

The outlook for world energy: underlying assumptions and possible futures



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Contents

1. Assumptions

2. Possible futures

	Known	Unknown
Known		
Unknown		

	Known	Unknown
Known	What we know	What we know we don't know
Unknown	What we <u>think</u> we know	What we don't know and cannot aspire to know in advance

	Known	Unknown
Known	<ul style="list-style-type: none">• Sufficient oil and gas reserves to meet demand• Demand is not where supply is found –for the most part	
Unknown		

	Known	Unknown
Known		
Unknown	<ul style="list-style-type: none">• Asia energy demand will continue to grow faster than the rest of the world• OECD energy demand remains flat• Germany is not going back to nuclear and Japan is going back, but not completely• North American oil and gas output is profitable and safe for the environment	

	Known	Unknown
Known		<ul style="list-style-type: none">• Government policy<ul style="list-style-type: none">○ Energy efficiency○ Environment• Technological change<ul style="list-style-type: none">○ Transportation○ Power generation• Geopolitical developments
Unknown		

	Known	Unknown
Known		
Unknown		

Are
you
sure?

Why?

	Known	Unknown
Known	<ul style="list-style-type: none">• Sufficient oil and gas reserves to meet demand• Demand is not where supply is found –for the most part	<ul style="list-style-type: none">• Government policy<ul style="list-style-type: none">○ Energy efficiency○ Environment• Technological change<ul style="list-style-type: none">○ Transportation○ Power generation• Geopolitical developments
Unknown	<ul style="list-style-type: none">• Asia energy demand will continue to grow faster than the rest of the world• OECD energy demand remains flat• Germany is not going back to nuclear and Japan is going back, but not completely• North American oil and gas output is profitable and safe for the environment	

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In a nutshell, the new action is about:

**Asian demand
and
unconventional oil and gas supply

...and trade**

Table 9. Long-term Scenario Key Assumptions

IEA WEO Scenarios	OPEC WOO Scenarios
<p>Current Policies Scenario Only considers policies that have been enacted as of mid-2013</p>	<p>Reference Case Only considers policies that have been enacted</p>
<p>New Policies Scenario Considers both policies in place and commitments announced</p>	<p>Higher Economic Growth Scenario (HEG) Assumes higher economic growth rate than the Reference Case</p>
<p>450 Scenario Assumes policies to be taken to limit the concentration of GHG in the atmosphere to 450 ppm of CO2 equivalent</p>	<p>Lower Economic Growth Scenario (LEG) Assumes lower economic growth rate than the Reference Case</p>
	<p>Upside Supply Scenario (UPS) Looks at possibility of higher non-OPEC supply than the Reference Case</p>

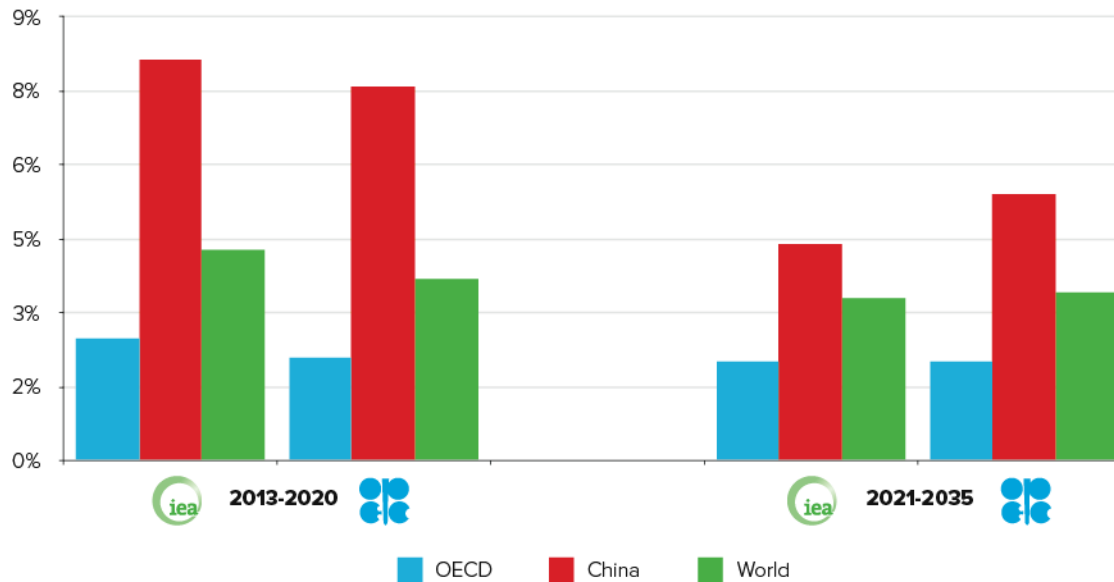


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Figure 12. Long-term GDP Growth Assumptions for Selected Regions





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Figure 13. Long-Term Oil Price Assumptions (real 2012 US\$)

