



Energy Industry Trends & Strategies

Ramin Forouzandeh | September 23rd and 30th, 2021 | RIEMP DBA

Instructor



- Strategy, investment & M&A professional in the energy industry
- 10+ years experience as researcher, consultant, and executive
- Educations in engineering, economics and management
- Vice President, PE and VC at Dana Investment Group
- Email: raaminf@gmail.com, Telegram: @raaminf

Agenda

Energy Day

Introduction

References

The Energy Cake

Trend 1: Electrification

Trend 2: Efficiency

Trend 3: Peak Oil

Trends in Investment & Finance

Focus: Iran

Energy Day Wrap-up: Trends

Carbon Day

Carbon

The Oil Market

Focus: Shale Oil

Oil and Energy Companies

Oilfield Services Companies

Refining & Chemicals

Focus: 8 MBPD Agenda

Focus: Total Case Study

Course Wrap-up: Strategic View

Course Objectives

- Drawing an systemic framework to analyze the energy industry
- Discussing major trends affecting the energy industry
- Deploying top references to understand the industry trends
- Discussing the strategic implications of energy transition

Questions

US Shale Oil Production



MENA's Upstream Investment



Energy Industry's Greatest Challenges





References

References

Institutions

IEA

EIA

OPEC

GECF

OIES

IRENA

Data & Consultancy

Platts

Argus

IHSMarkit

FGE

Wood Mackenzie

Rystad Energy

Management Consulting

McKinsey

BCG

Bain

Accenture

Financial Services

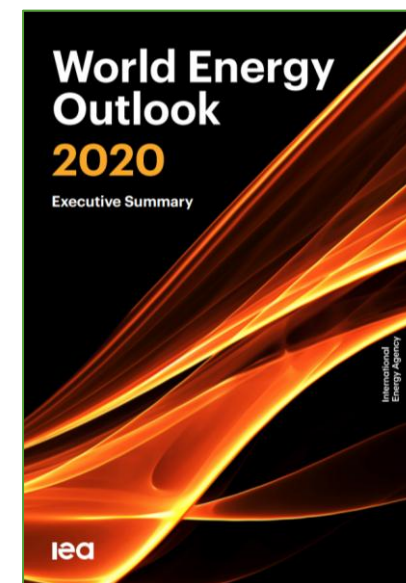
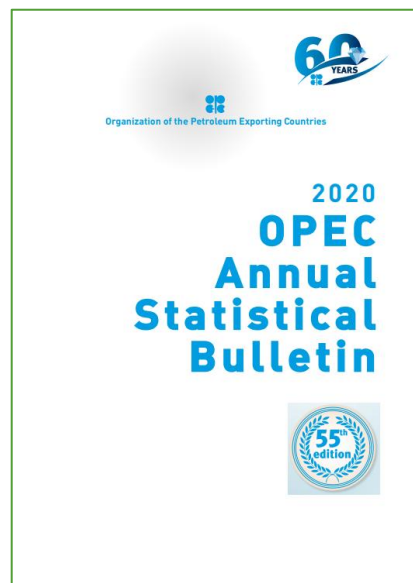
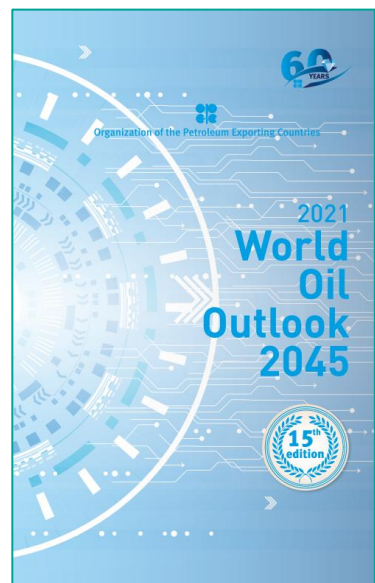
EY

Deloitte

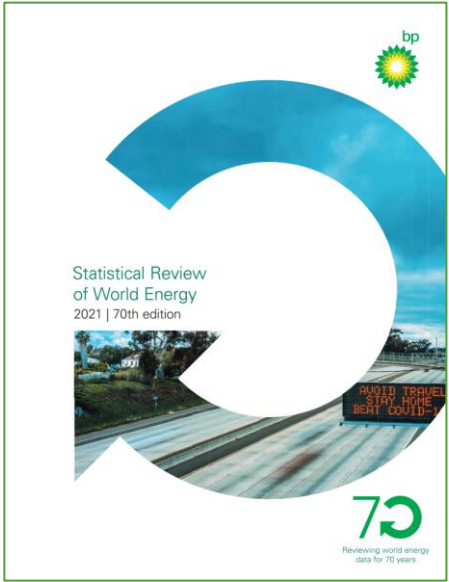
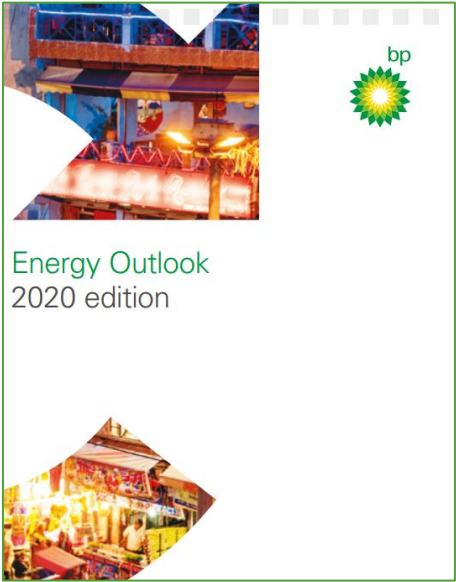
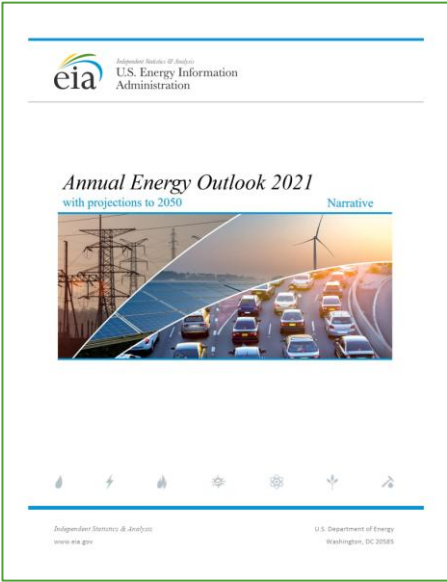
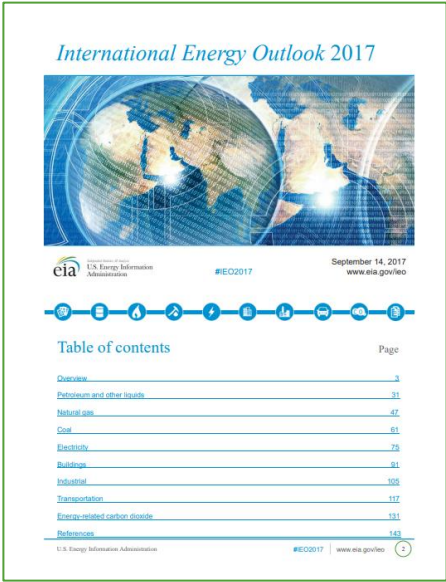
KPMG

PWC

10 reports to follow



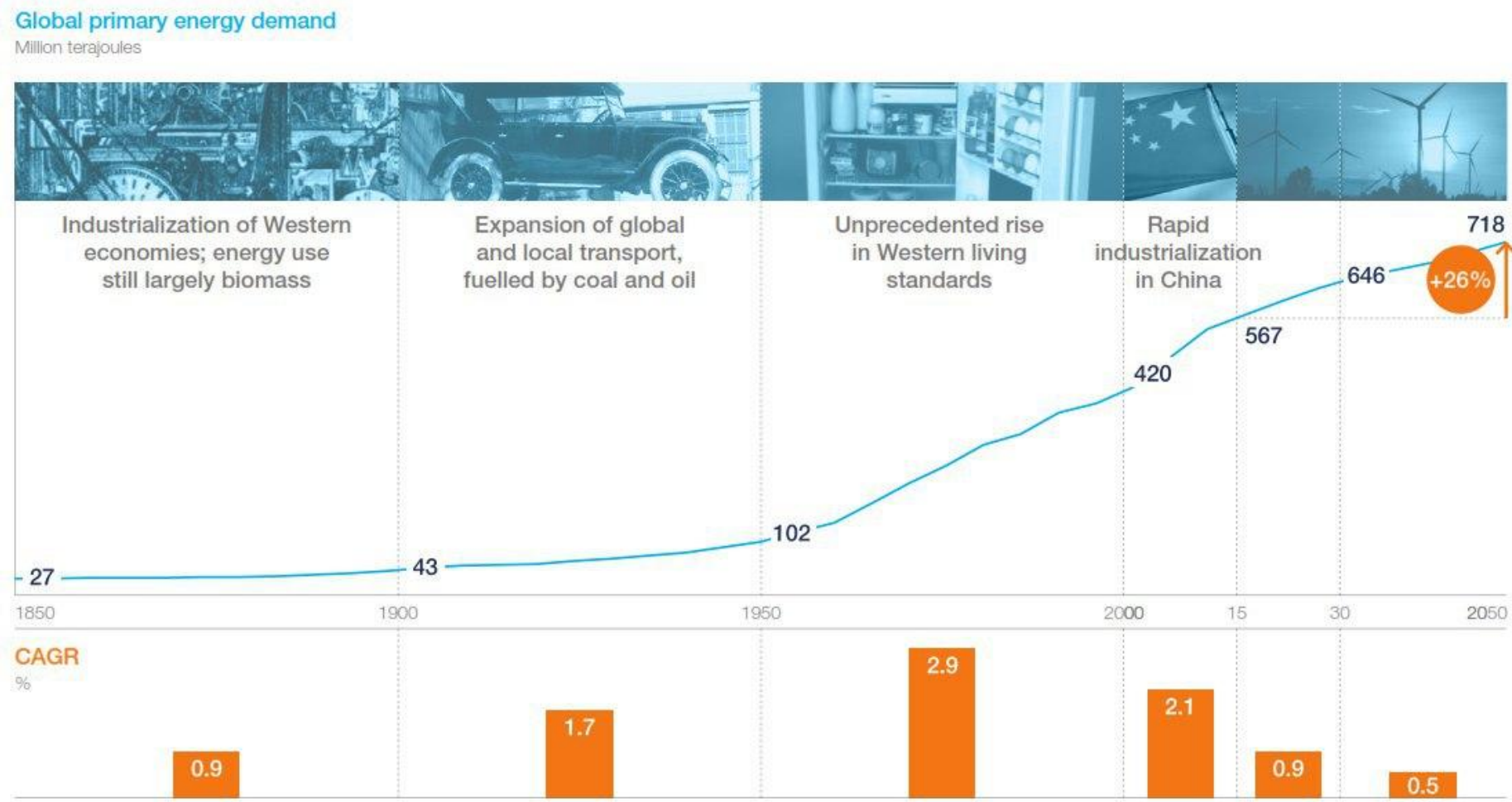
10 reports to follow





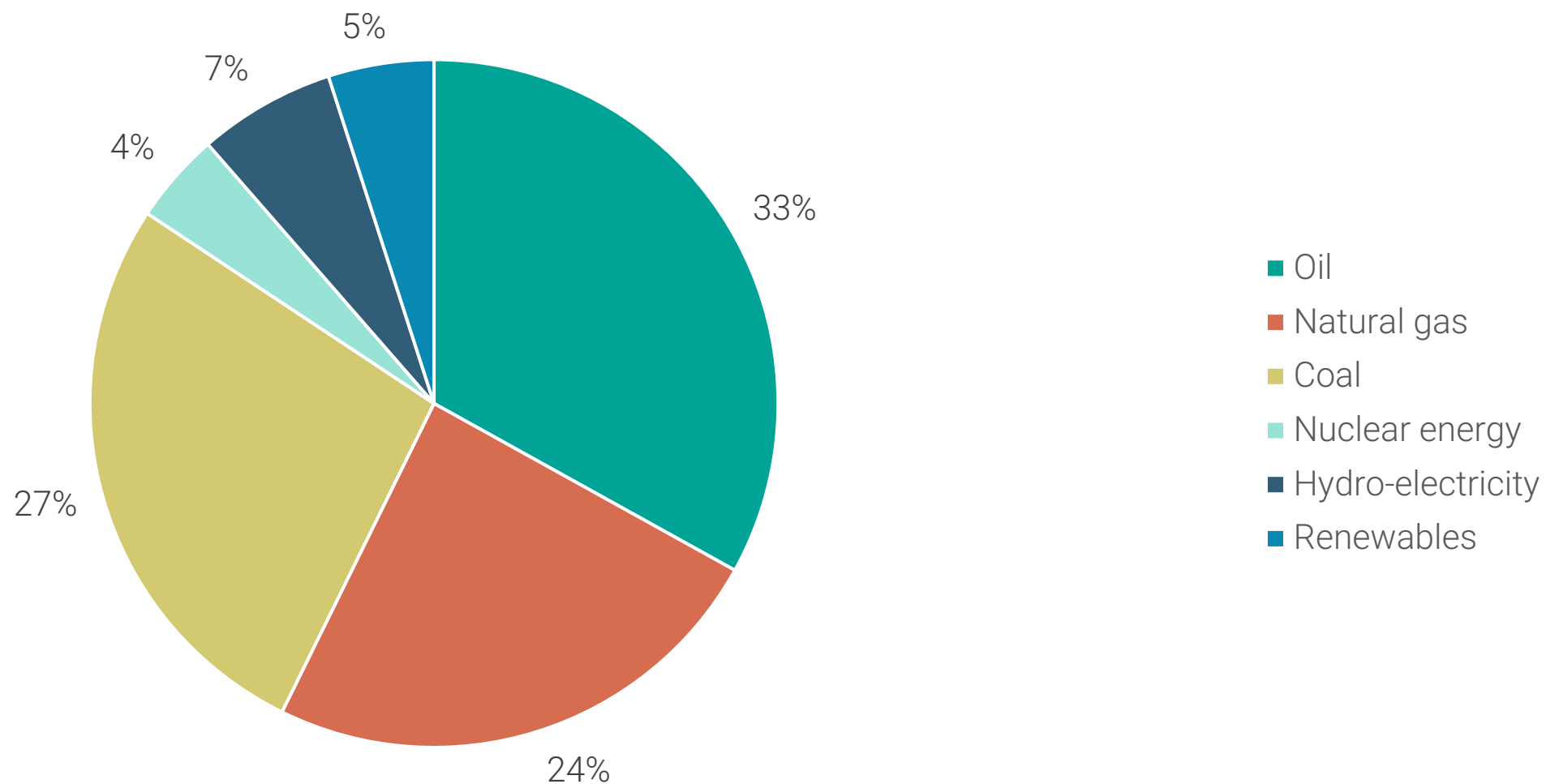
The Energy Cake

Energy Demand

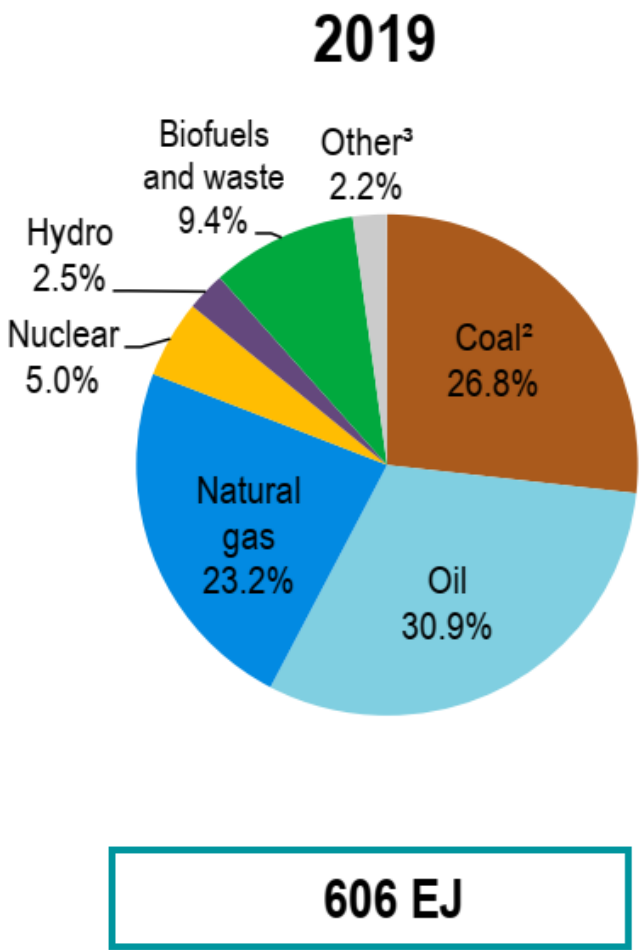
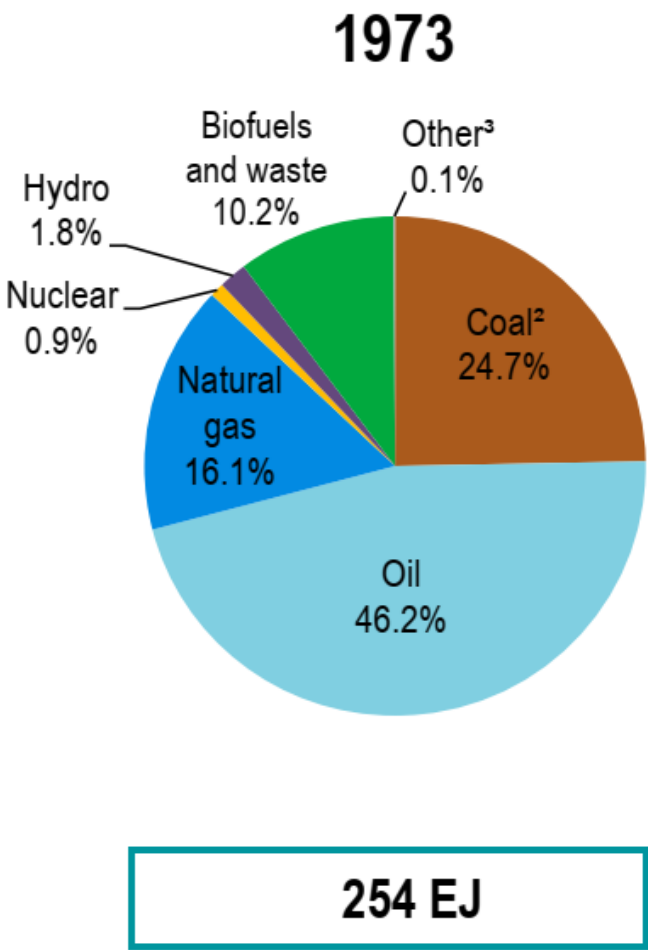


