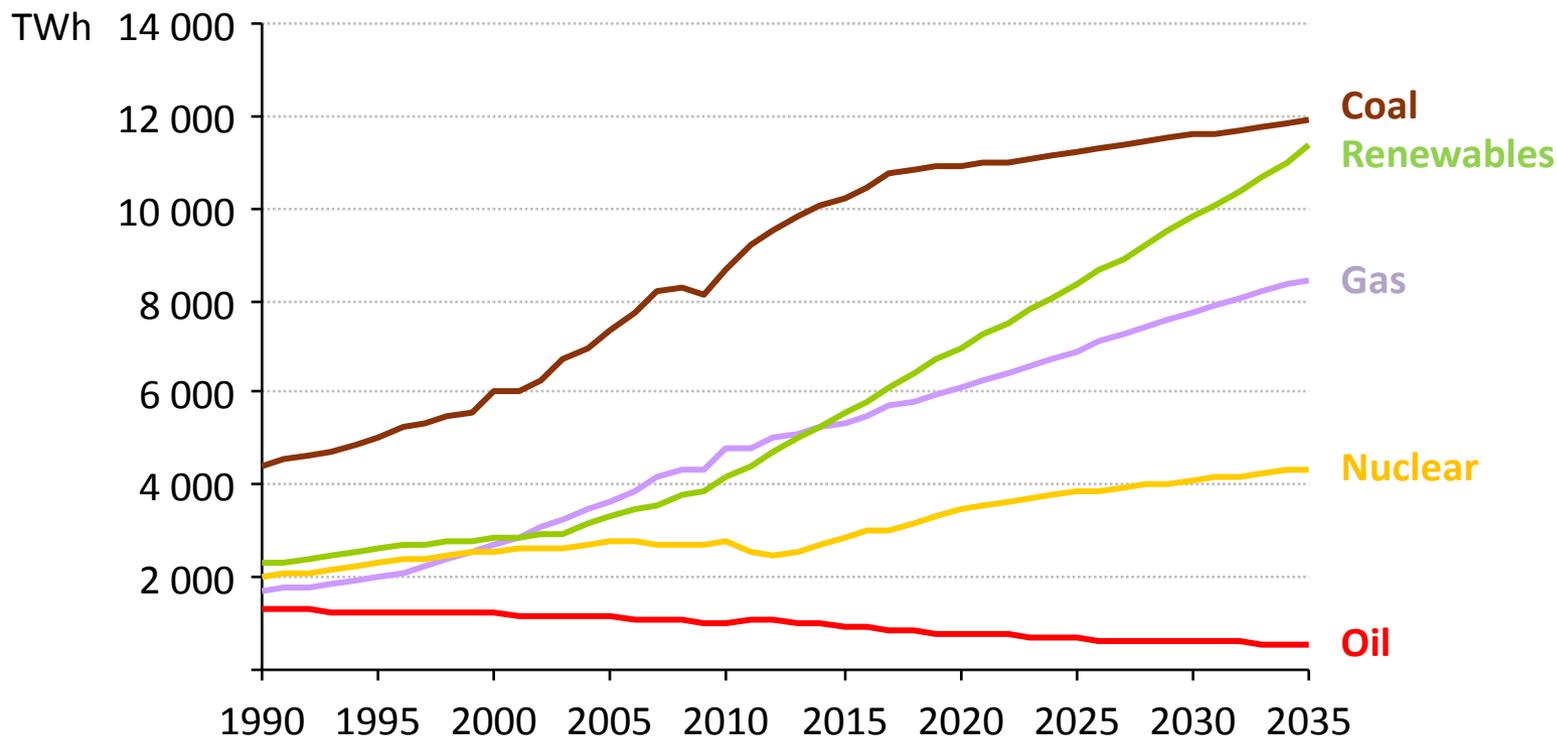
ASEAN incremental electricity generation by fuel, 2011-2035