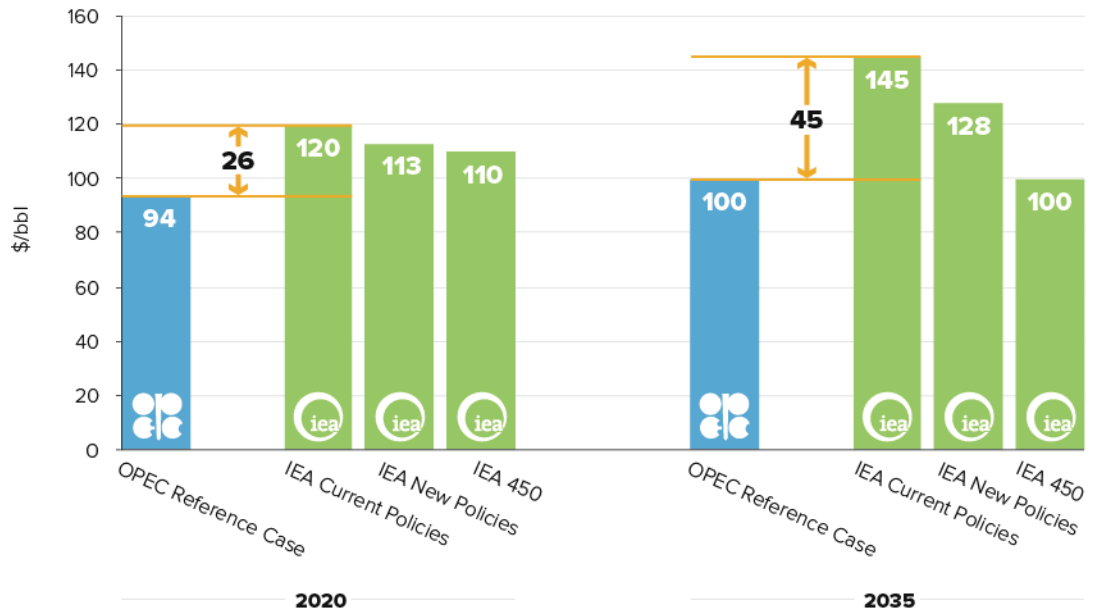


Figure 14. World Primary Energy in 2010 and Outlook for 2035

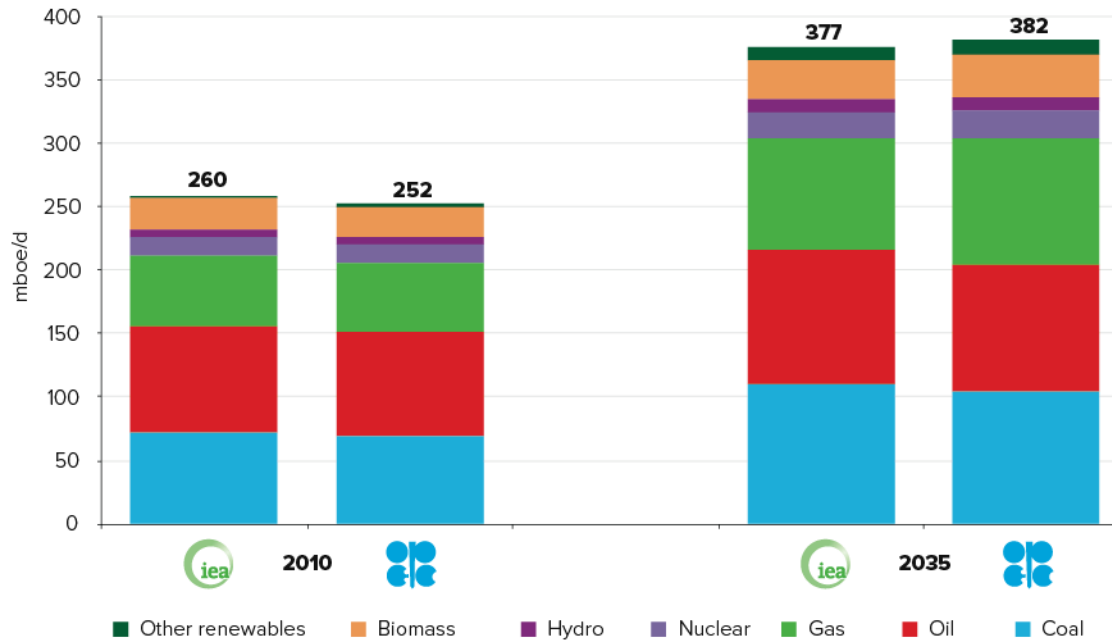
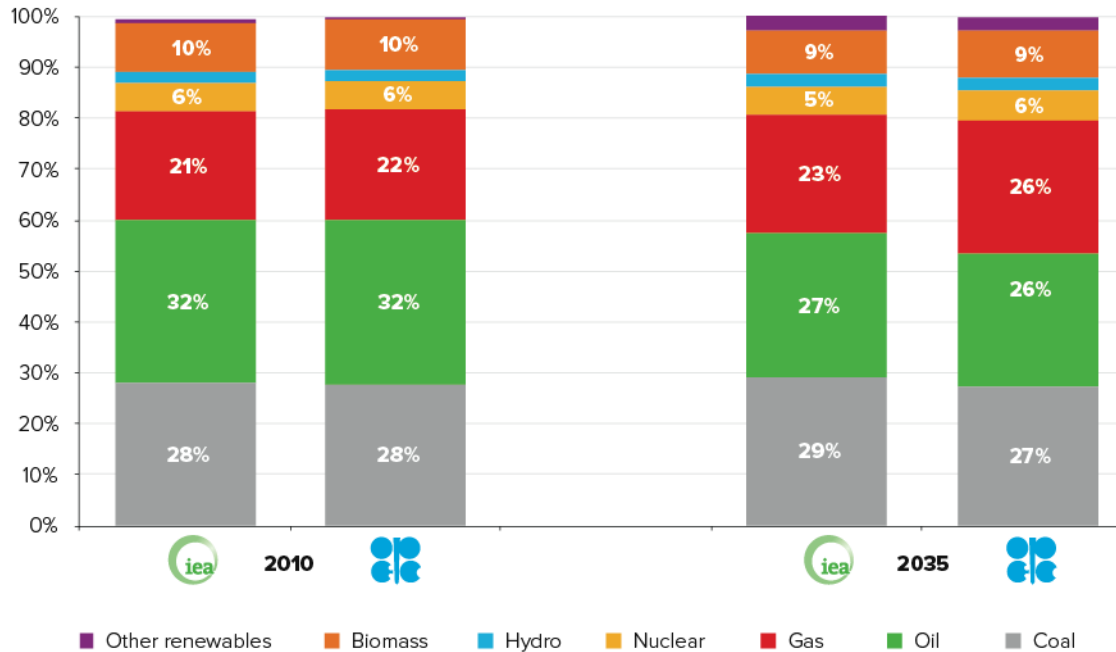