Sources: McKinsey Energy Insights' Global Energy Perspective, December 2017; IEA Energy Balances (Historical); Smil, V. (Historical)

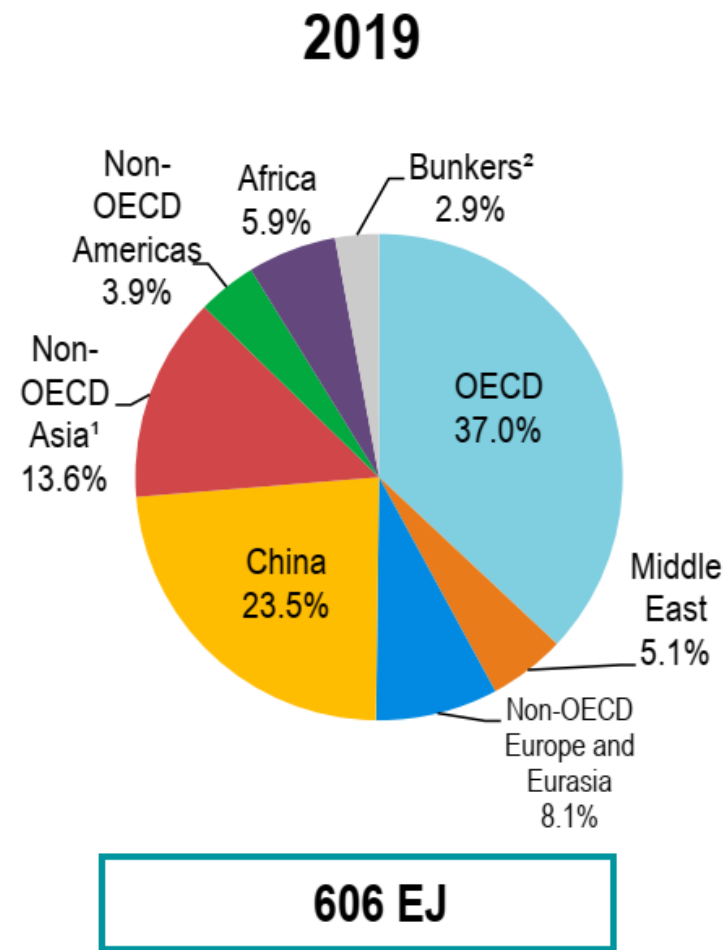
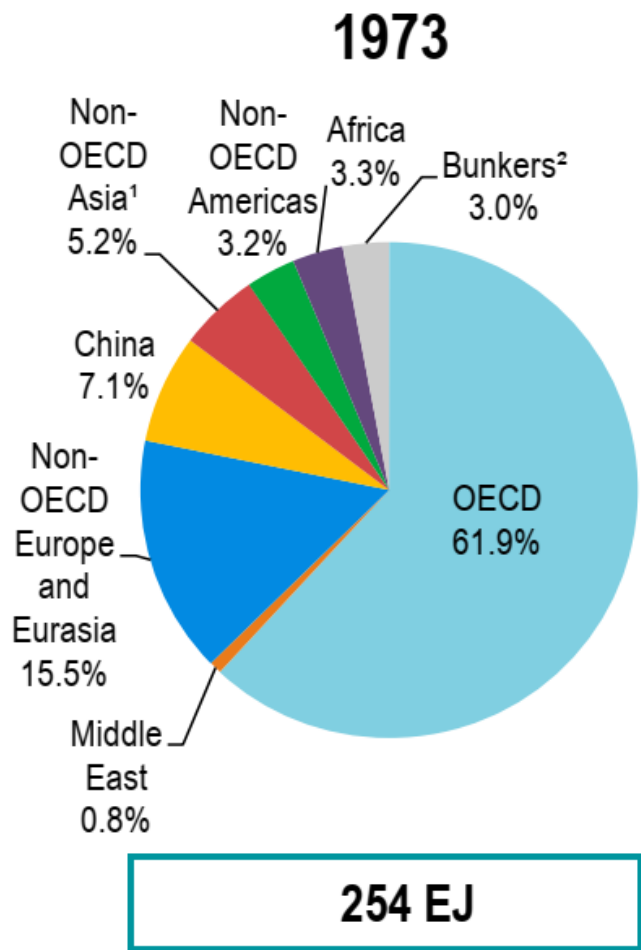
Fuels Share of Primary Energy Consumption (Exajoules)



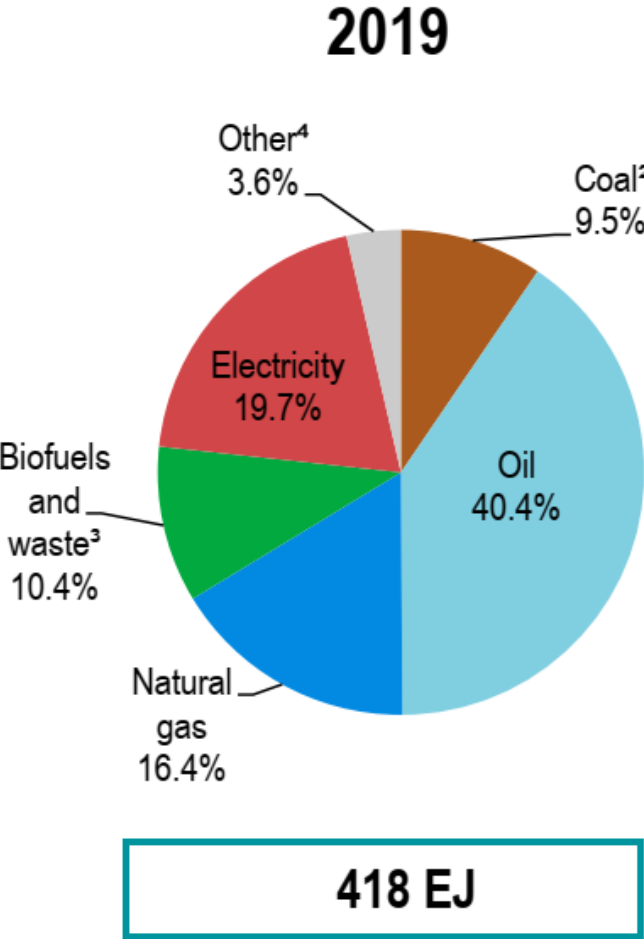
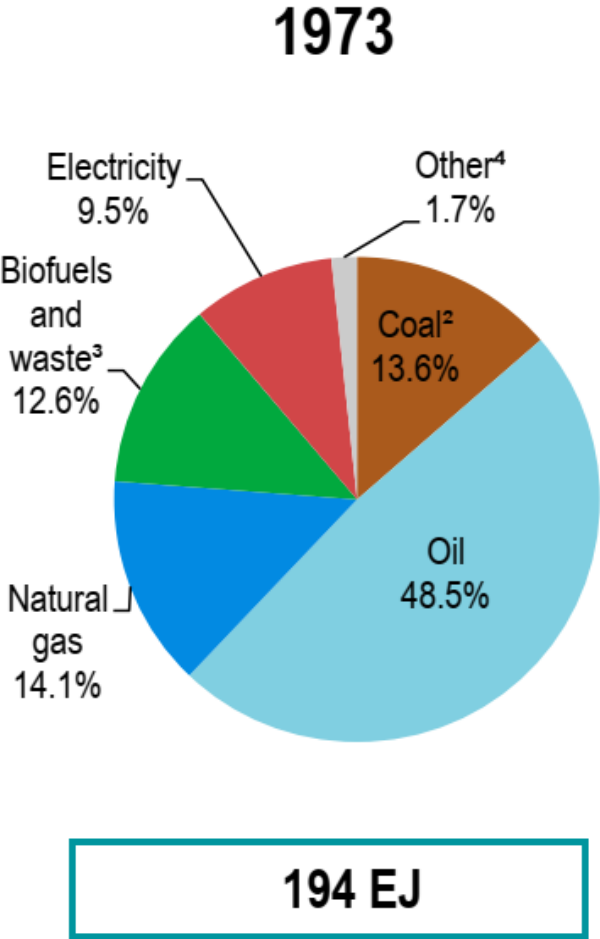
World Total Energy Supply by Source



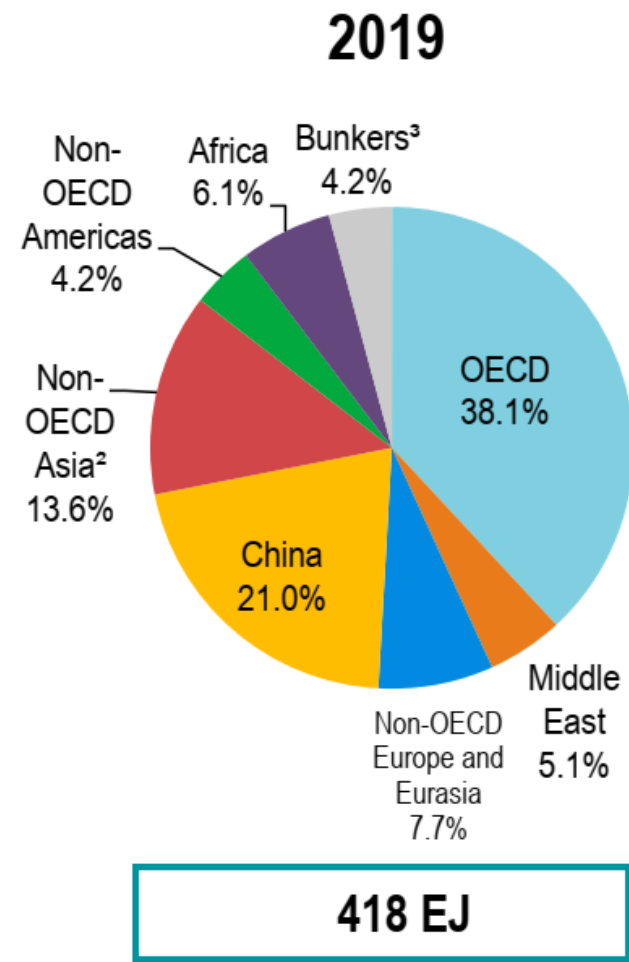
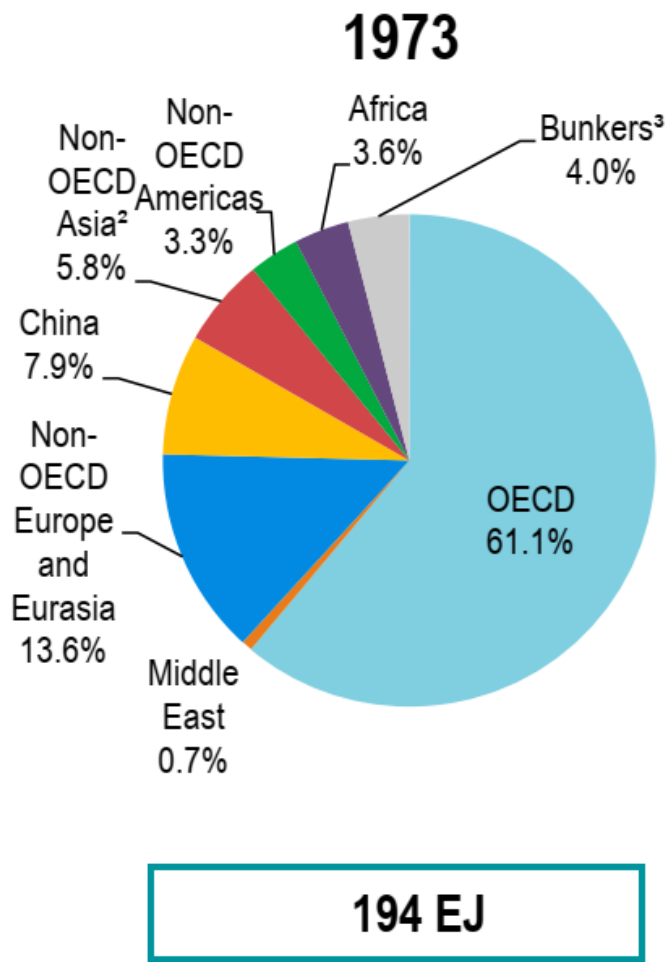
World Total Energy Supply by Region



World Total Final Consumption by Source

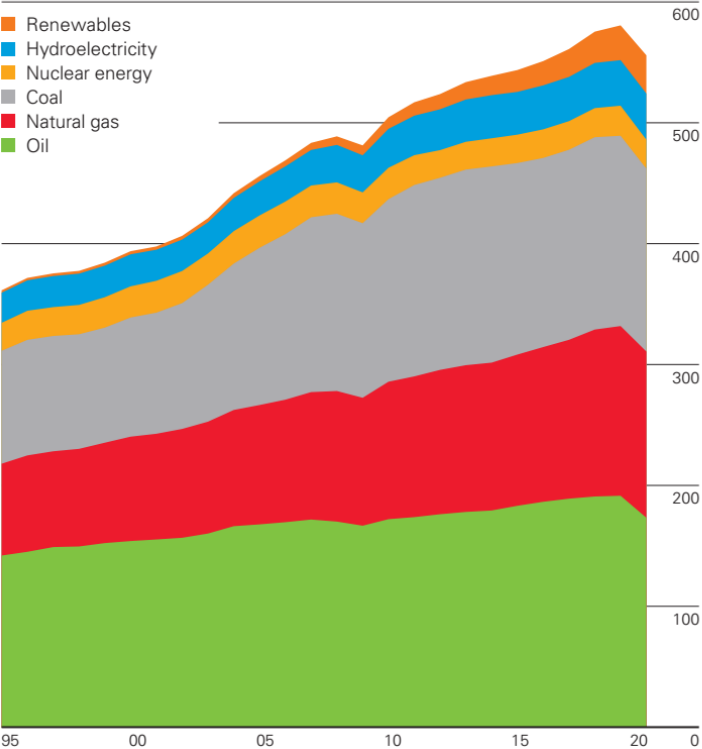


World Total Final Consumption by Region



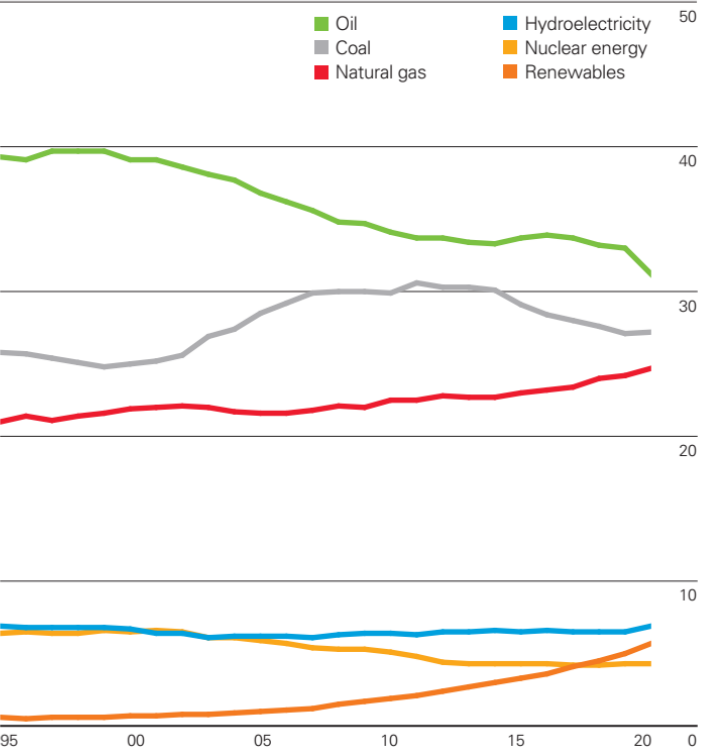
World Energy Consumption

World consumption
Exajoules



Primary energy consumption decreased by 4.5% last year, the first decline in energy consumption since 2009. The decline was driven largely by oil (-9.7%), which accounted for almost three quarters of the decrease. Consumption for all fuels decreased, apart from renewables (+9.7%) and hydro (+1.0%). Consumption fell across all the regions, with the largest declines in North America (-8.0%) and Europe (-7.8%). The lowest decrease was in Asia-Pacific (-1.6%) due to the growth in China (+2.1%), the only major country where energy consumption increased in 2020. In the other regions, the decline in consumption ranged between -7.8% in South and Central America to -3.1% in the Middle East.