Over the long term, the power generation mix is set to change

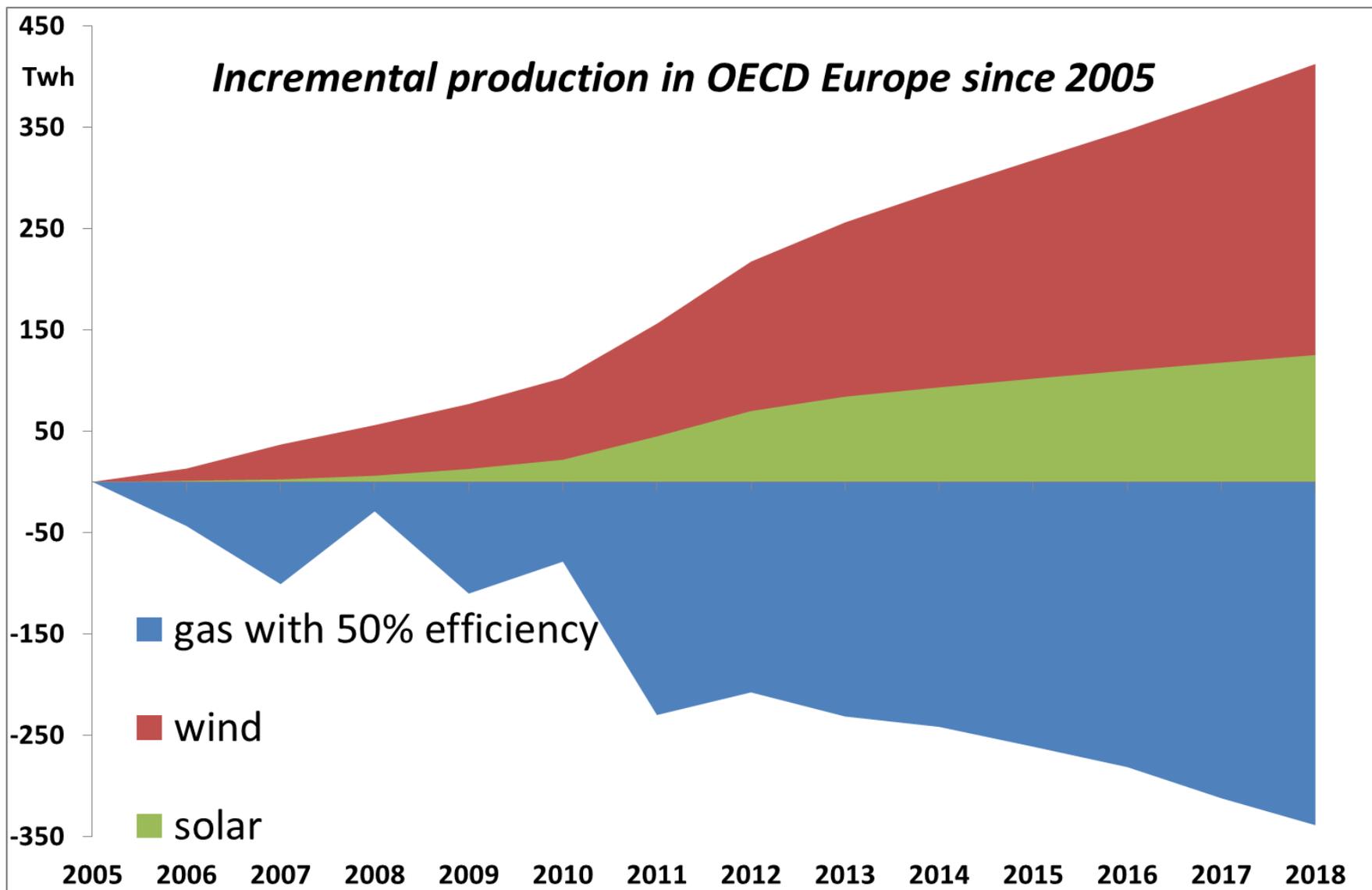


Global electricity generation by source, 2010-2035