Figure 15. World Primary Energy Fuel Shares in 2010 and Outlook for 2035



It's about the
**share of natural
gas**

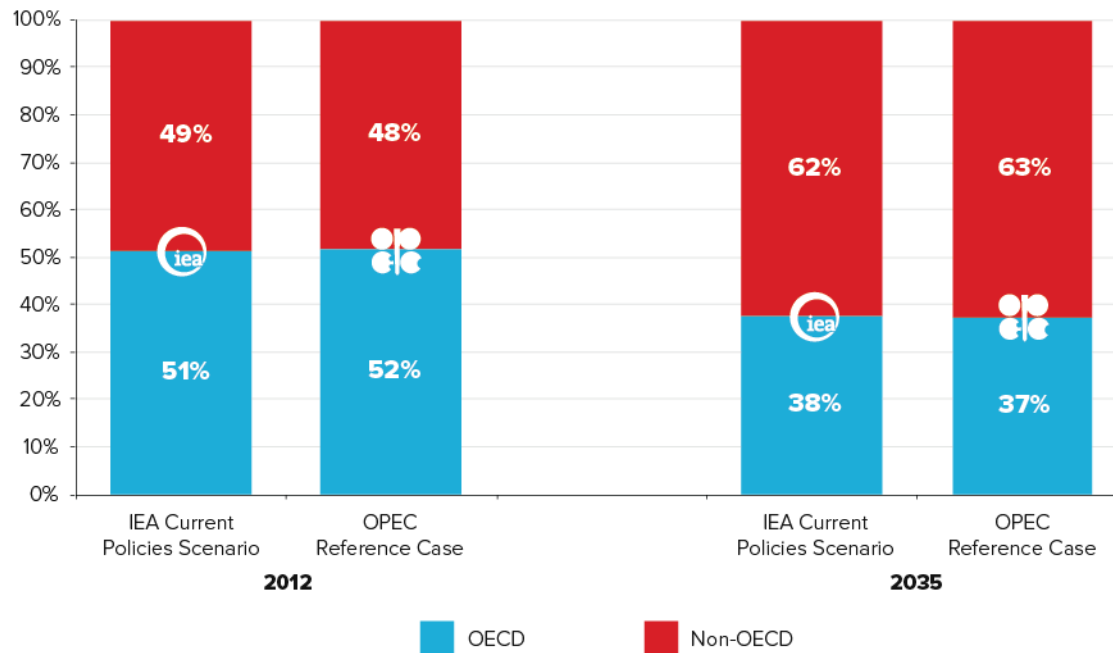


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Figure 16. OECD and Non-OECD Shares of Liquids Demand in 2012 and Outlook for 2035.