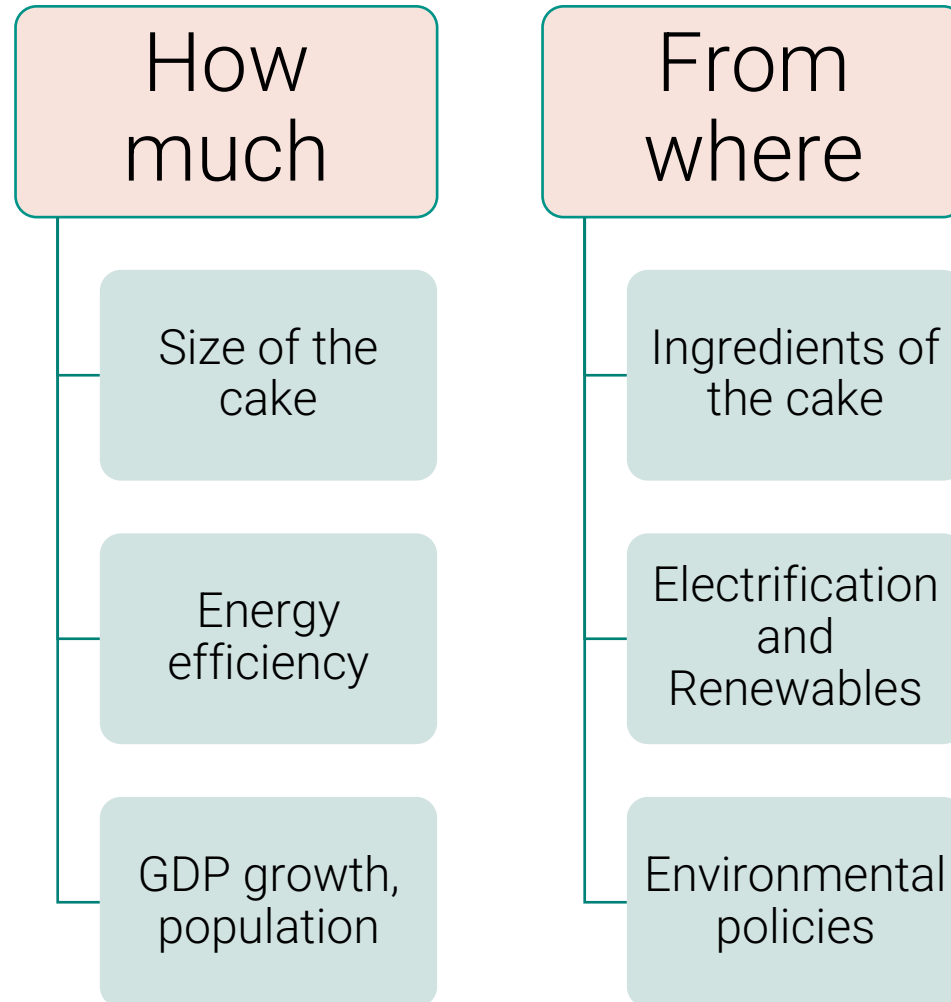
Shares of global primary energy
Percentage



Oil continues to hold the largest share of the energy mix (31.2%). Coal is the second largest fuel in 2020, accounting for 27.2% of total primary energy consumption, a slight increase from 27.1% in the previous year. The share of both natural gas and renewables rose to record highs of 24.7% and 5.7% respectively. Renewables has now overtaken nuclear which makes up only 4.3% of the energy mix. Hydro's share of energy increased by 0.4 percentage points last year to 6.9%, the first increase since 2014.



Aspects of the Cake



Drivers of Energy Transition

Shape of GDP

- increase in share of the services sector

▪ Efficiency

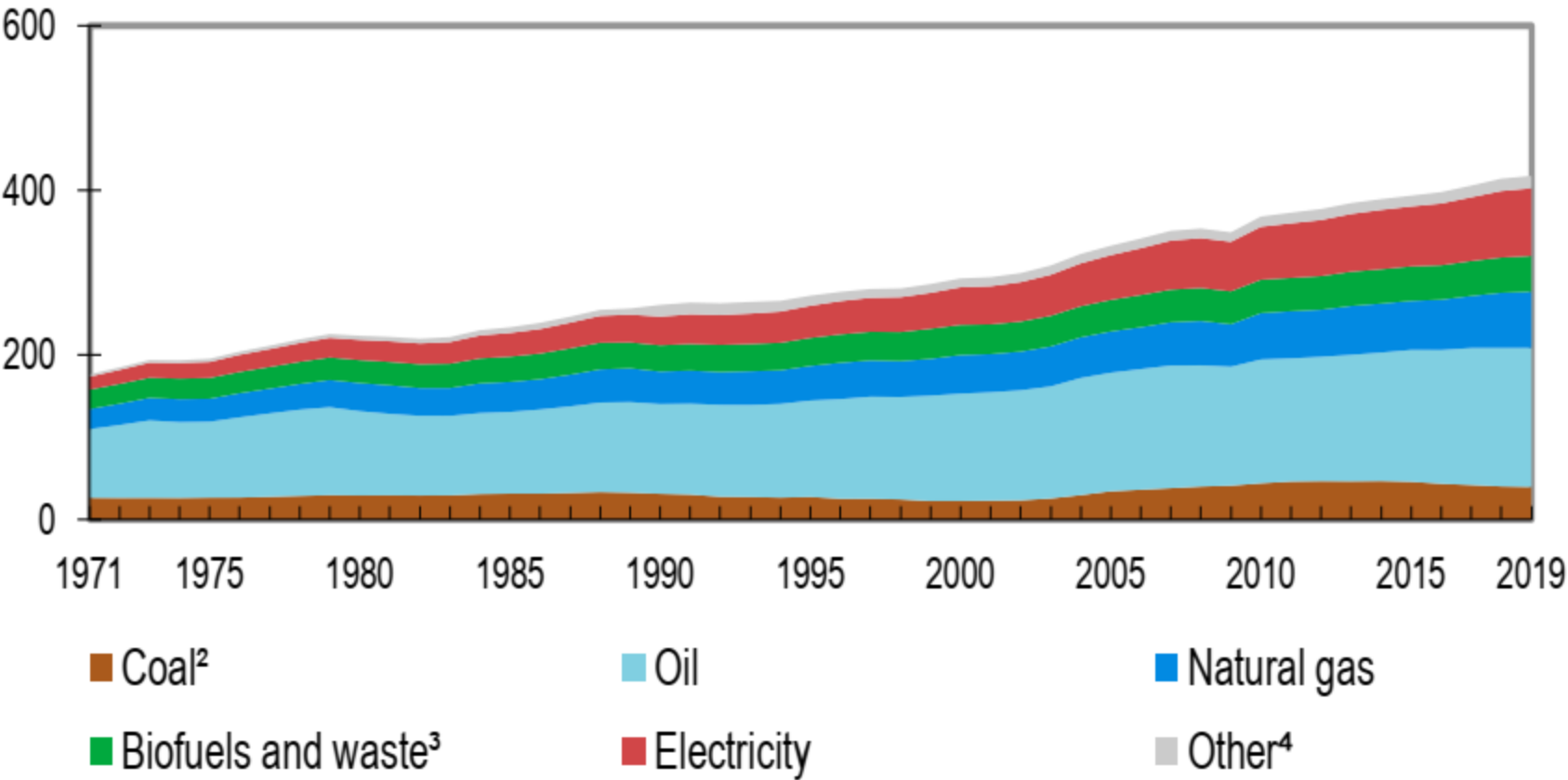
- less energy for the same GDP level

▪ Electrification

- High growth of electricity

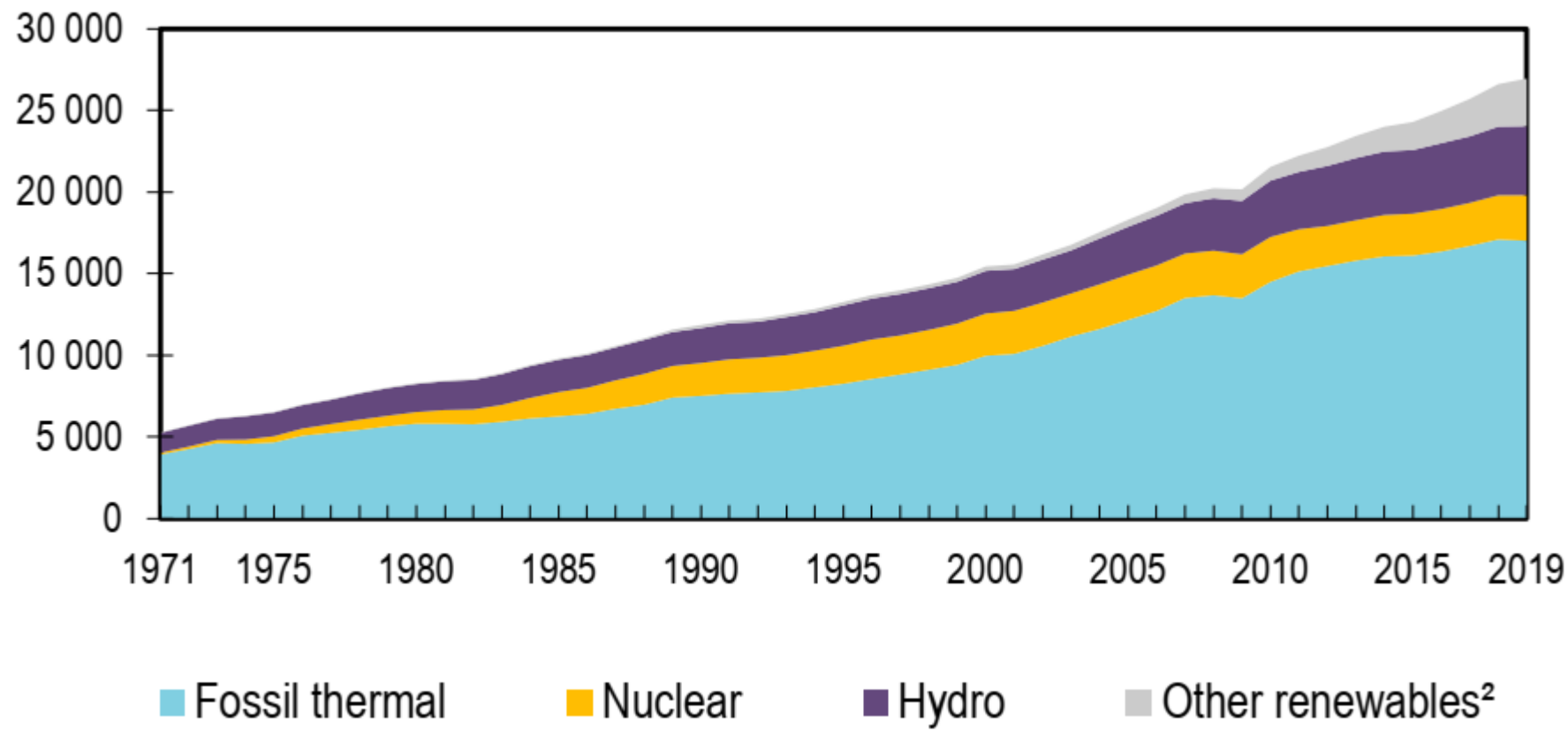
Trend 1: Electrification

World Total Final Consumption by Source (EJ)



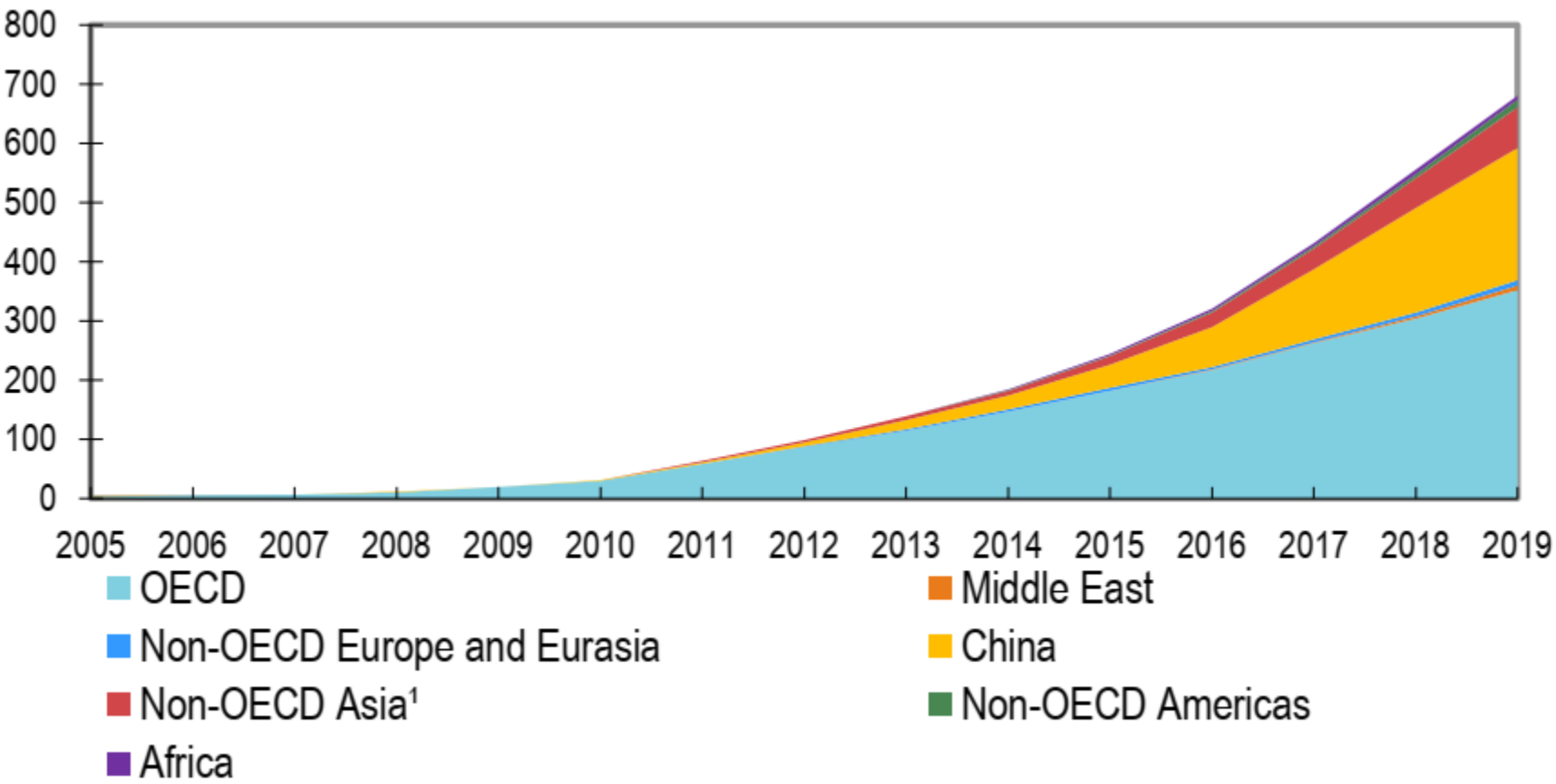
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World Electricity Generation By Source (Twh)



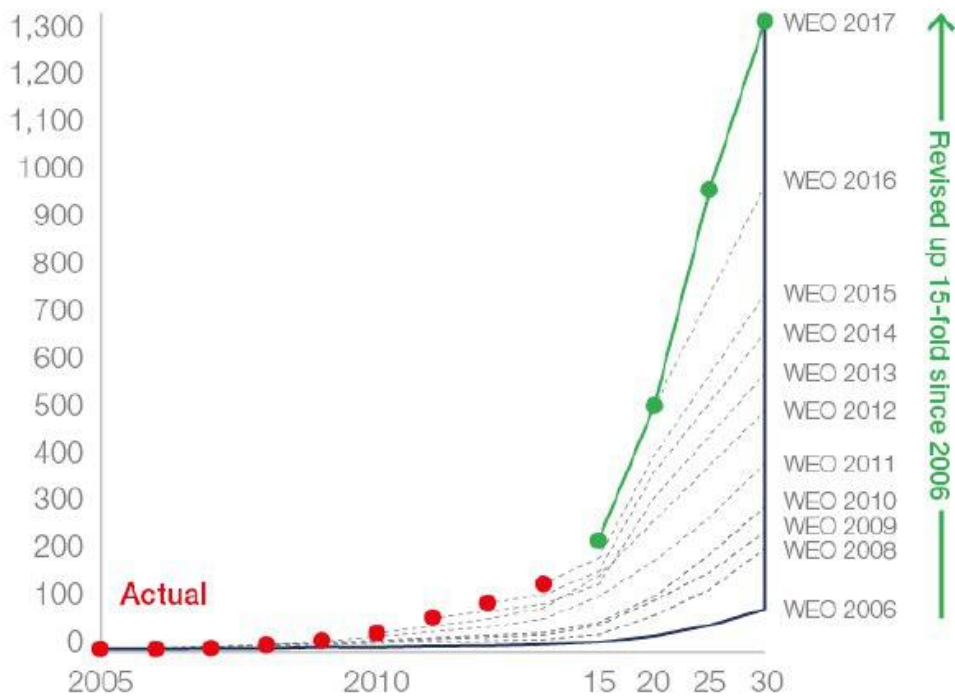
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World Solar PV Electricity Production by Region (Twh)