Source: IEA World Energy Outlook 2012

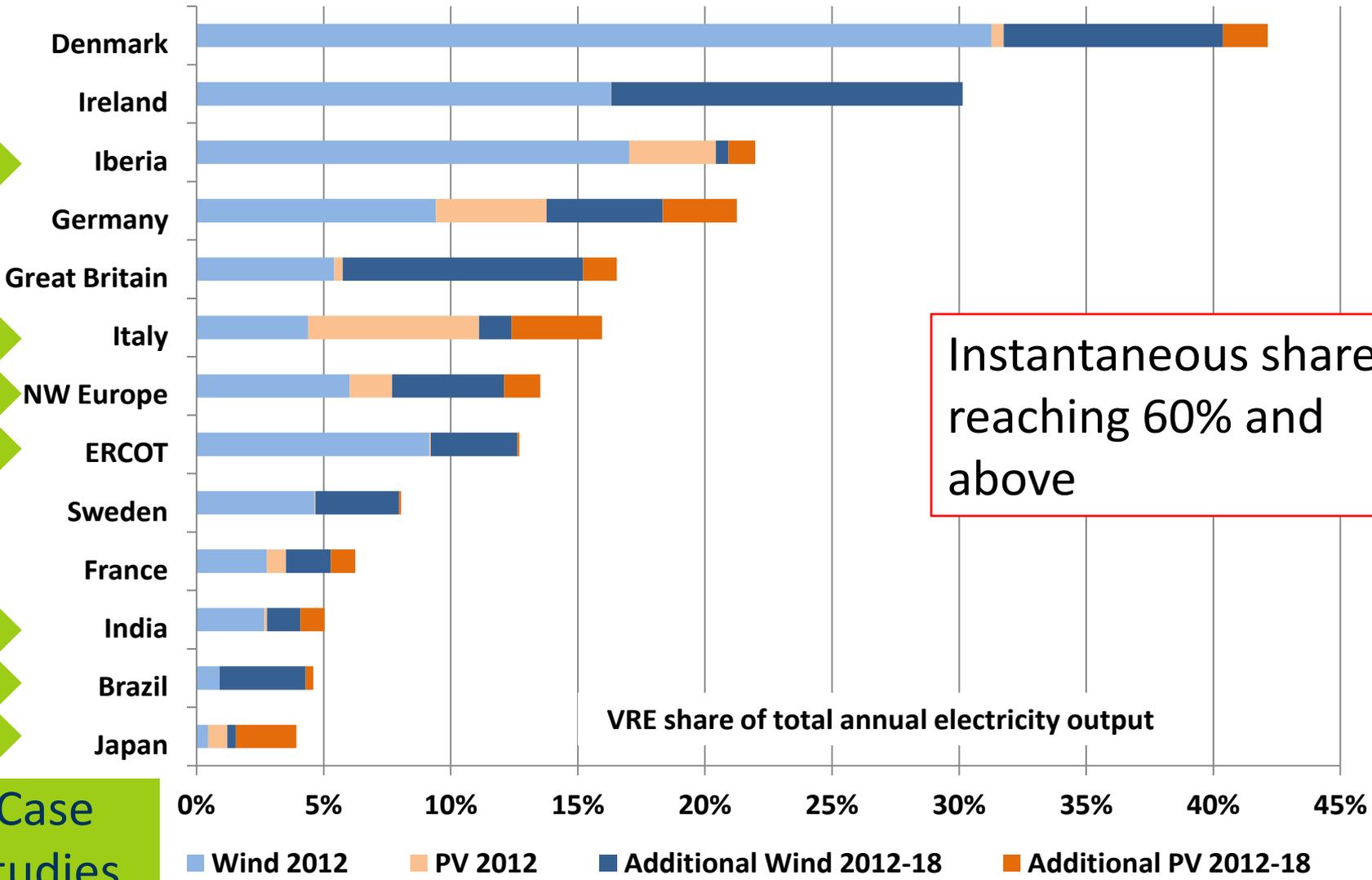
Wind and solar compensated for the decline of domestic gas upstream