It's about what happens outside the OECD

Figure 17. World Liquids Demand Projections in Various Scenarios

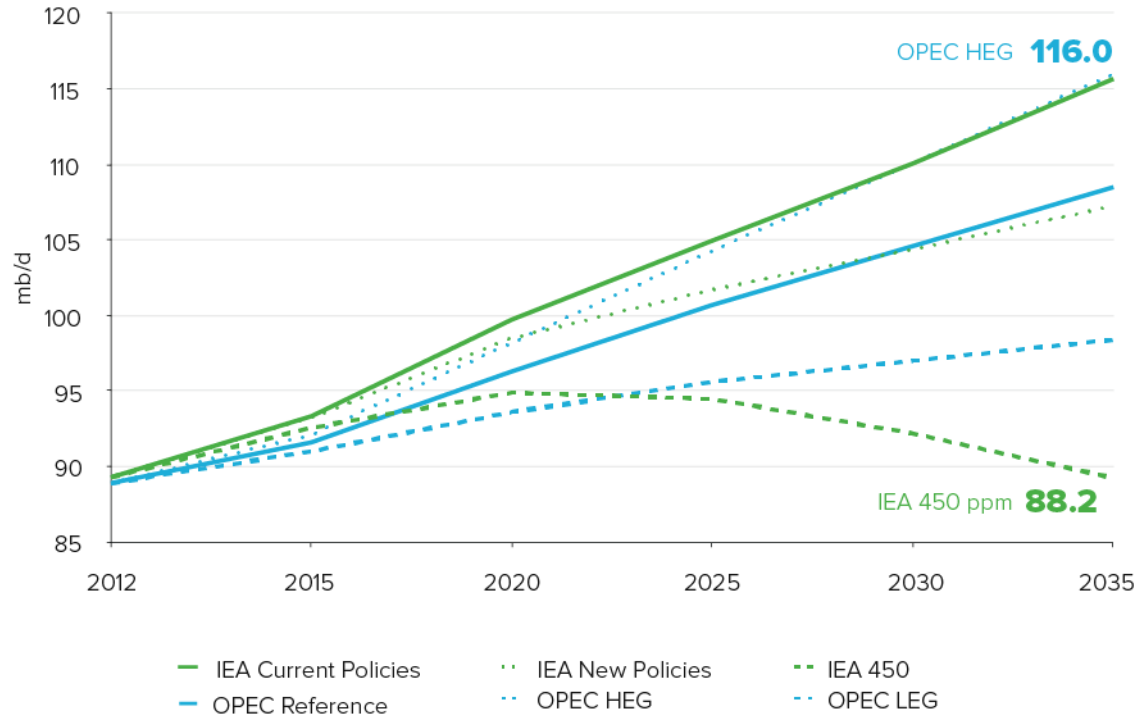
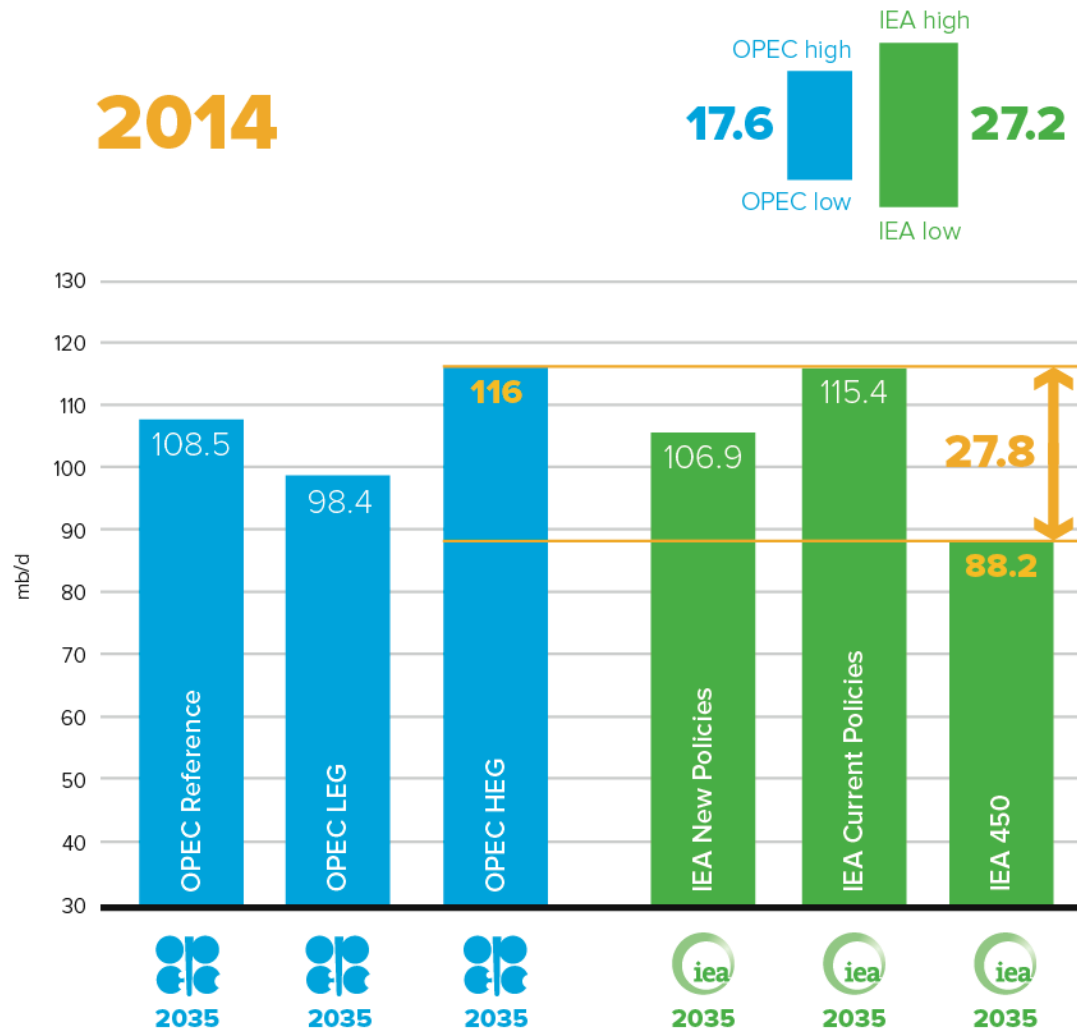