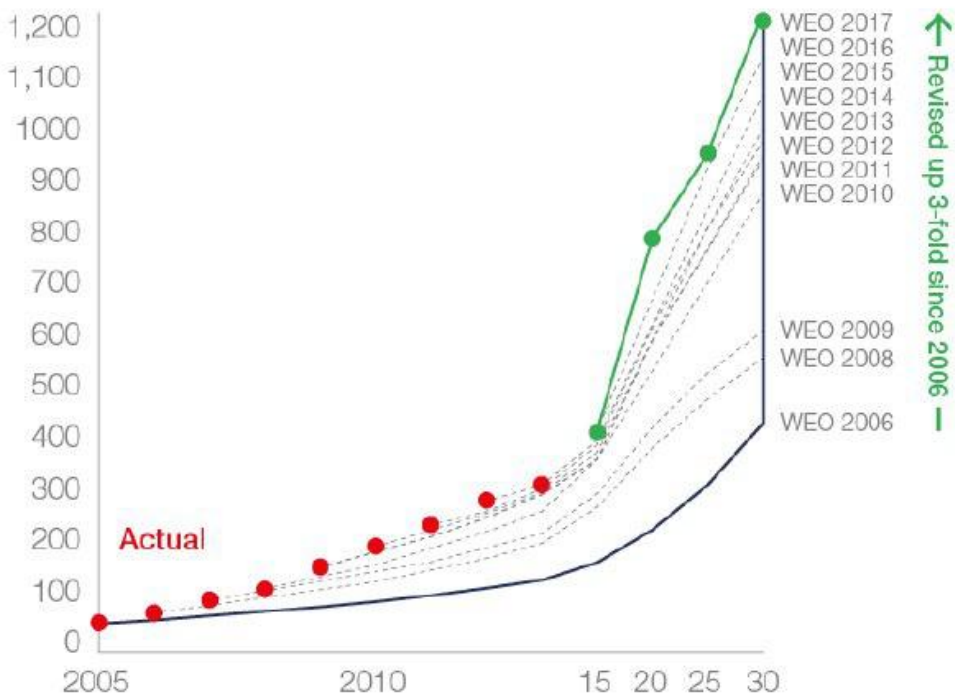


Underestimating Renewables

Solar: global forecast of cumulative installed capacity
GW

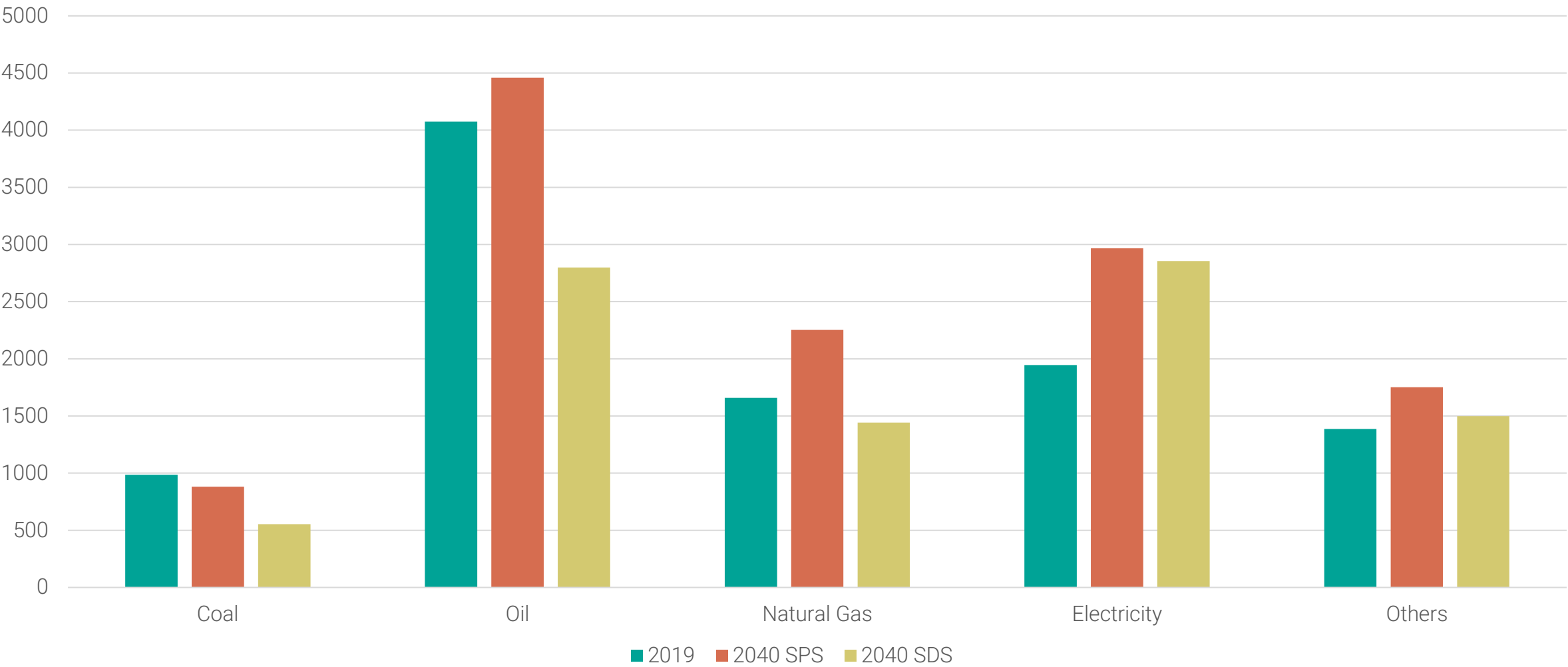


Wind: global forecast of cumulative installed capacity
GW

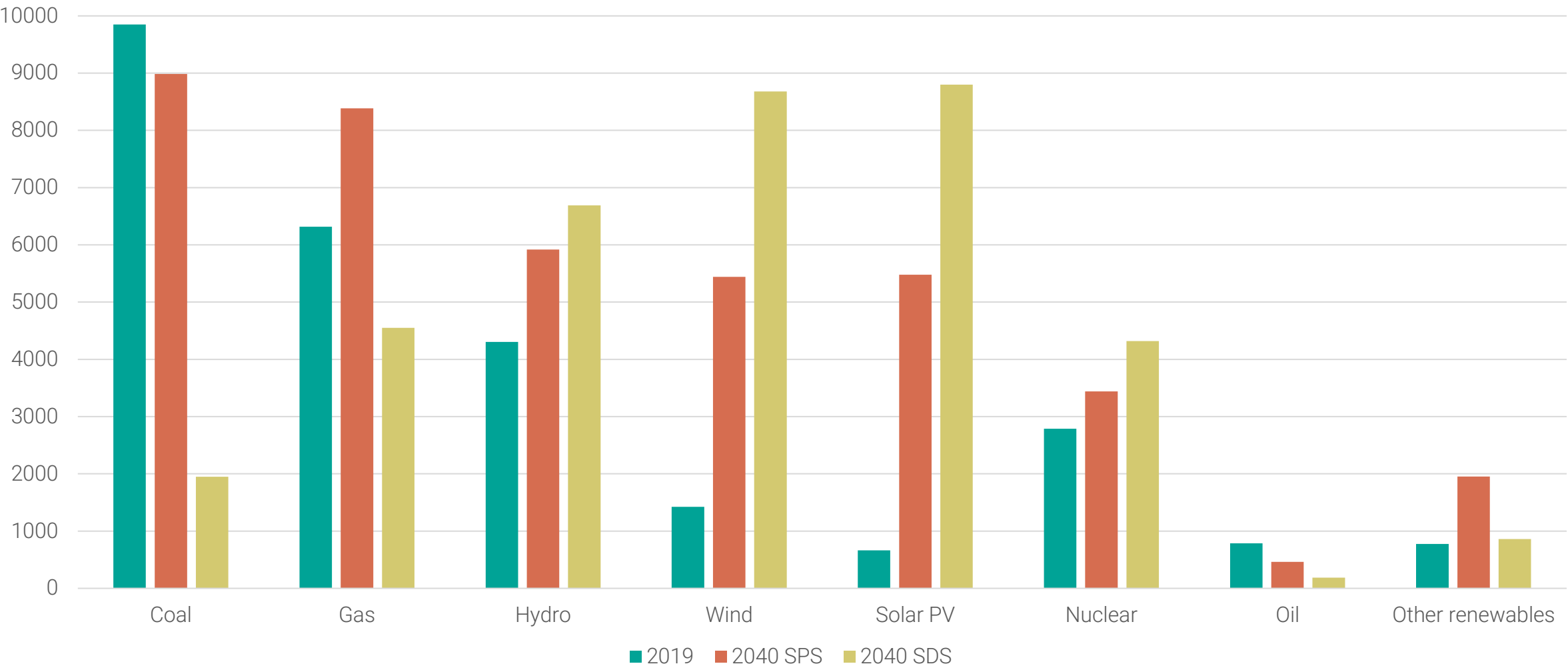


Source: IEA World Energy Outlook – New Policy Scenario

Total Final Consumption (Mtoe)

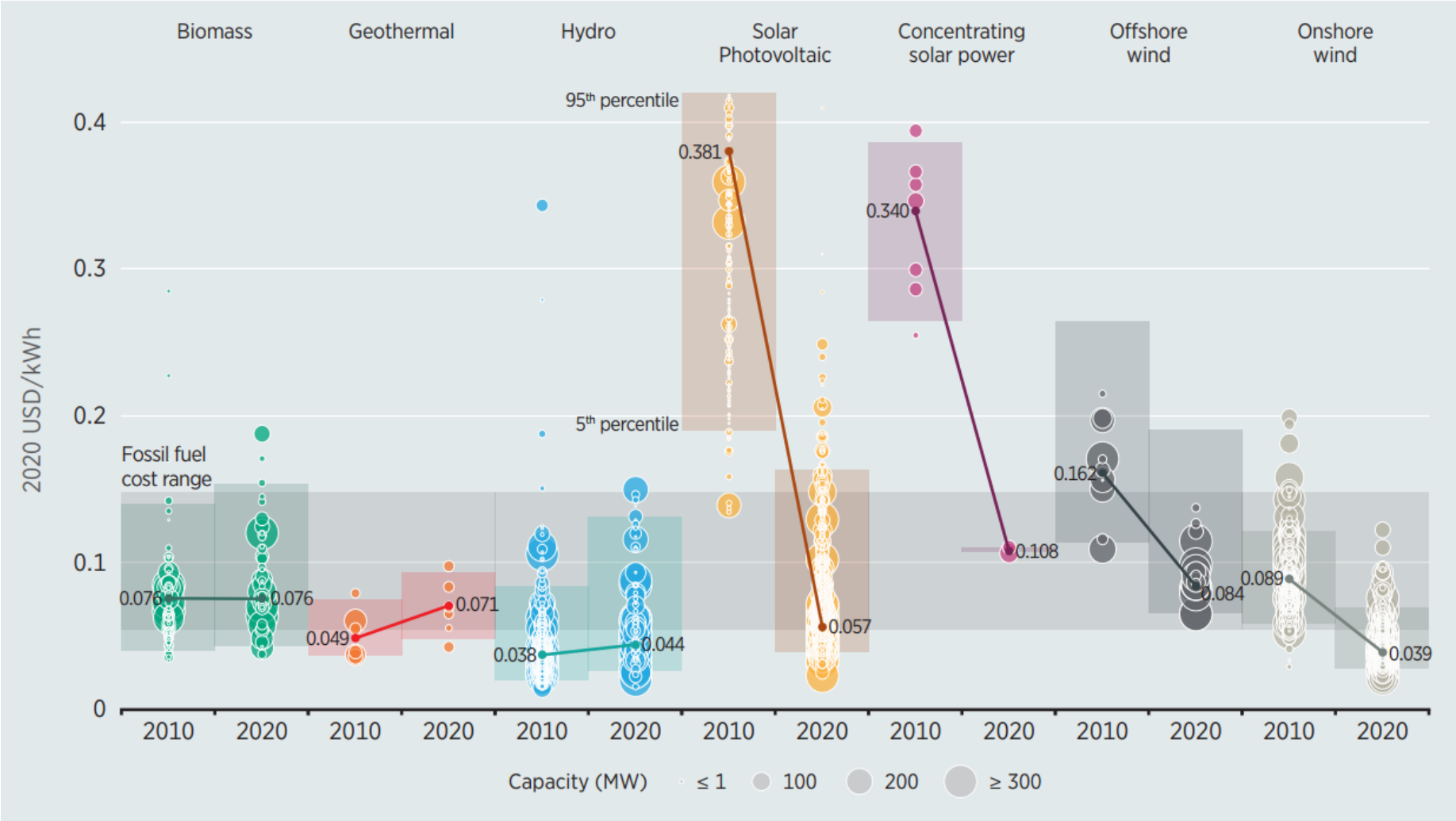


Electricity Generation (TWh)



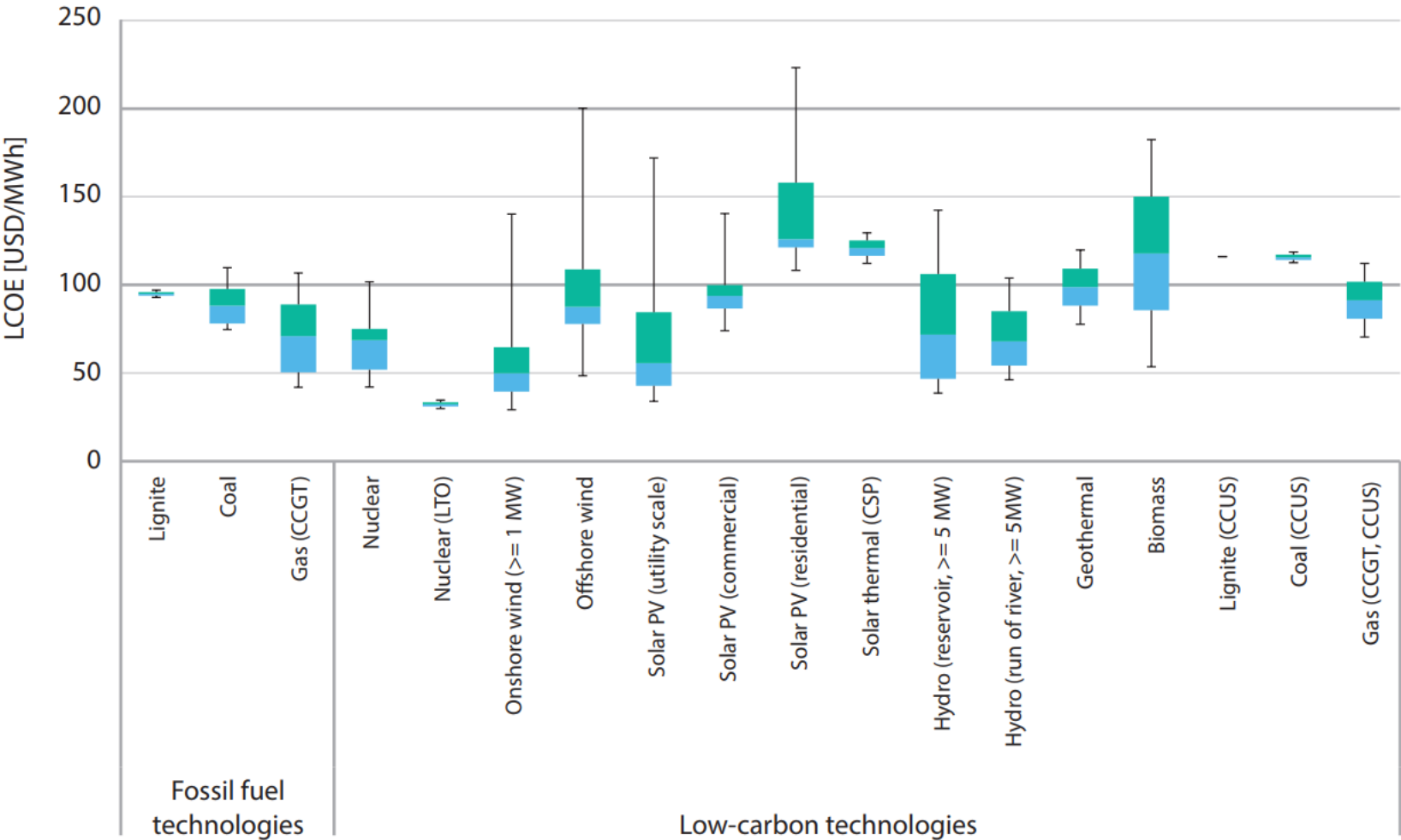
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Global LCOEs from newly commissioned, utility-scale renewable power generation technologies, 2010-2020