Large-scale integration accomplished today, but more to come



Case studies



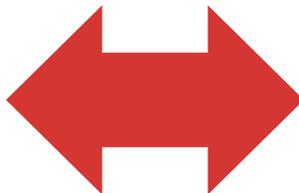
Instantaneous shares reaching 60% and above

Note: ERCOT = Electricity Reliability Council of Texas, United States

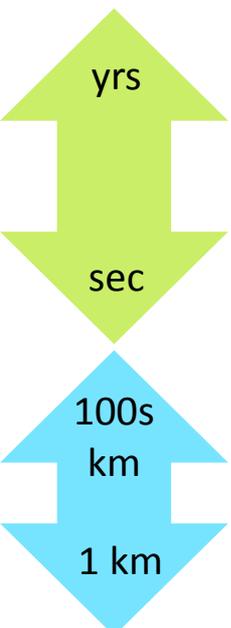
Source: IEA estimates derived in part from IEA Medium-Term Renewable Energy Market Report 2013.

Interaction is key

Properties of variable renewable energy (VRE)



Flexibility of other power system components

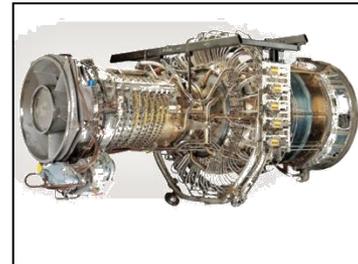


- **Variable**
- **Uncertain**
- **Non-synchronous**
- **Location constrained**
- **Modularity**
- **Low short-run cost**