Figure 17. World Liquids Demand Projections in Various Scenarios



It depends on what you assume about:

- Economic growth
- Technology
- Policies
- Call on OPEC crude

Figure 19. 2035 Liquids Supply Outlook in Different Scenarios

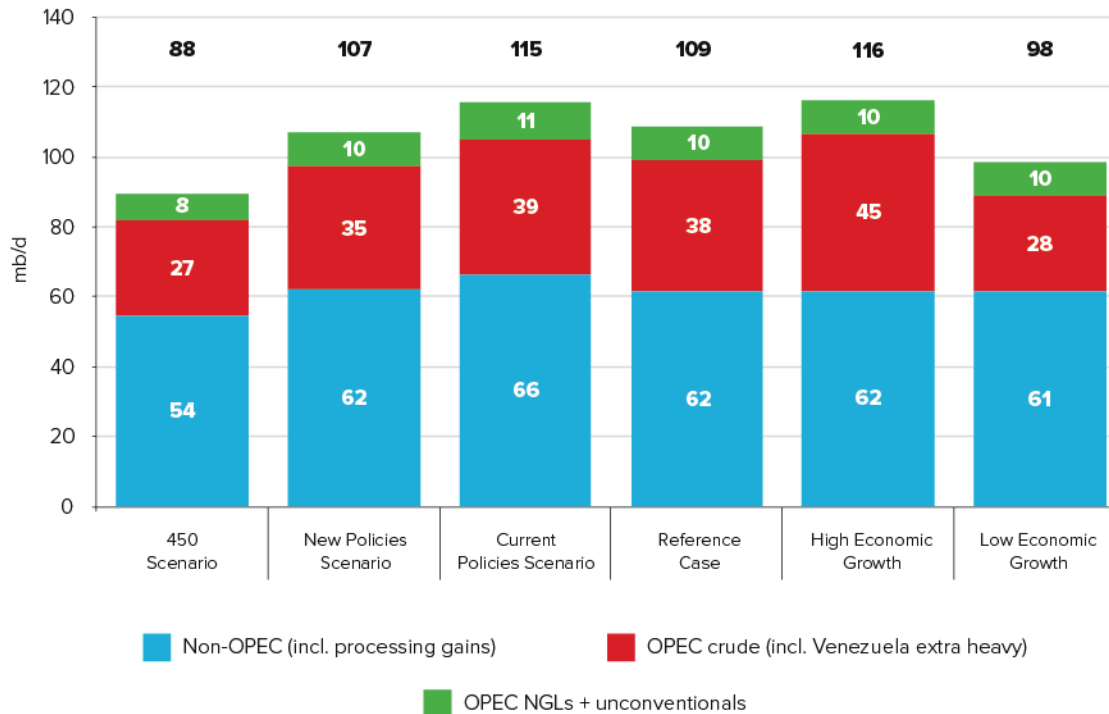
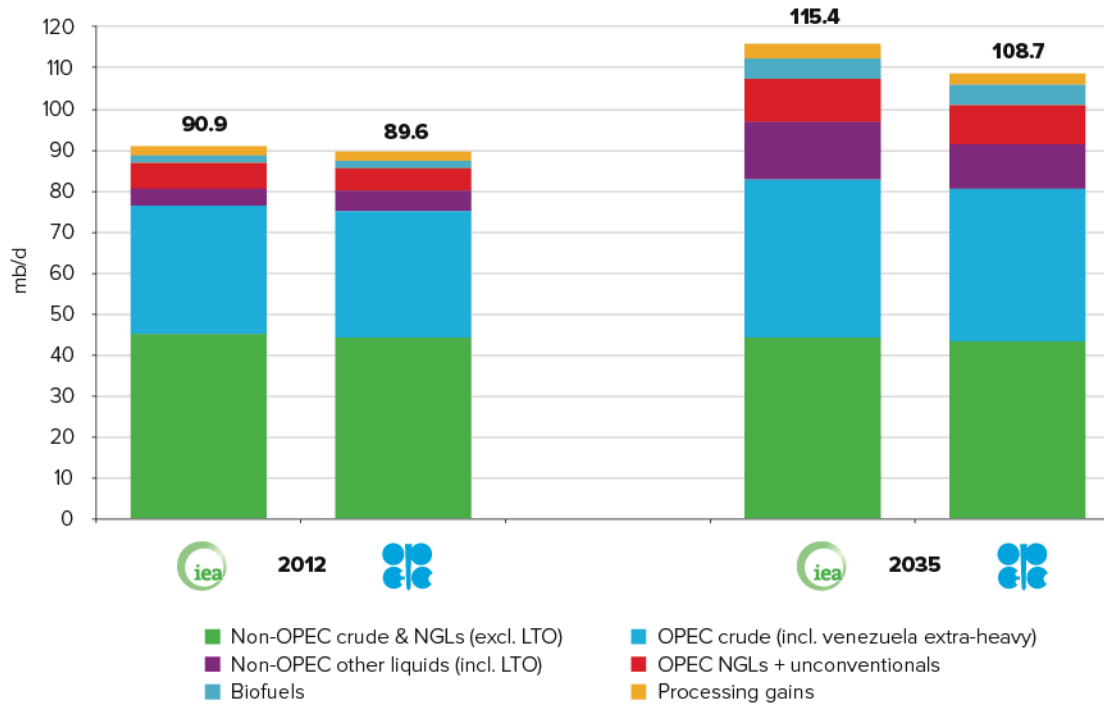