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LCOE by technology



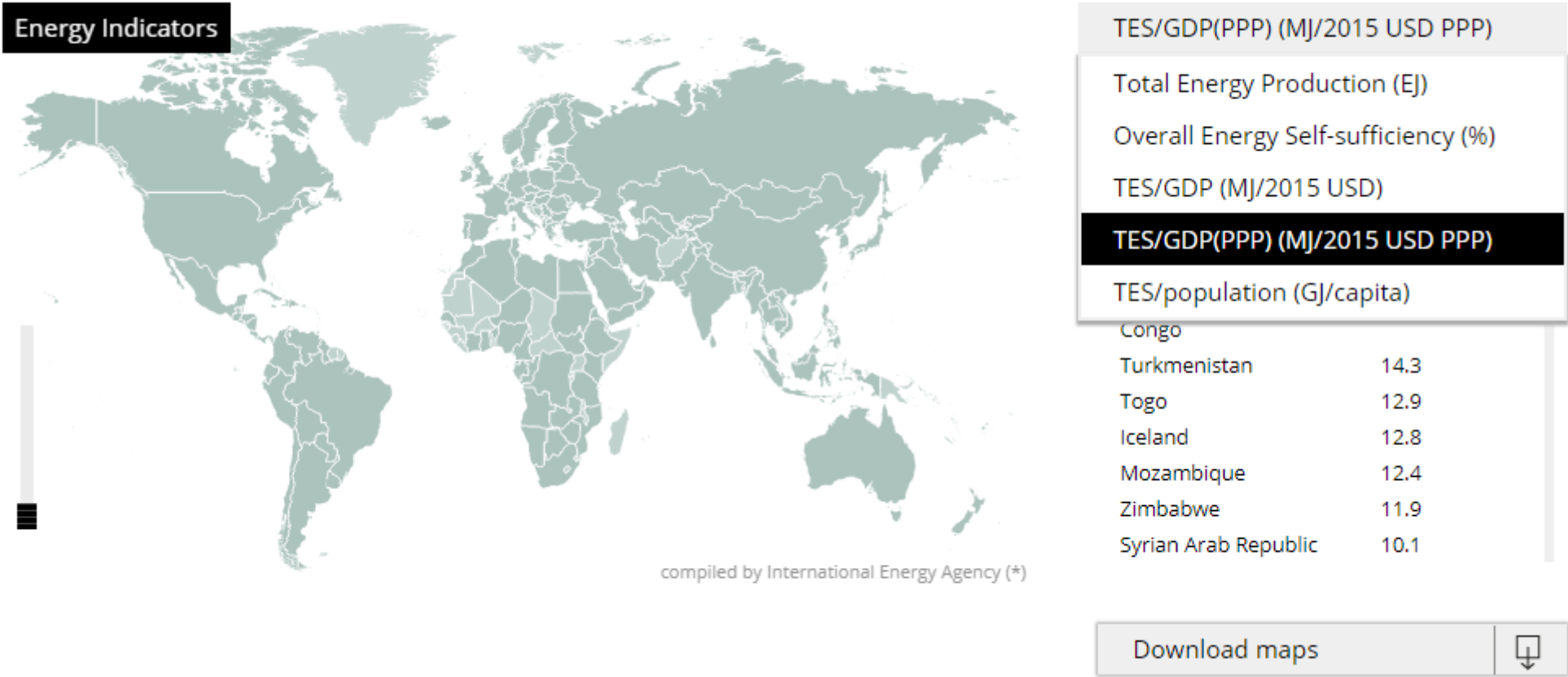
Key Metrics



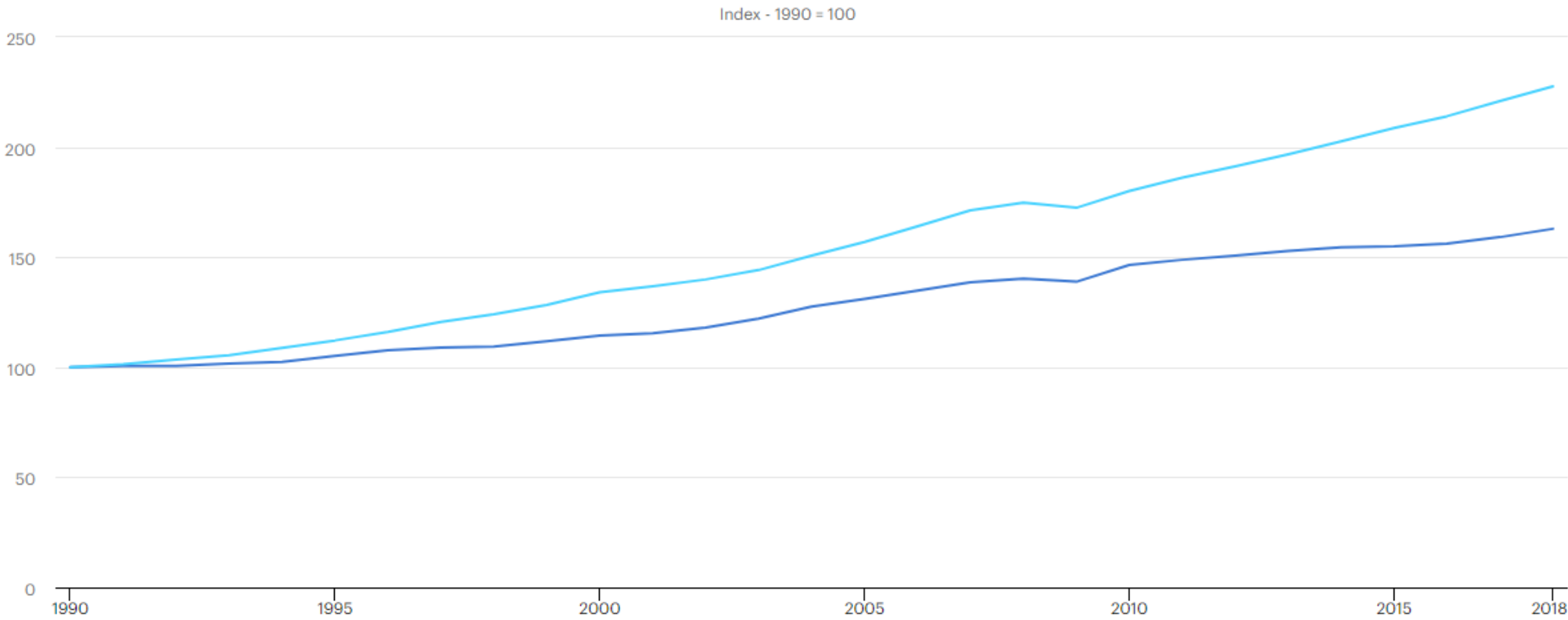
Trend 2: Efficiency

Energy Efficiency and Energy Intensity

- **Energy Intensity** is measured by the quantity of energy required per unit output or activity, so that using less energy to produce a product reduces the intensity.
- **Energy Efficiency** improves when a given level of service is provided with reduced amounts of energy inputs or services are enhanced for a given amount of energy input.
- Declines in energy intensity are a proxy for efficiency improvements, provided:
 - a) energy intensity is represented at an appropriate level of disaggregation to provide meaningful interpretation, and
 - b) other explanatory and behavioral factors are isolated and accounted for.



World GDP and TES trends, 1990-2018



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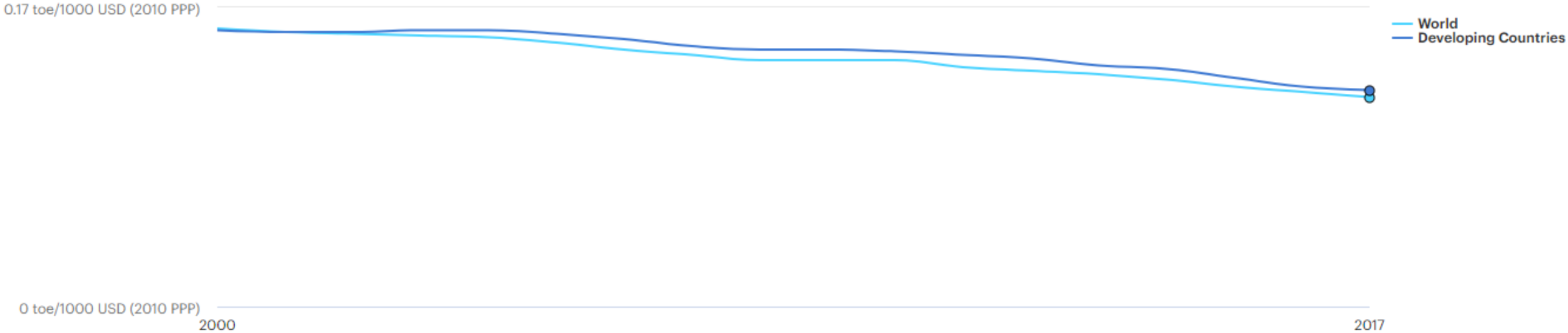
● GDP ● TES

Energy Intensity

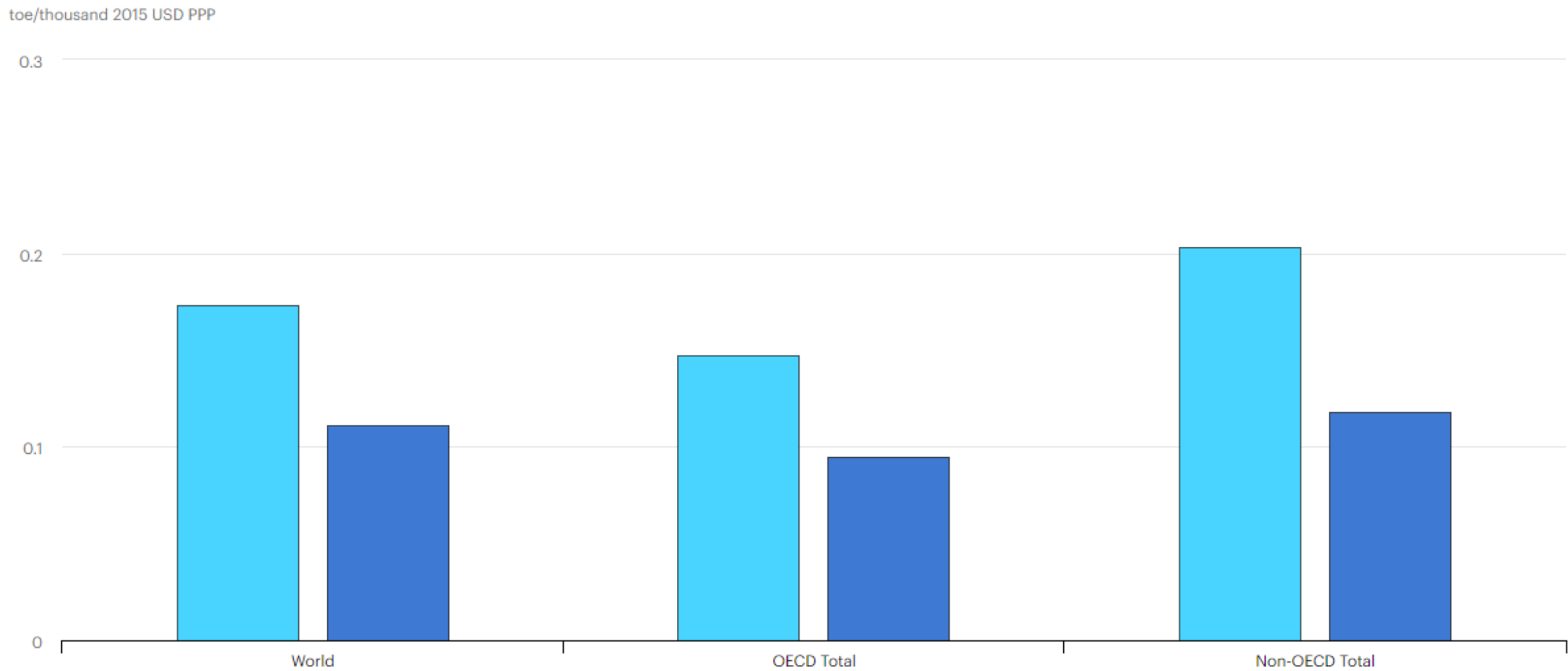
Energy intensity measured in terms of primary energy and GDP, 2000-2017

country ▼

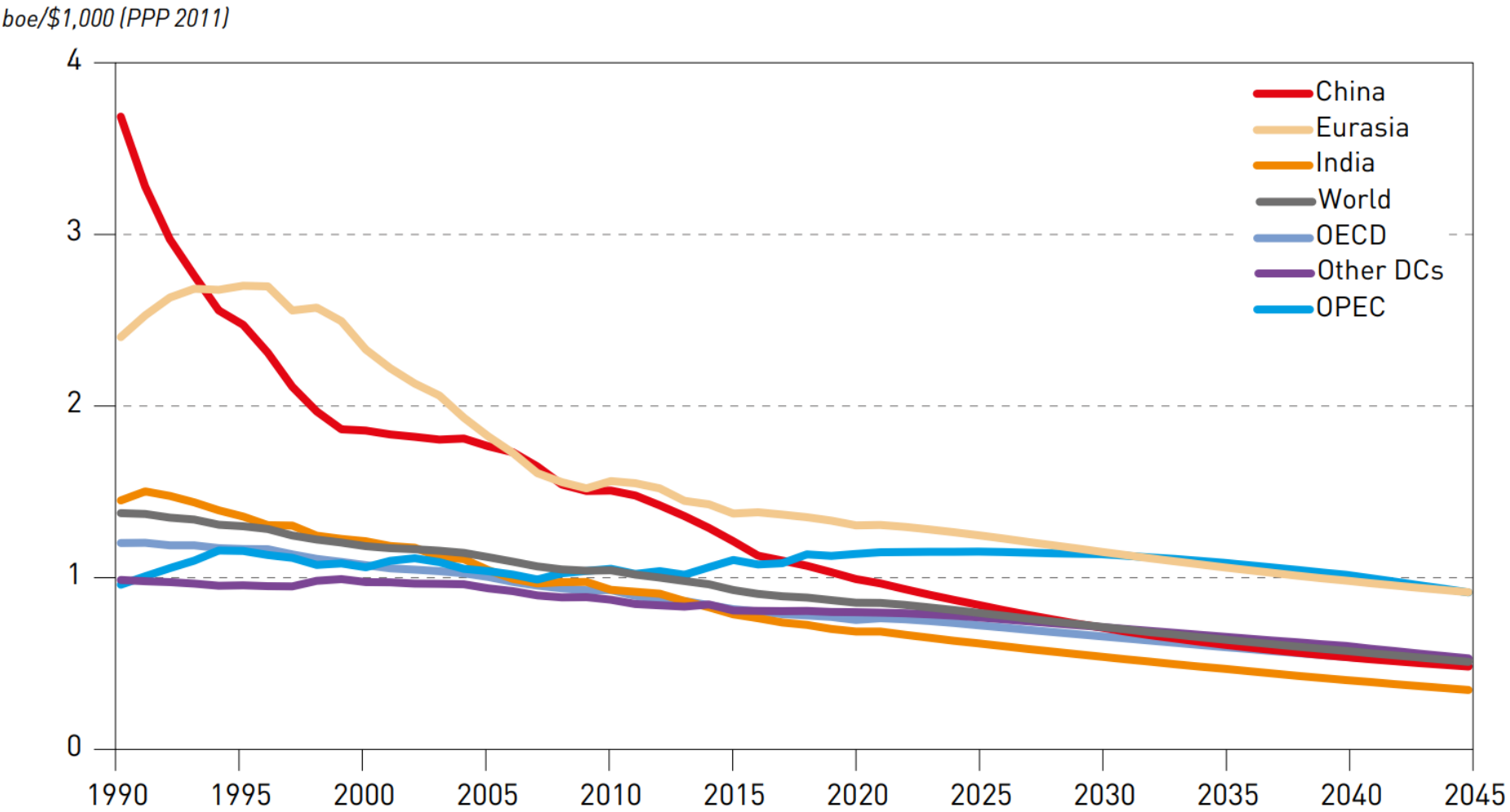
region ▼



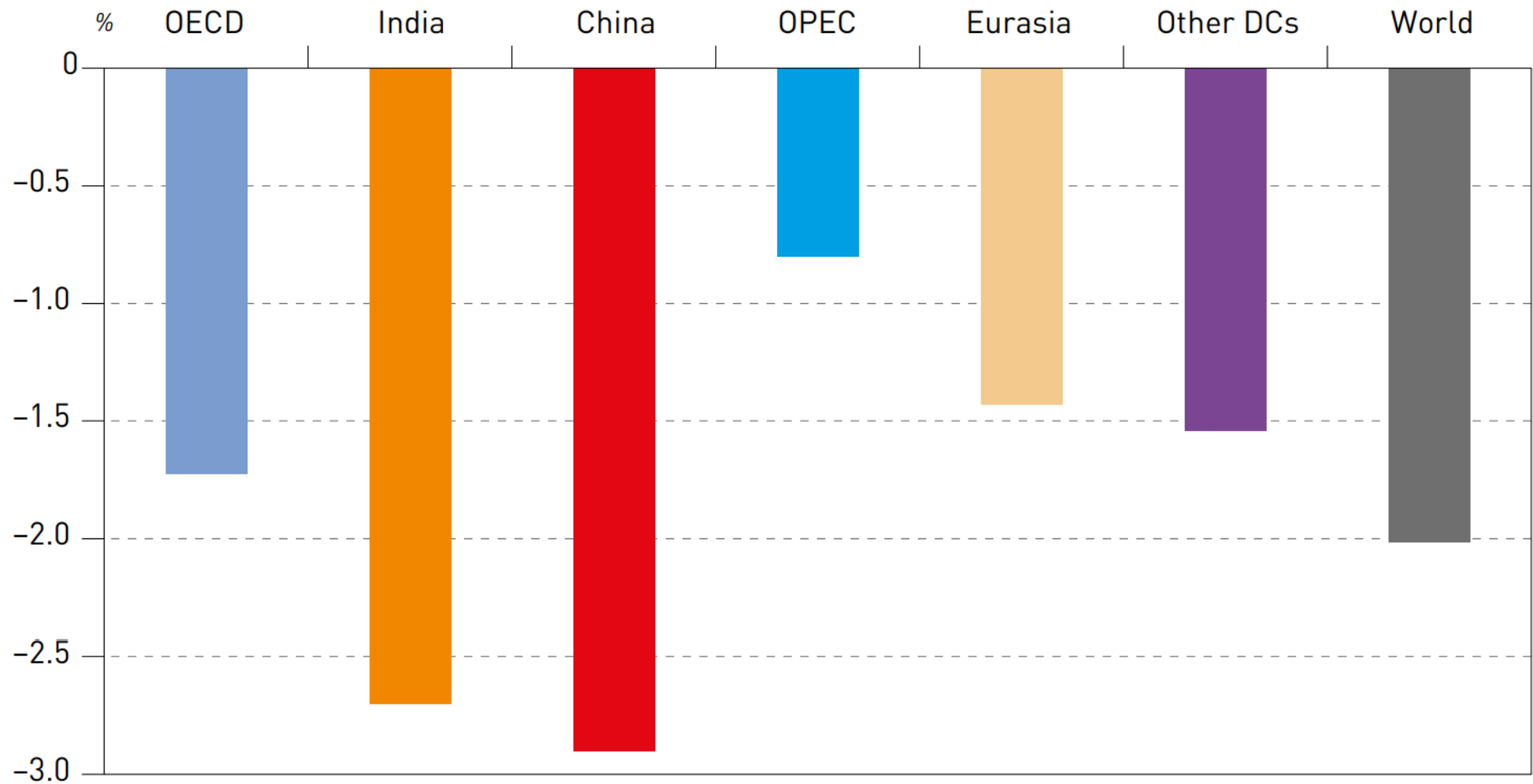
Global energy intensity, 1990 compared to 2018