Grids



Generation



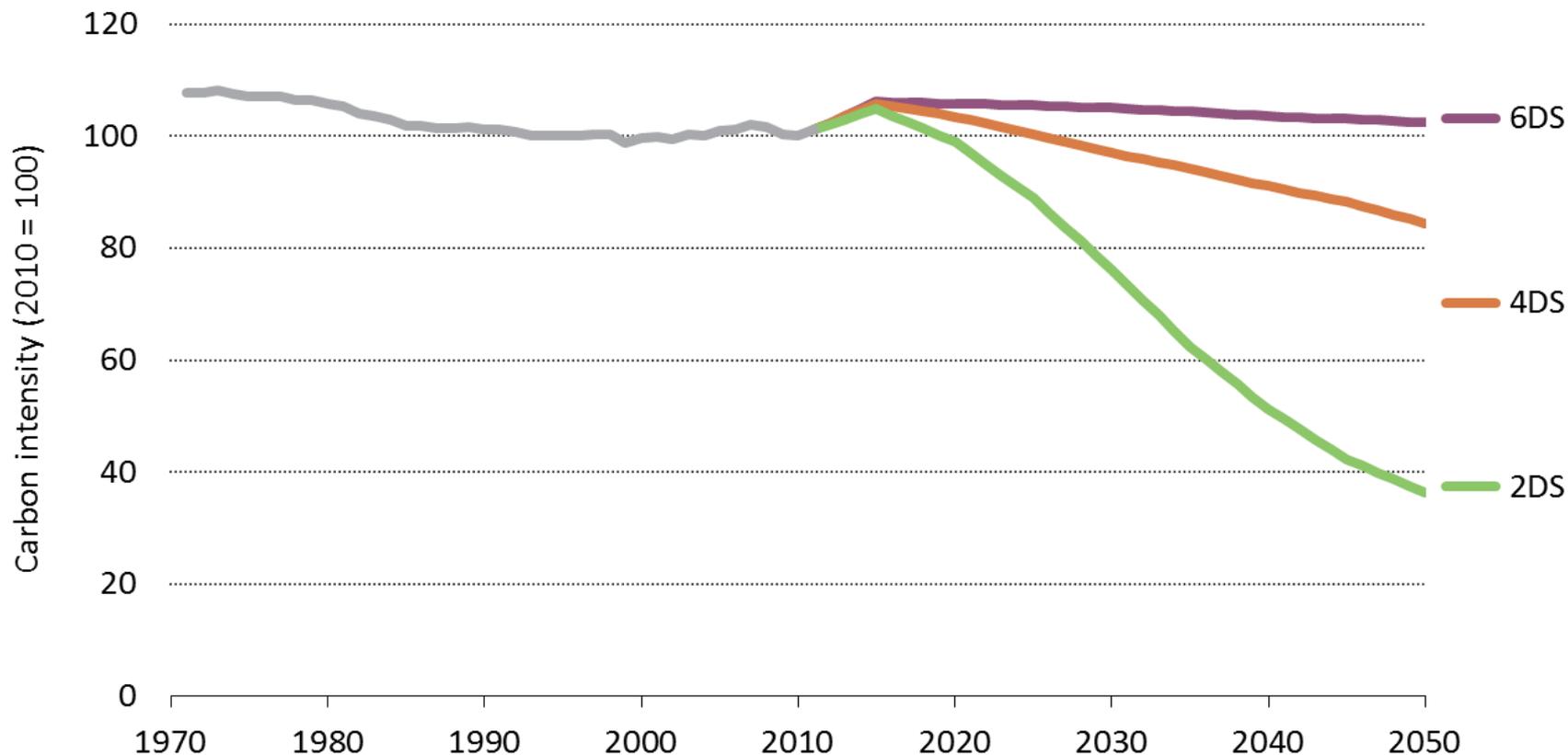
Storage



Demand Side



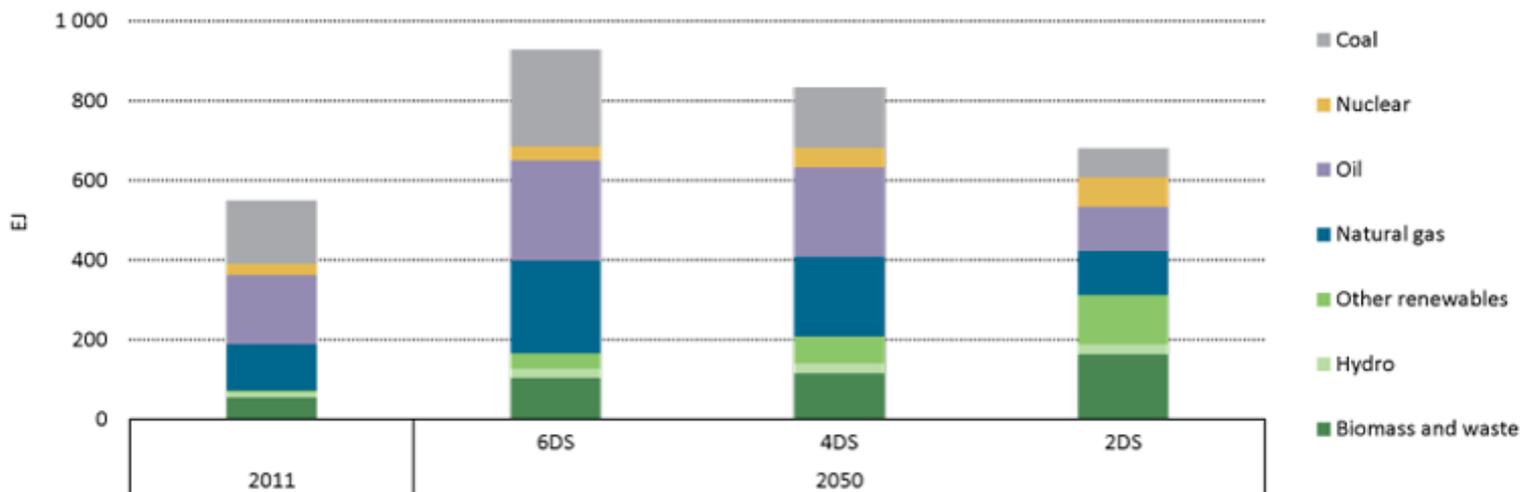
Carbon Intensity of supply is stuck