Figure 18. Liquids Supply Sources in 2012 and Outlook for 2035



In the central scenarios it's about unconventional and NGLs








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- a. Medium-term
- b. Long-term

2. Assumptions

Focus of IEA-IEF-OPEC cooperation on energy outlooks

-  Treatment of **ethane**
-  Treatment of **biofuels** and unit of measure
-  Definition of **biomass**
-  Categorisation of **regional long-term oil demand**
-  Definition of the **medium-term**
-  Definition of the **long-term**
-  Categorisation of **light tight oil** inside and outside the USA

The IEA, IEF and OPEC have agreed to continue discussions on the following topics

- Treatment of marine bunker fuels
- Sizeable differences in non-OPEC supply for key regions and countries
- Demand growth outlooks in key countries and regions
- Respective outlooks for shale oil
- Differences in historical supply and demand data
- Improving non-OECD stocks data collection through JODI
- Production spare capacity

Appendix

1. Possible futures: the medium term

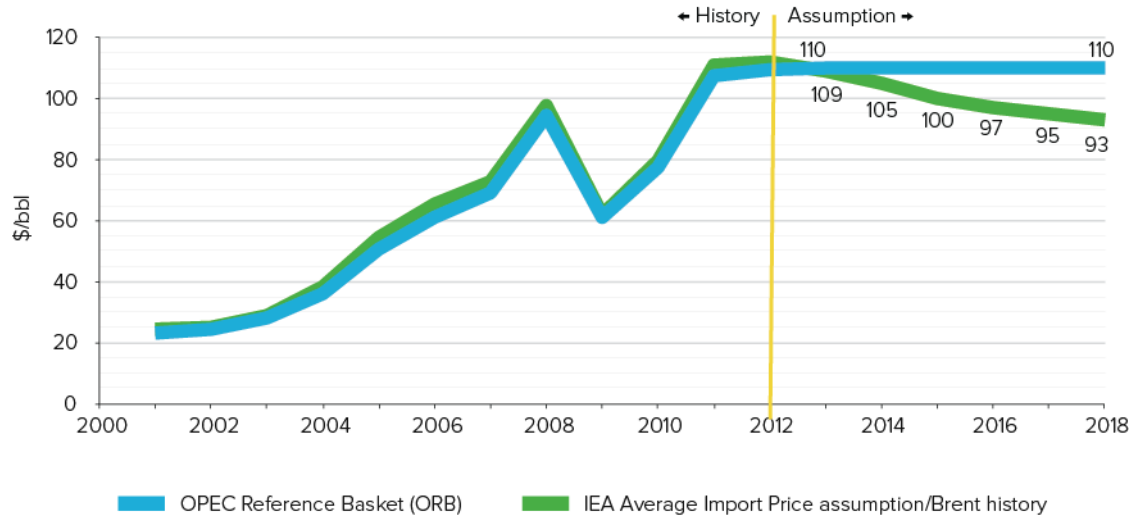


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Figure 7. Medium-term Oil Price Assumptions (nominal US\$)



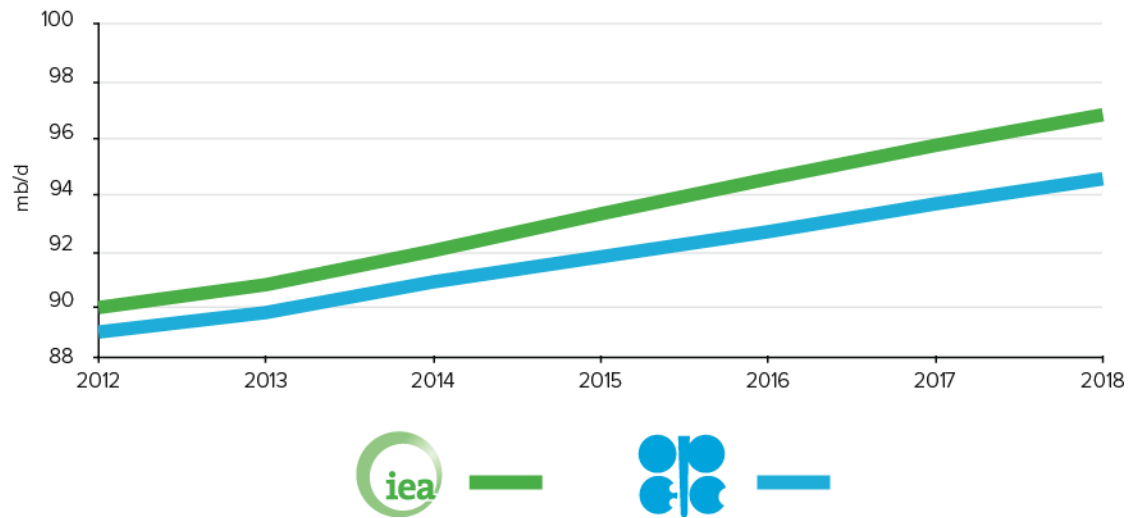


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Figure 8a. World Medium-term Liquids Demand