Energy Intensity



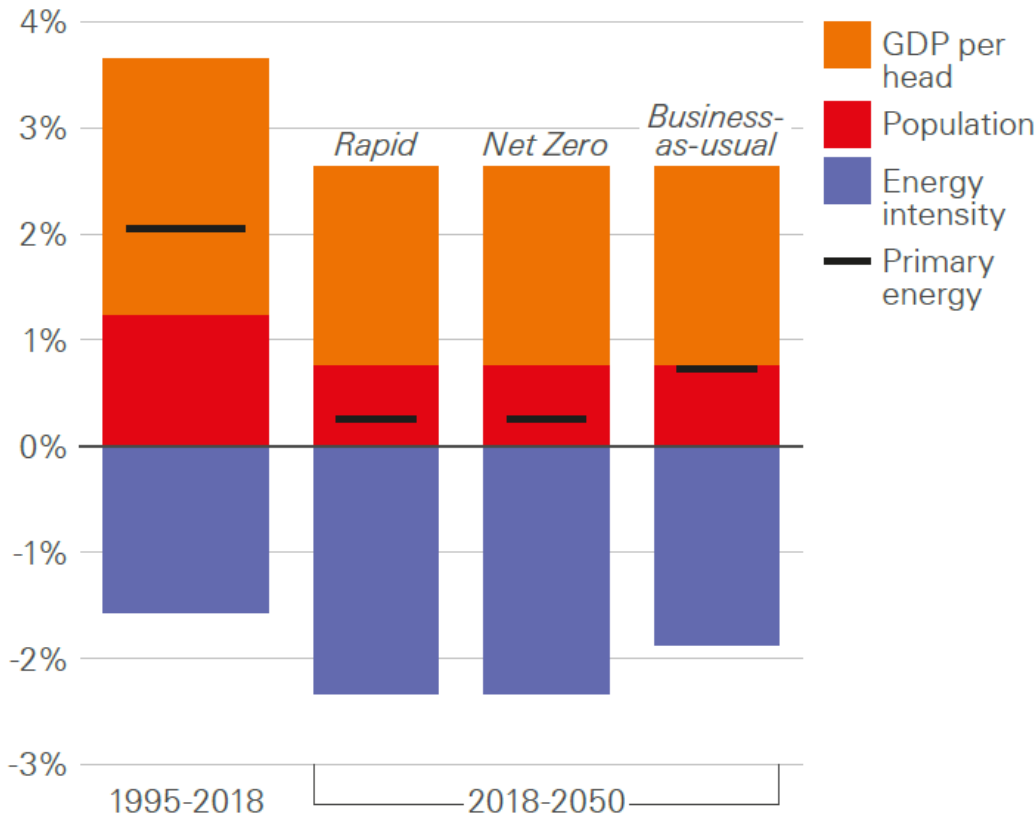
Average Annual Rate of Improvement in Energy Intensity



Primary Energy Demand

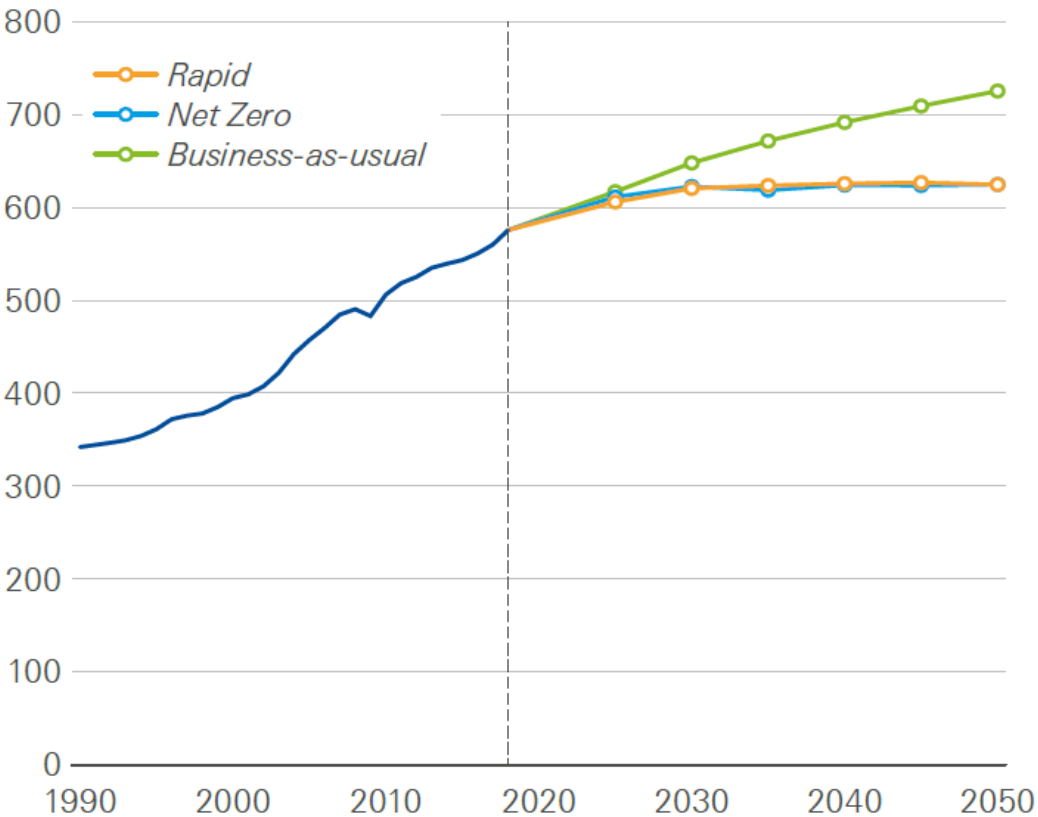
Contribution to primary energy demand growth

% per annum



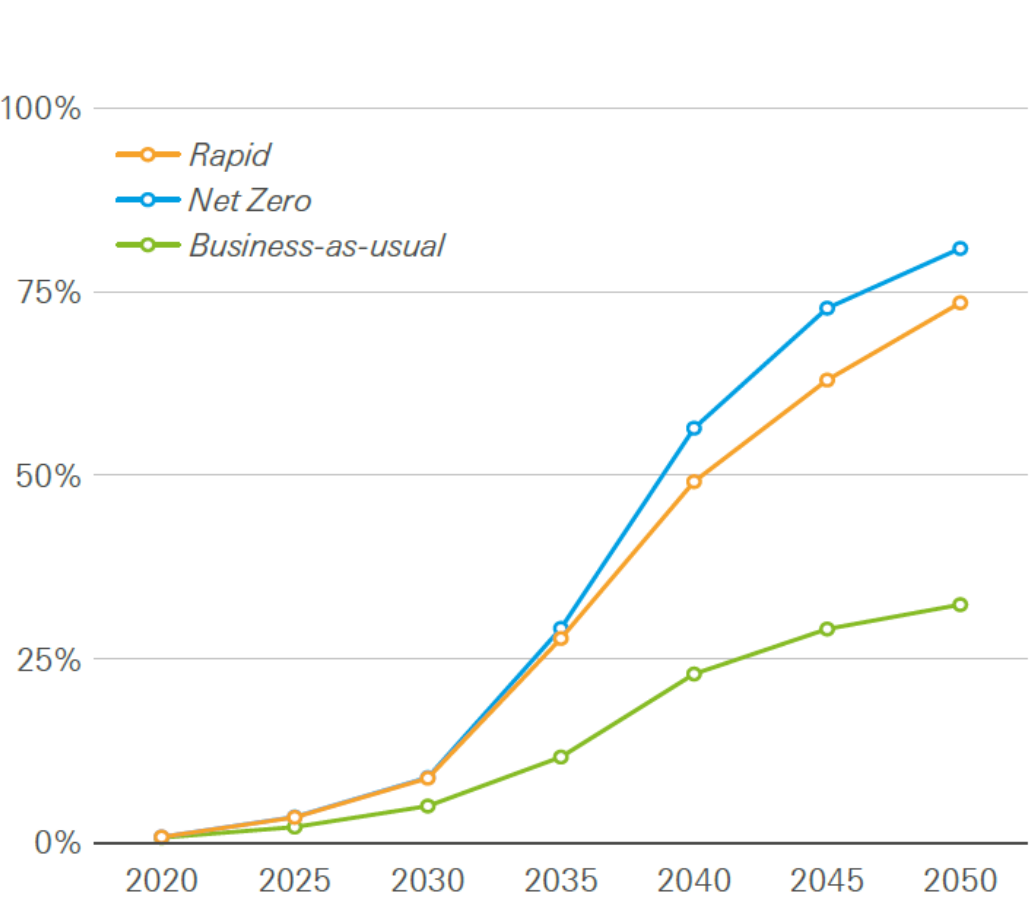
Global primary energy demand

EJ

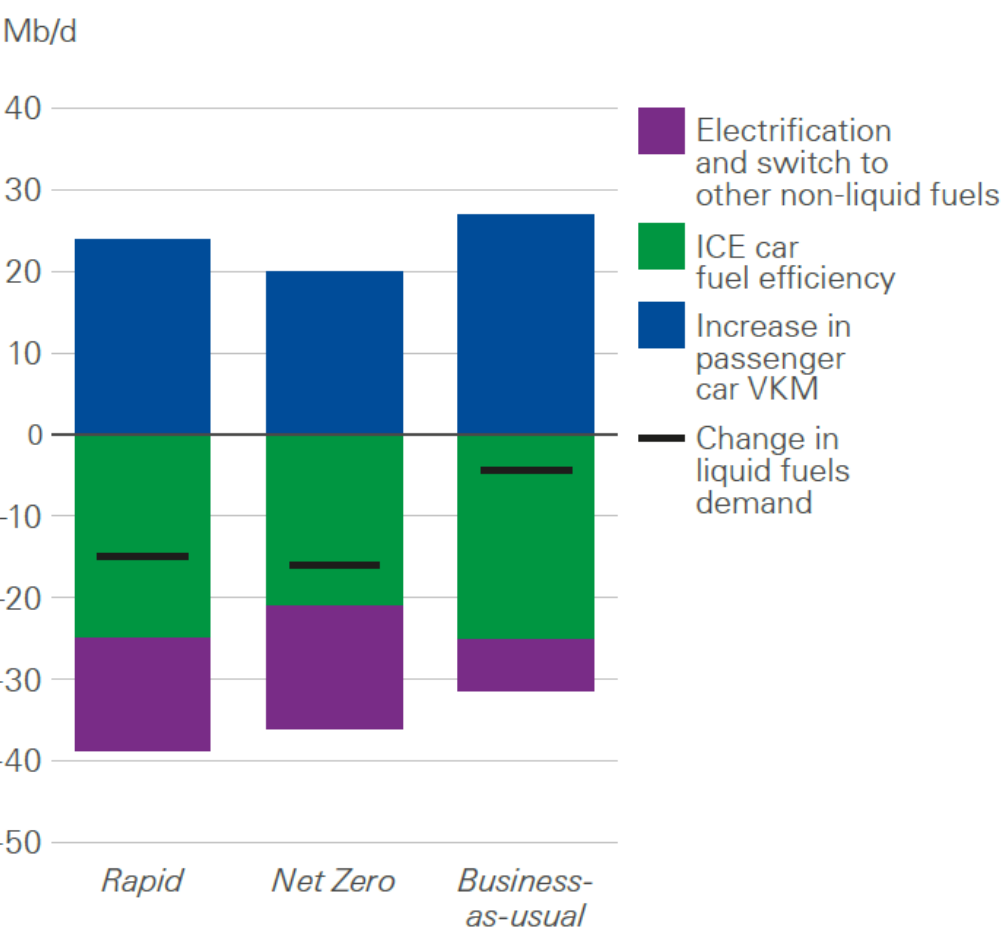


Energy Use in Road Transport

Share of car and truck vehicle kilometres electrified*



Factors impacting passenger car liquid fuels demand over the outlook



Trend 3:
Peak Oil

Peak Oil

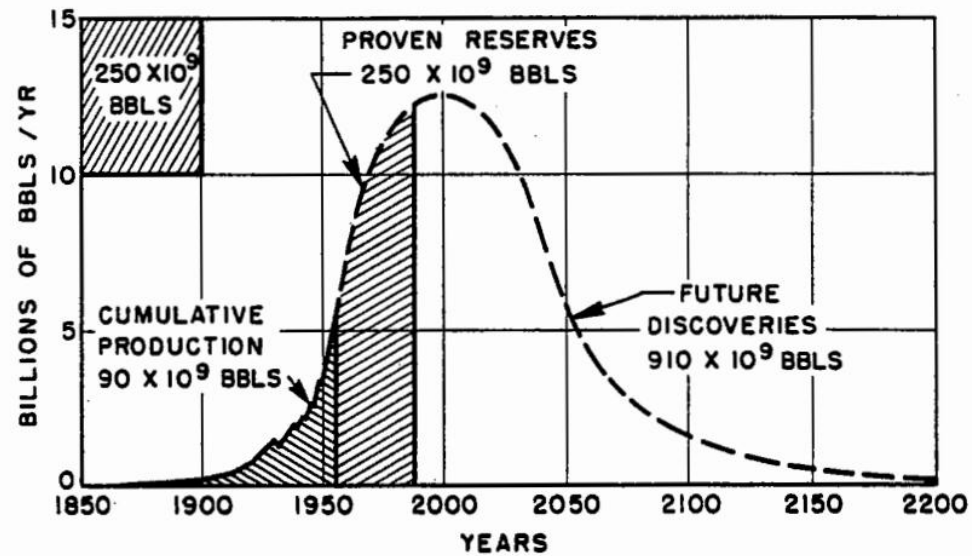


Figure 20 - Ultimate world crude-oil production based upon initial reserves of 1250 billion barrels.

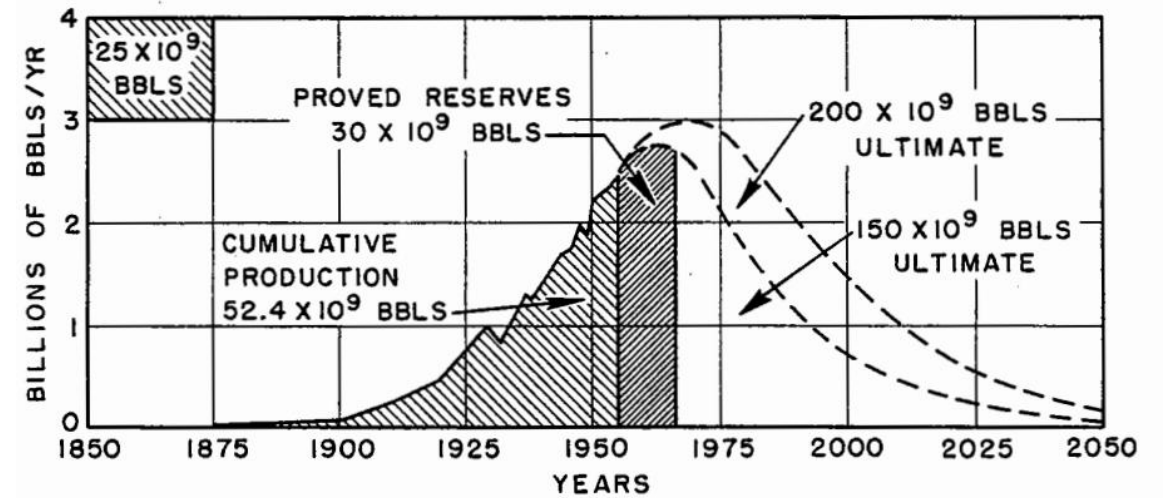
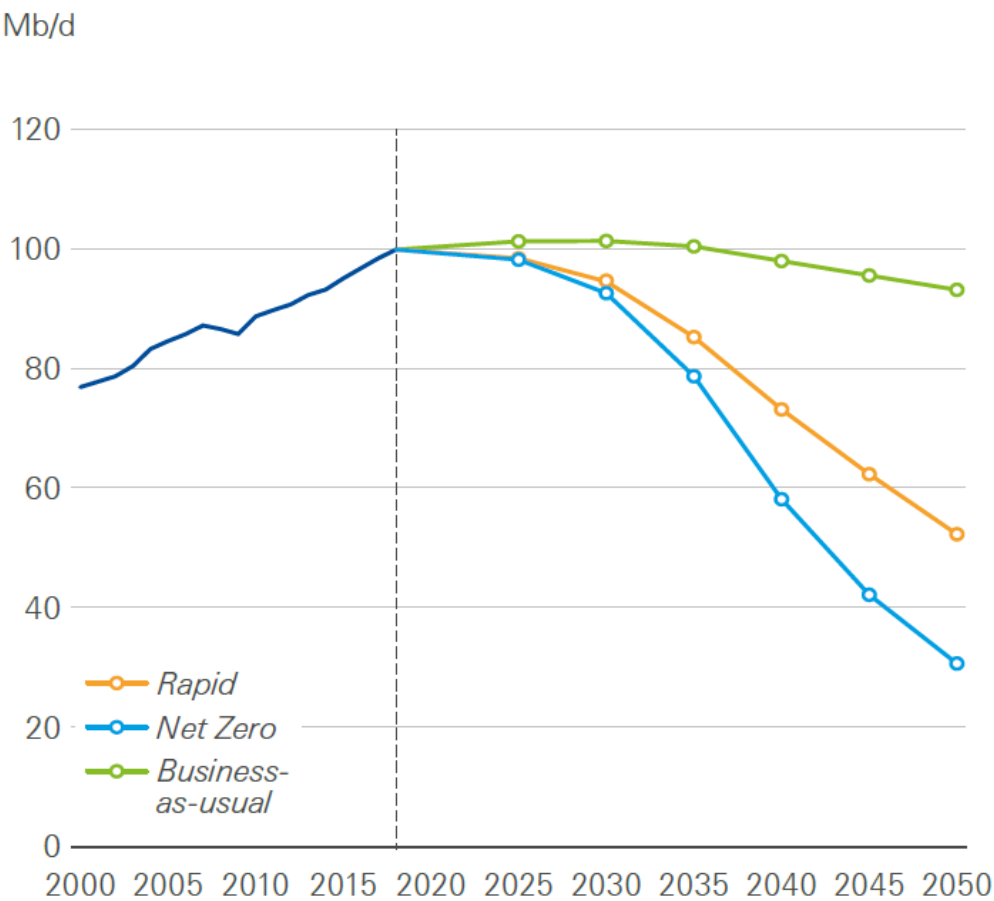


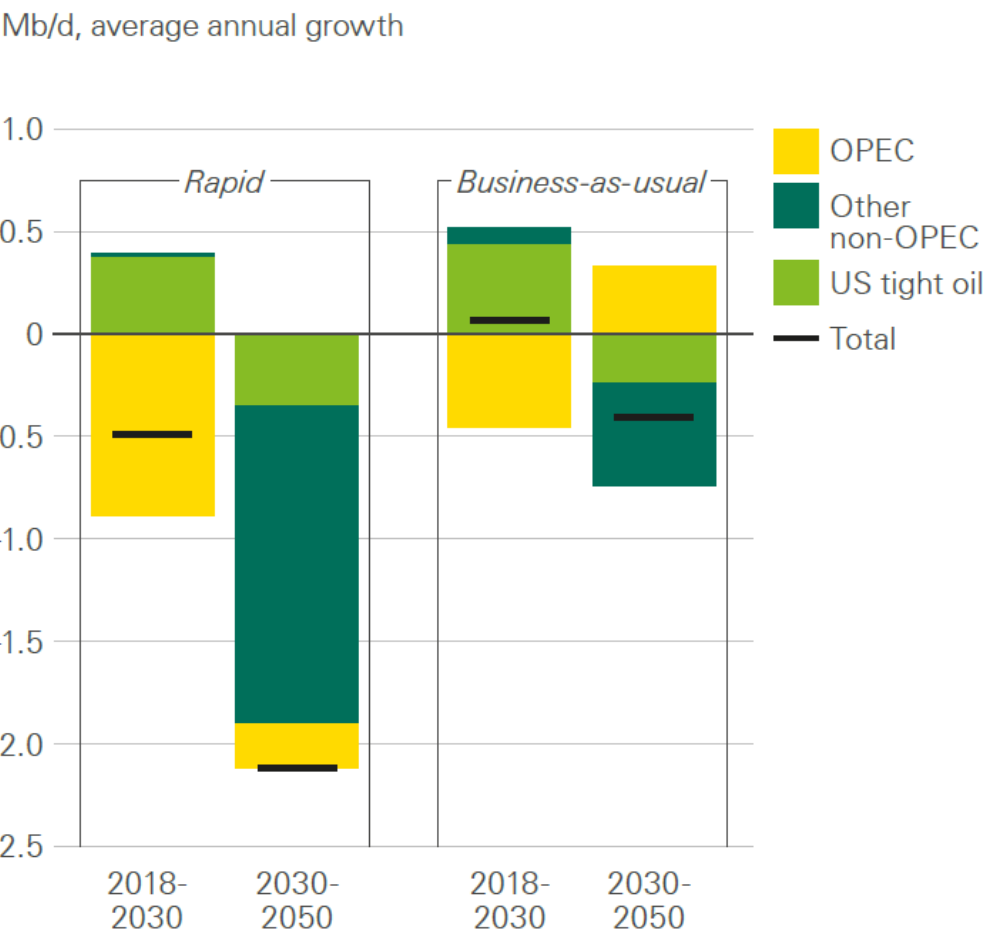
Figure 21 - Ultimate United States crude-oil production based on assumed initial reserves of 150 and 200 billion barrels.