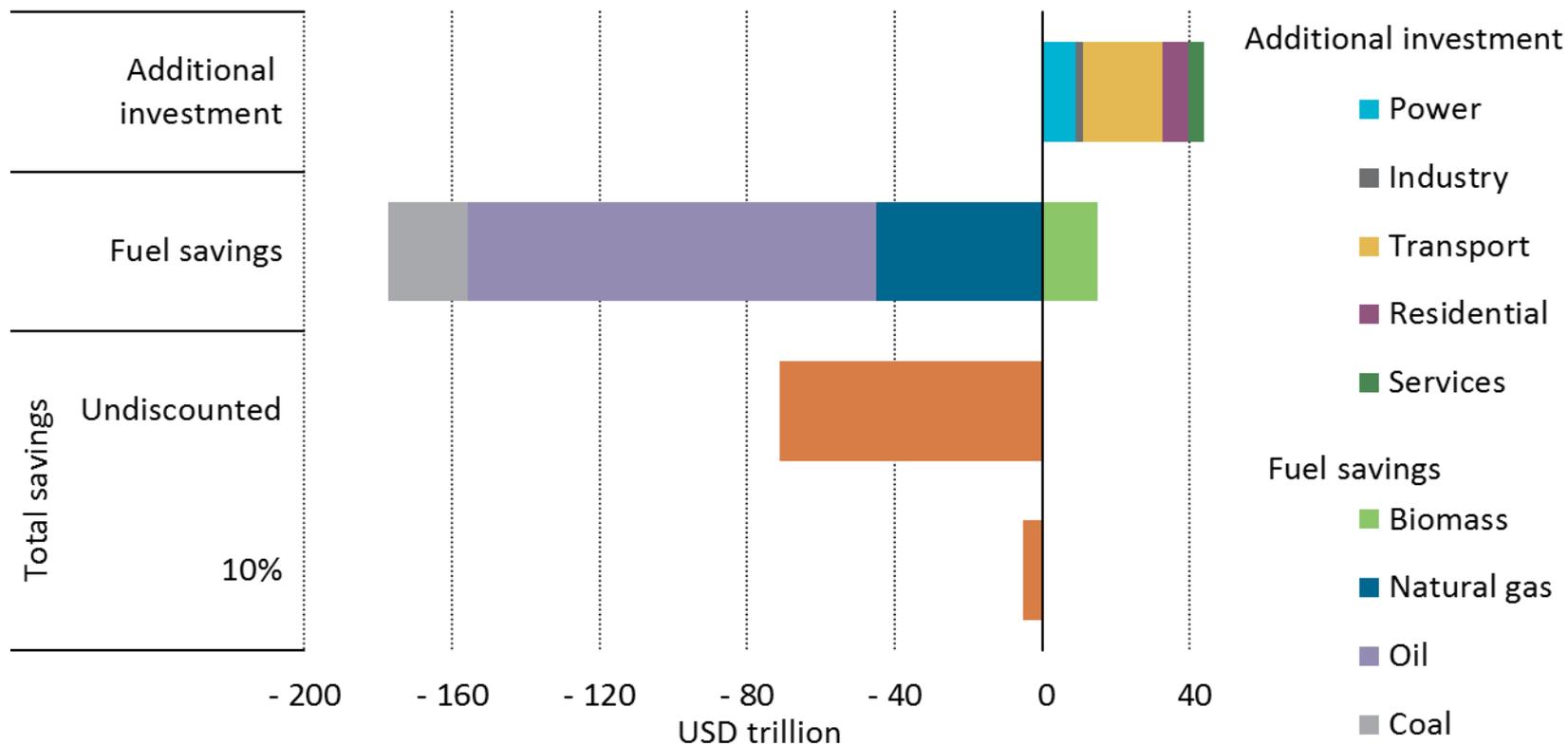
The political will to make meaningful progress at a global scale has yet to be demonstrated