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Figure 8b. OECD and Non-OECD Medium-term Liquids Demand

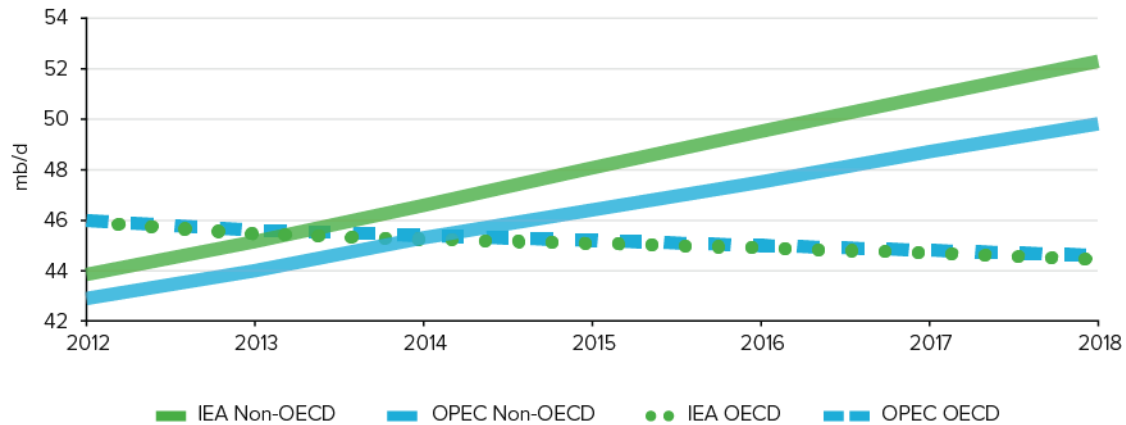
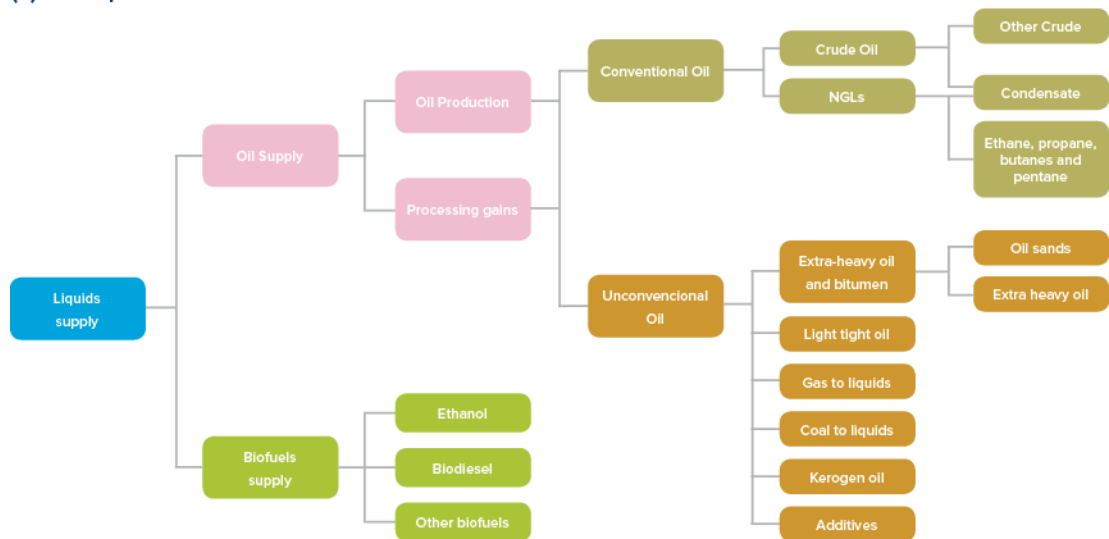


Figure 9. Liquid Fuels Categories by the IEE and OPEC

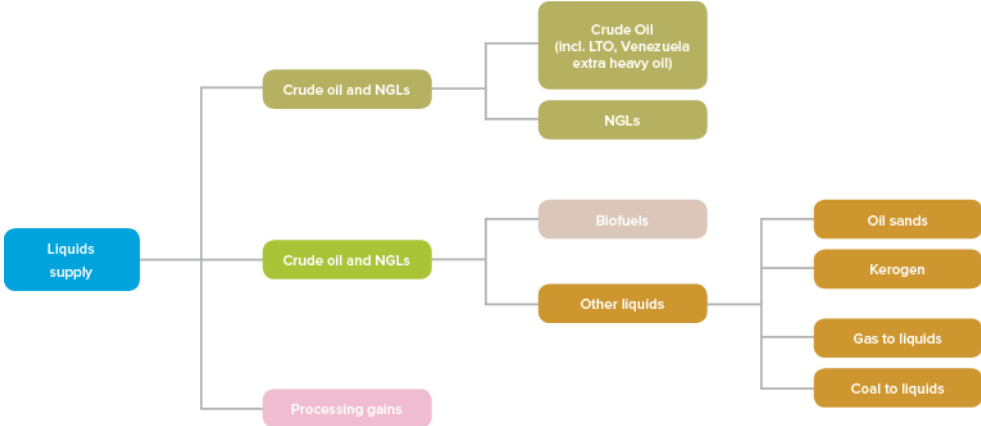
(a) IEA Liquid Fuel Schematic



Source: IEA WEO2013, Figure 13.2

Figure 9. Liquid Fules Categories by the IEE and OPEC

(b) OPEC Liquid Fuels Schematic



Source: Duke and IEF based on WOO2013.