Liquid Fuels Demand & Supply

Liquid fuels consumption

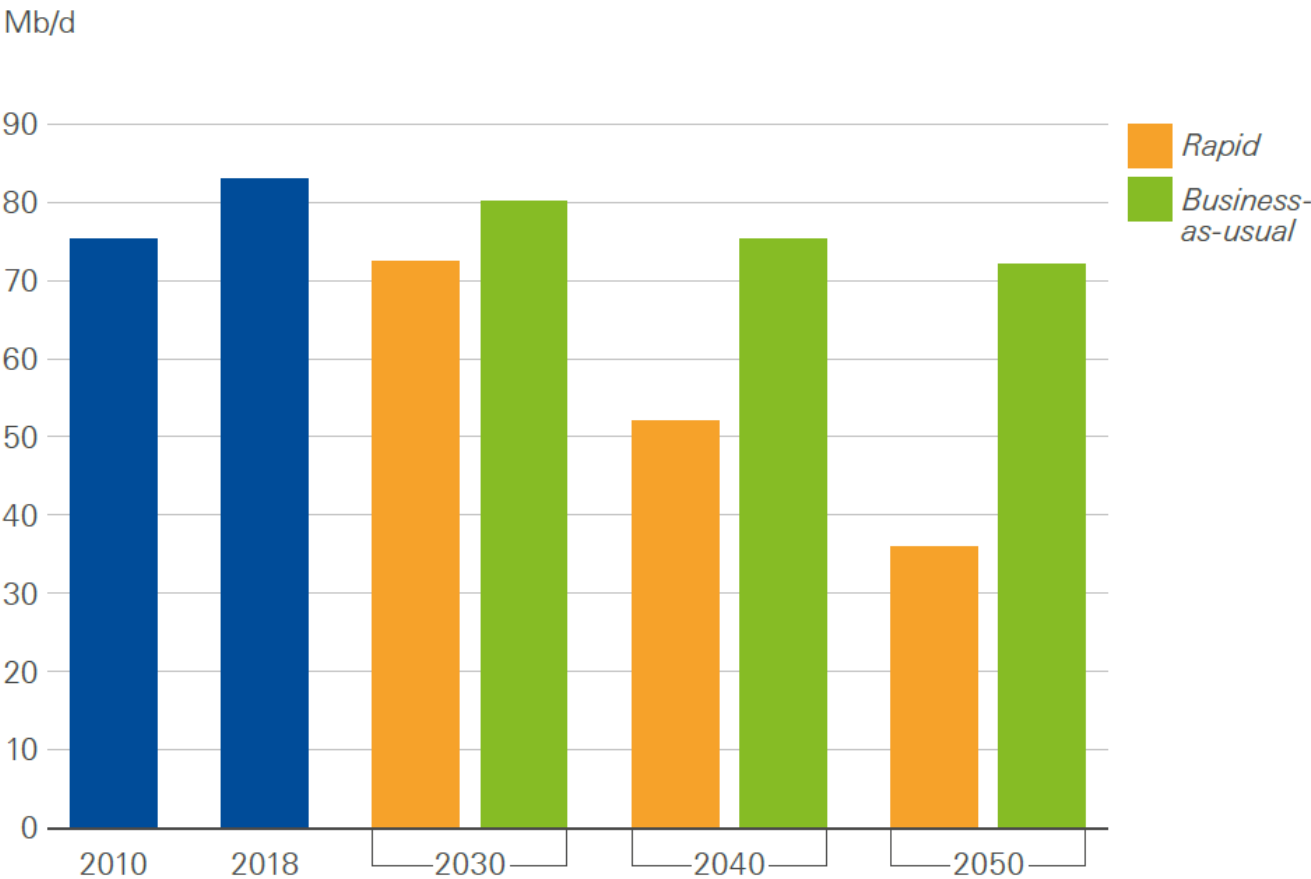


Liquid fuels supply growth

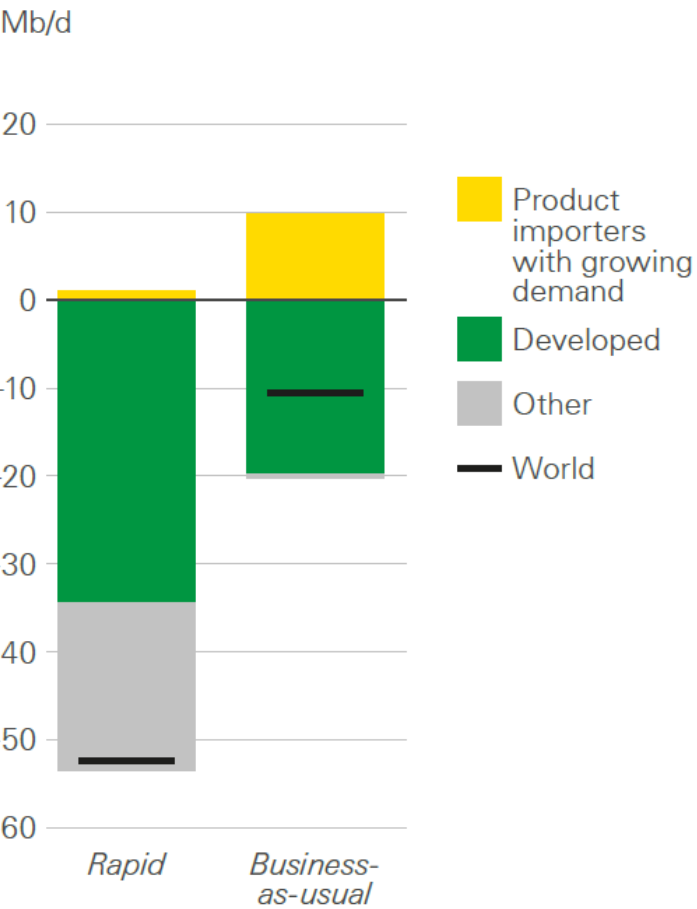


Refining Outlook

Refinery throughput



Refining capacity changes, 2018-2050

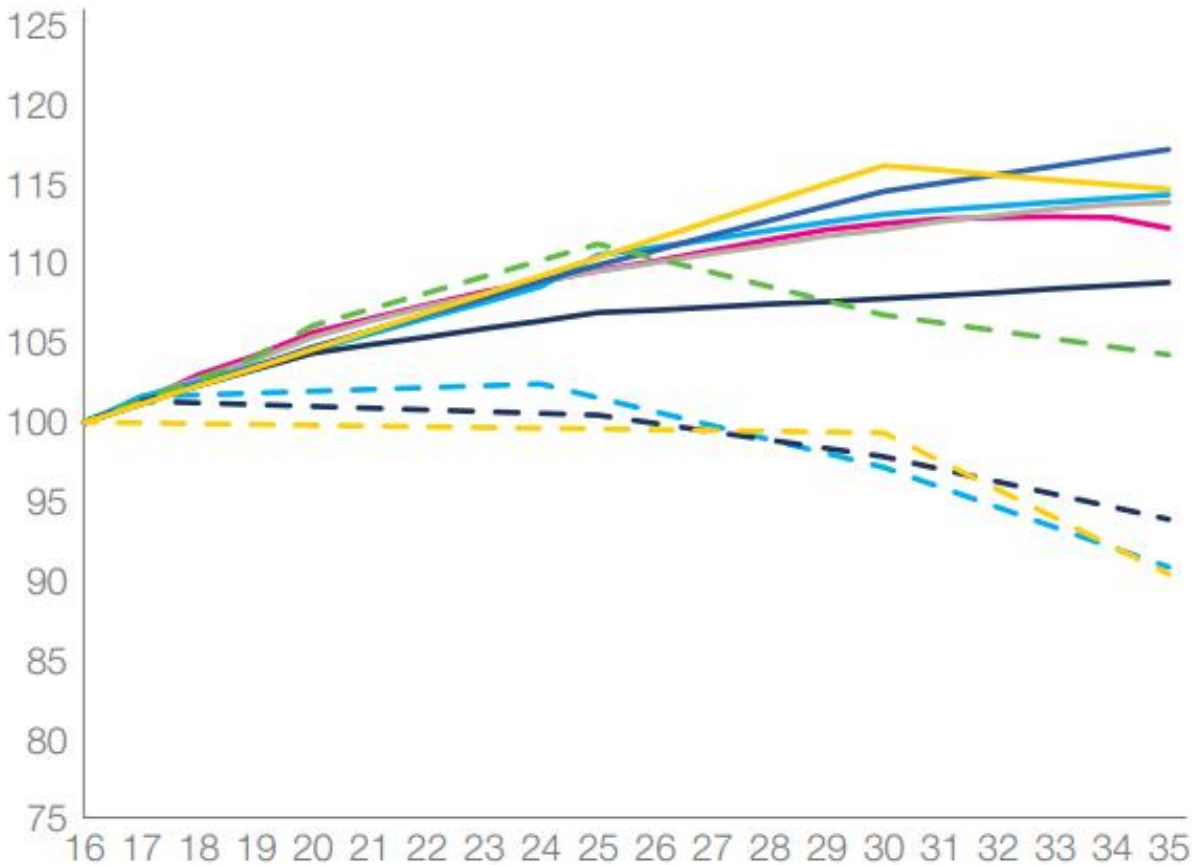


Peak Oil Scenarios

Global oil demand¹

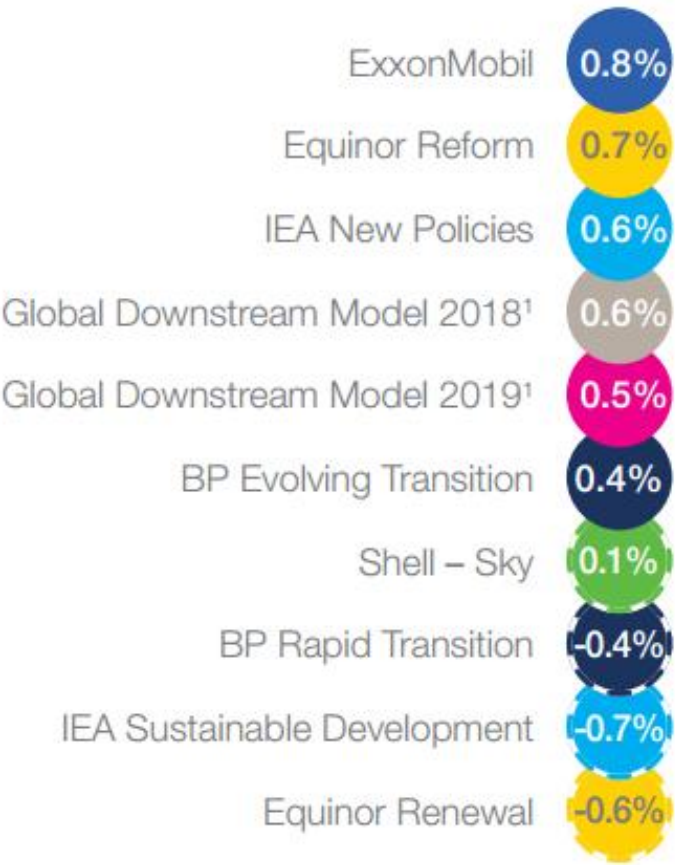
Indexed to 100

— Reference case forecasts -- Sustainability cases



CAGR

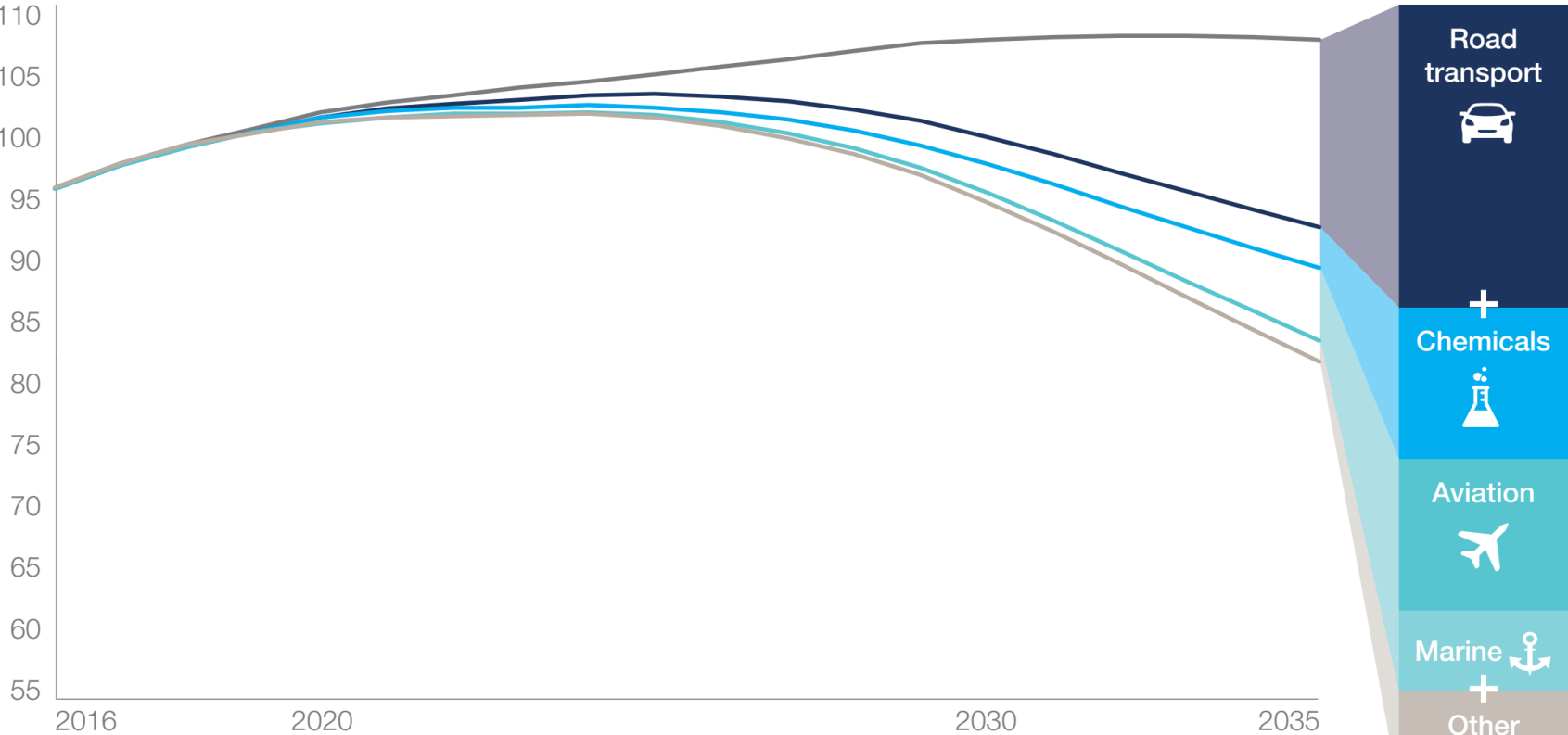
2018-35



Global Liquids Demand

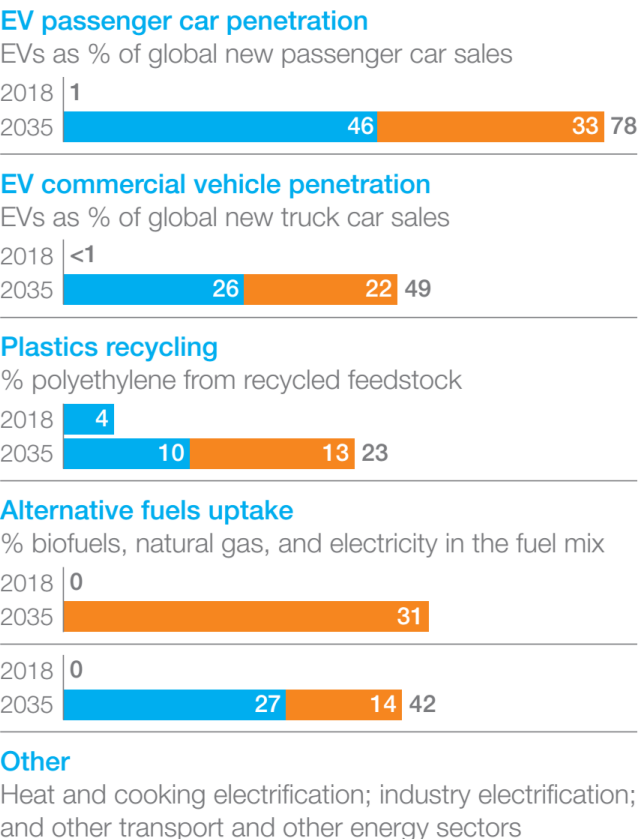
Global liquids demand