Total primary energy supply

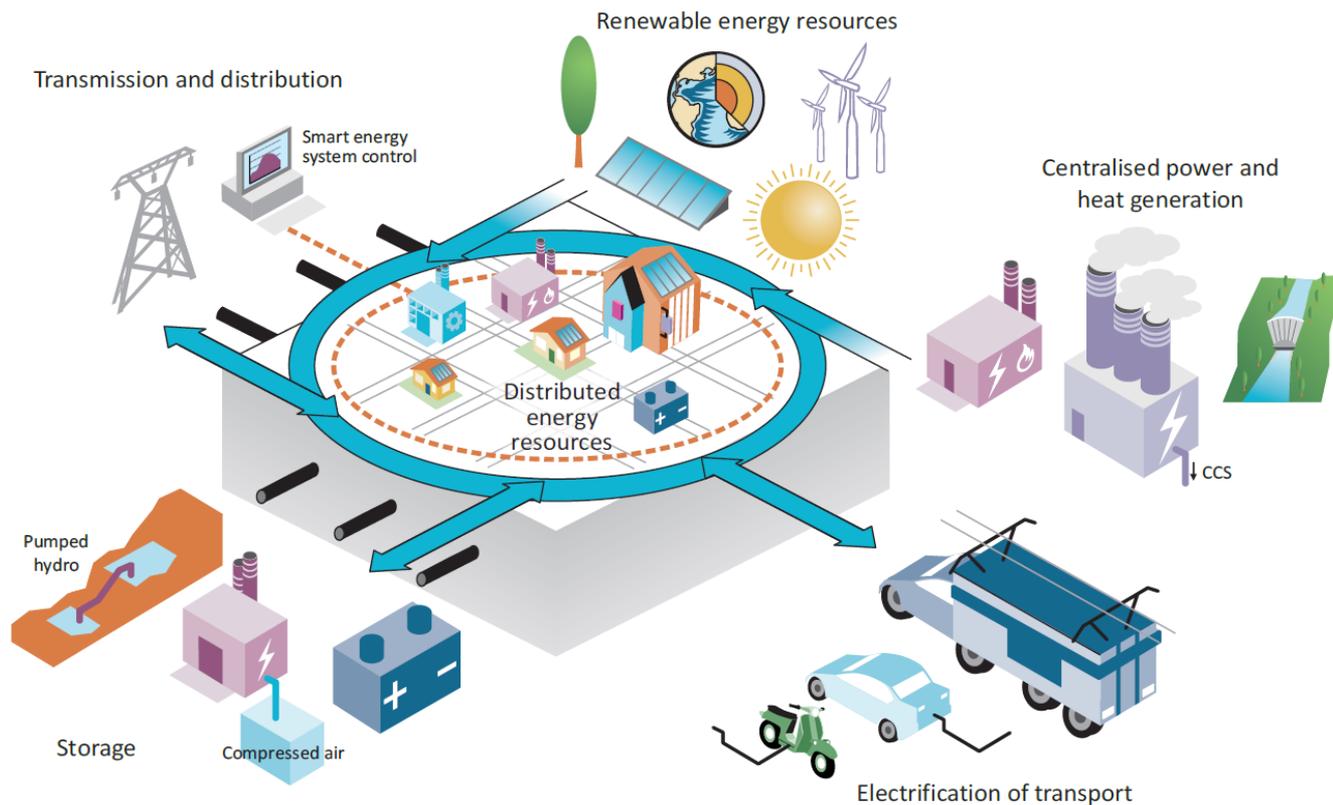


Investment in our future pays off...



...and it is cost effective to make the transition

Systems thinking and integration



A sustainable electricity system is a smarter, multidirectional and integrated energy system that requires long-term planning for services delivery



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Thank you
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