Figure 10a. Medium-term Non-OPEC Liquids Supply Annual Growth

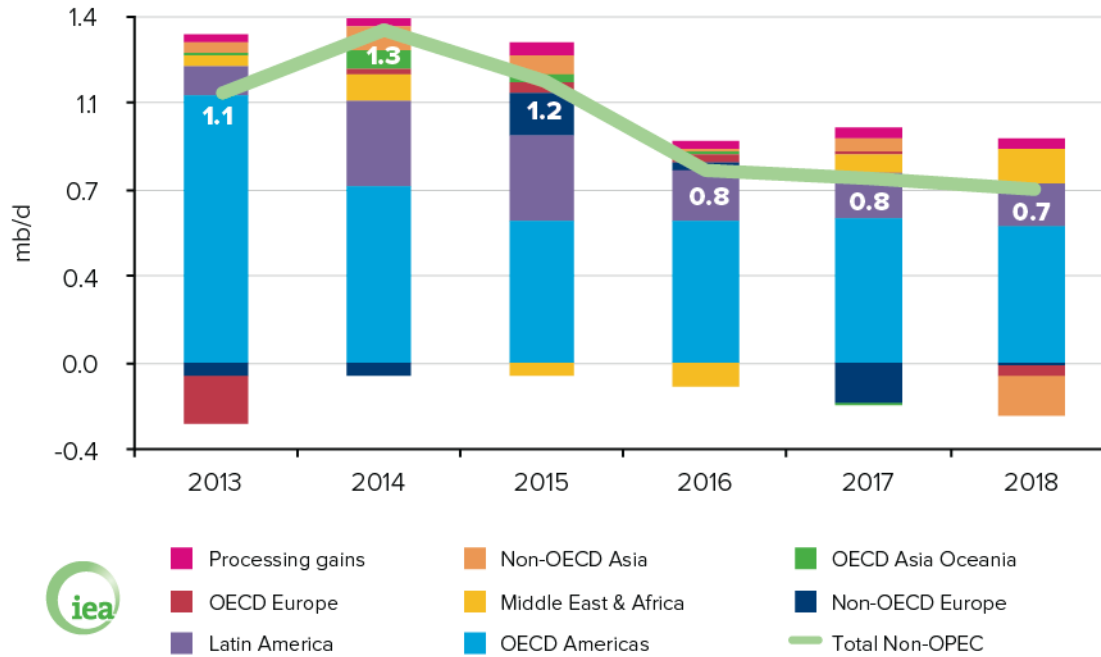
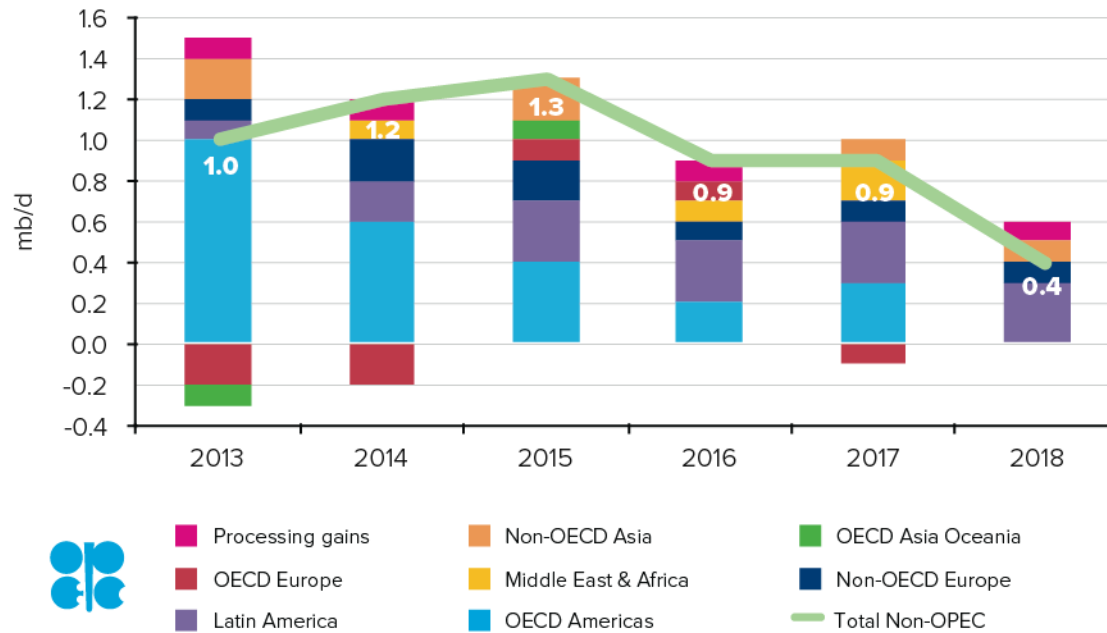


Figure 10b. Medium-term Non-OPEC Liquids Supply Annual Growth





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Figure 11. Medium-term US and Canadian Oil Supply (excluding biofuels)