MMb/d

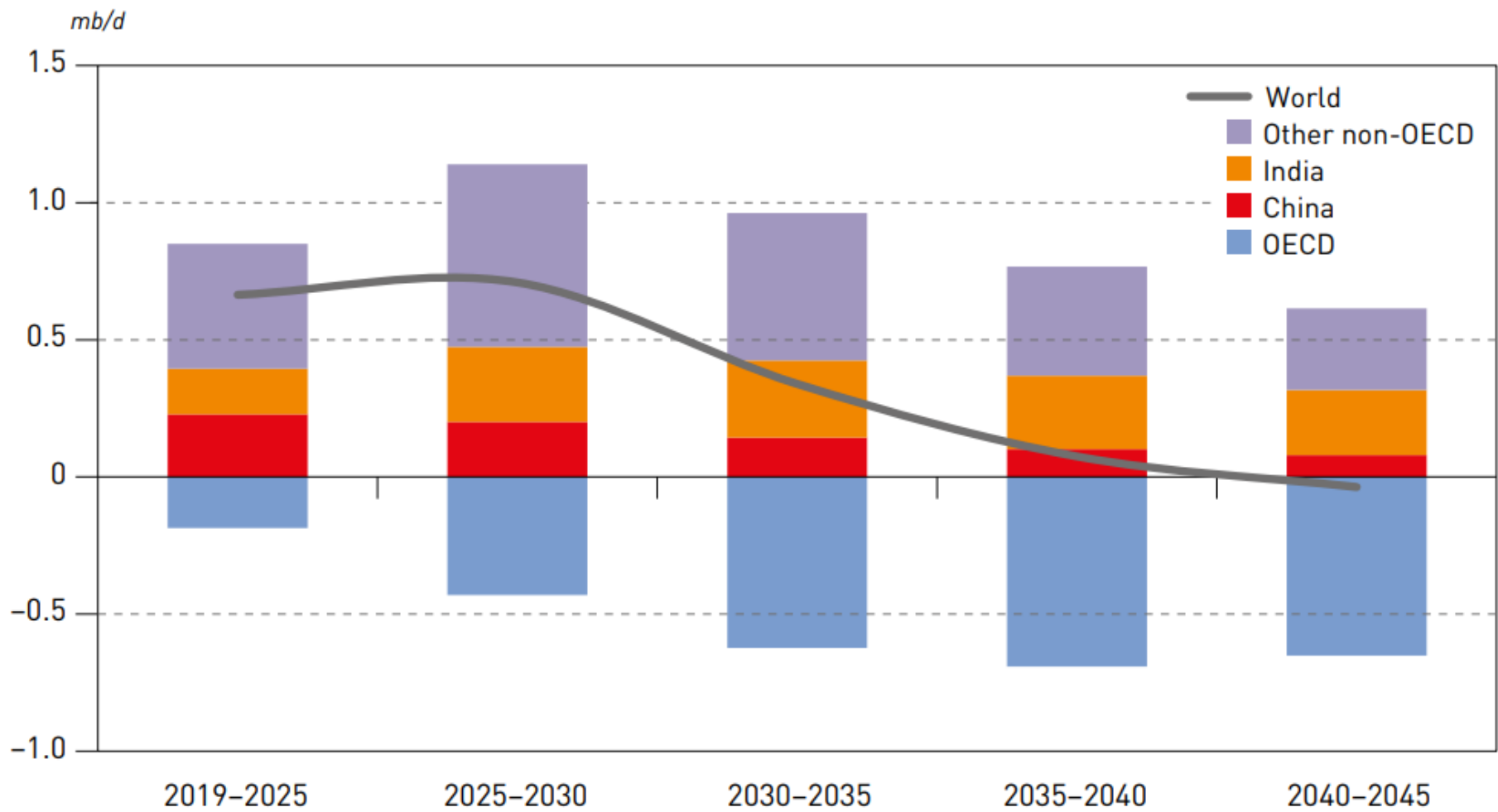


Source: Energy Insights' Global Energy Perspective, January 2019

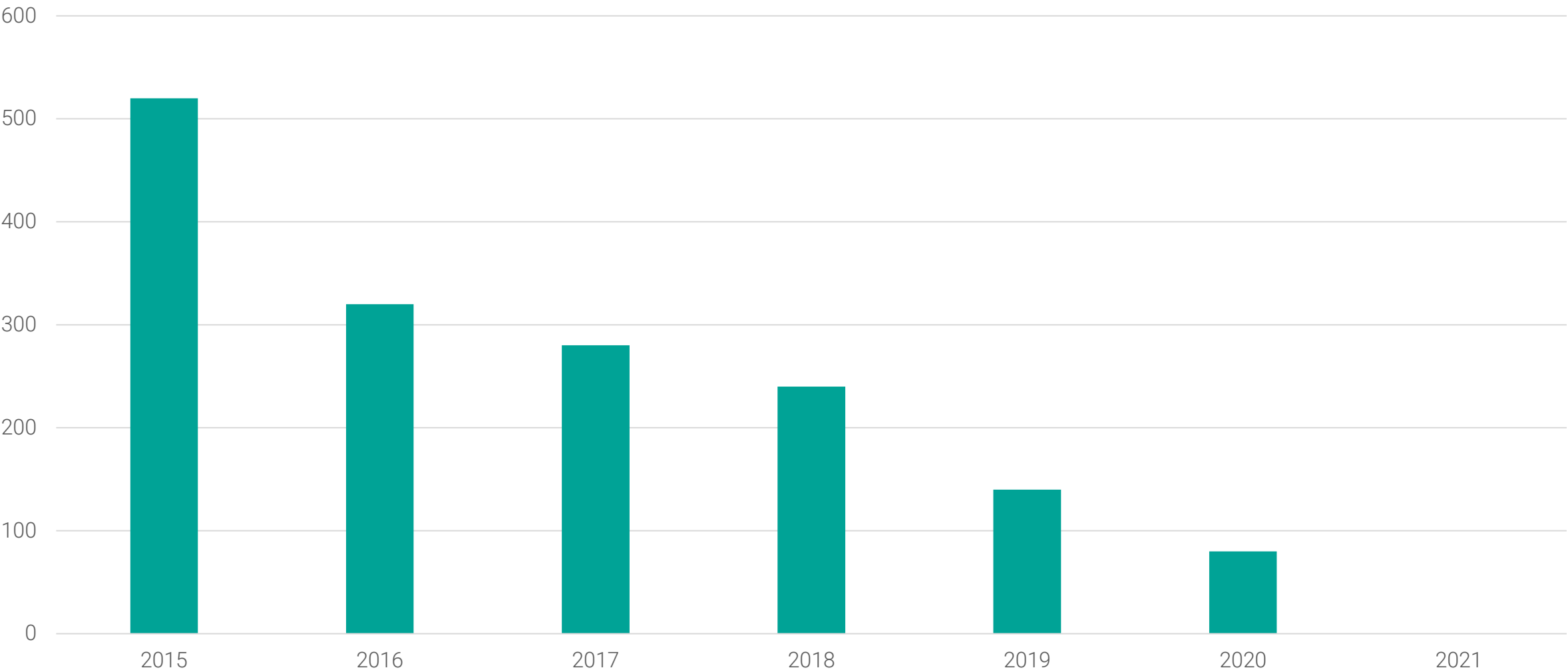
■ Reference Case ■ Additional in Accelerated Energy Transition case



Average Annual Oil Demand Growth



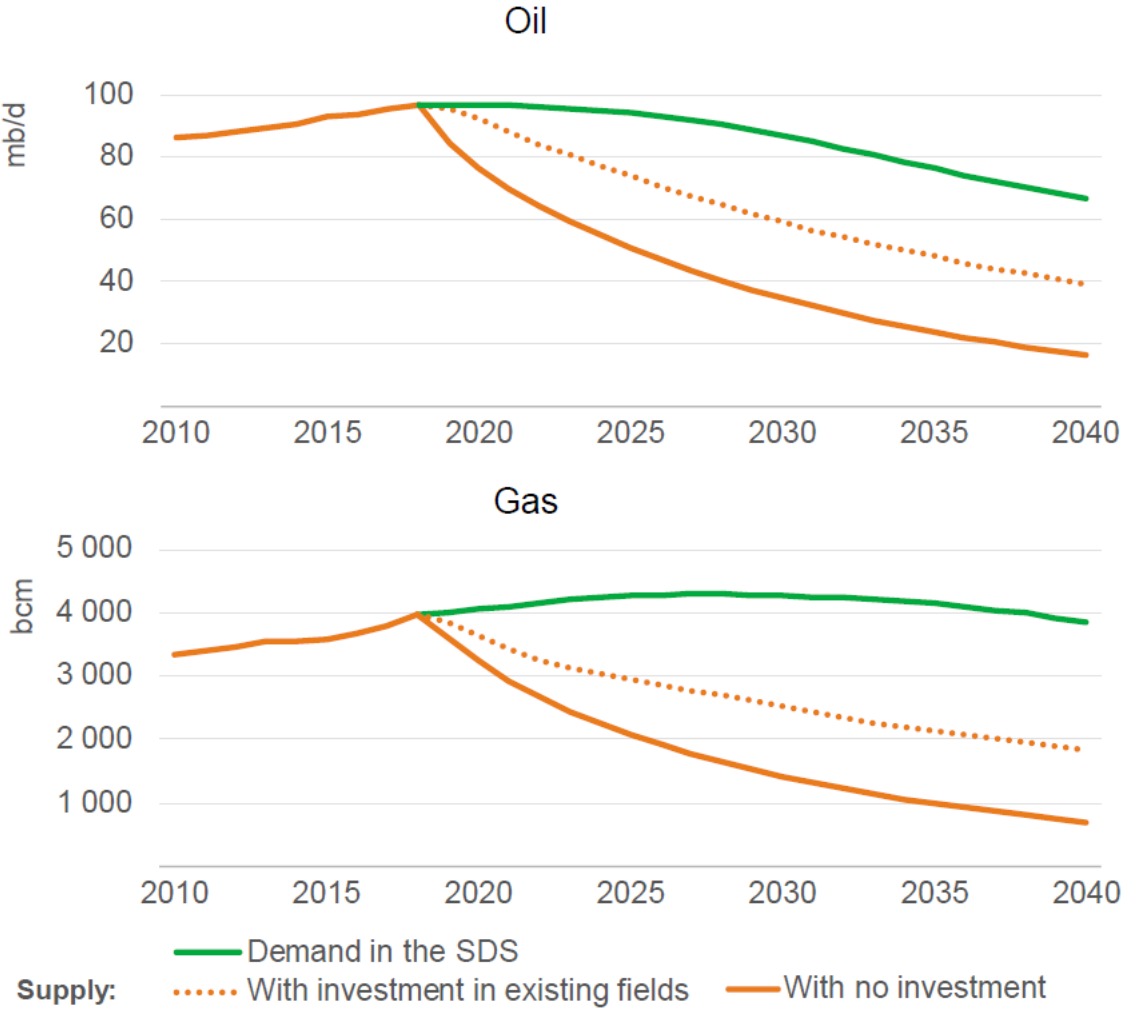
Average Annual Oil Demand Growth in OPEC WOO for Period 2035–2040



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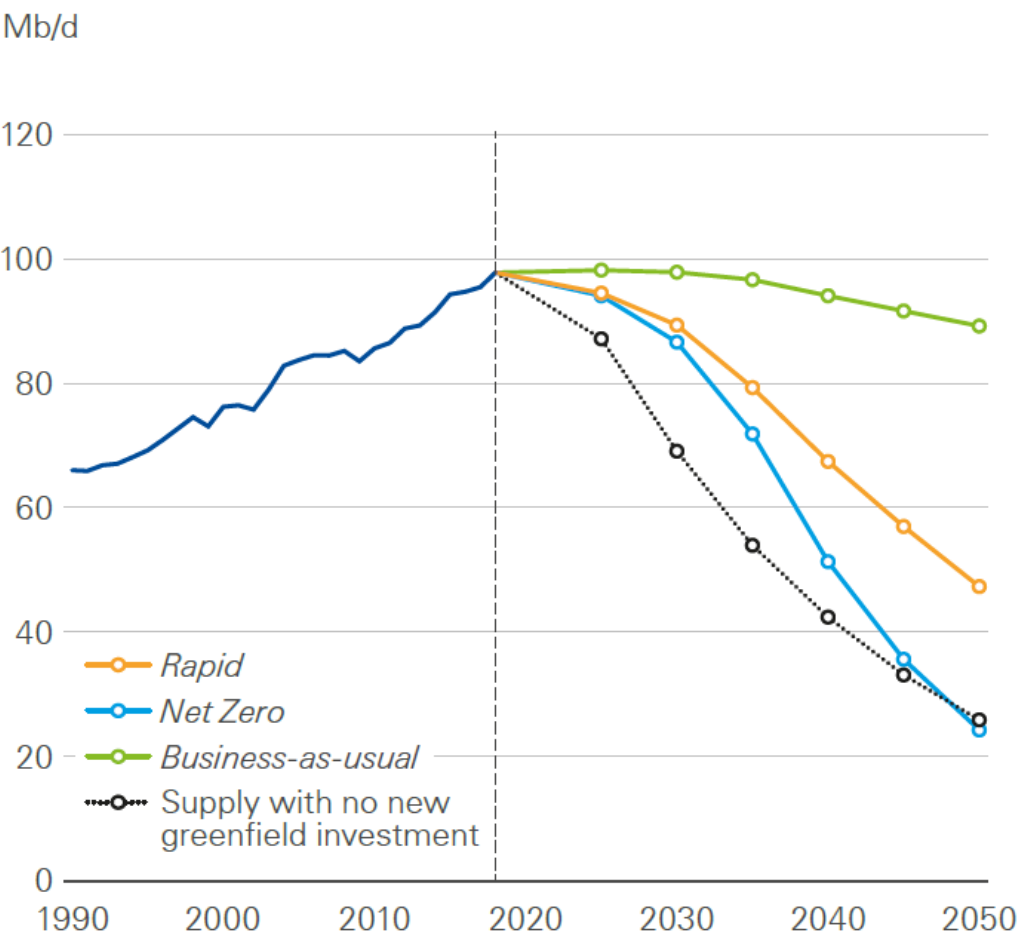


Required Investments

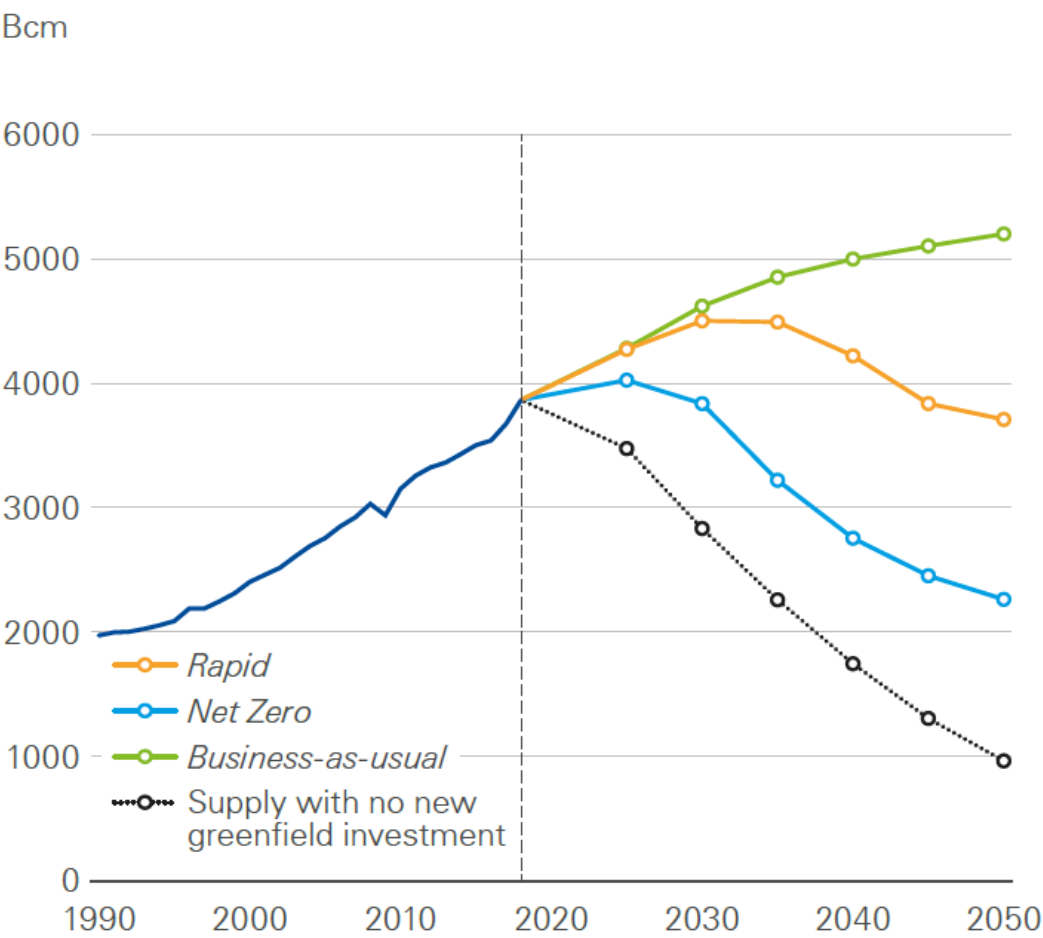


Uncertain Demand

Consumption and production of oil

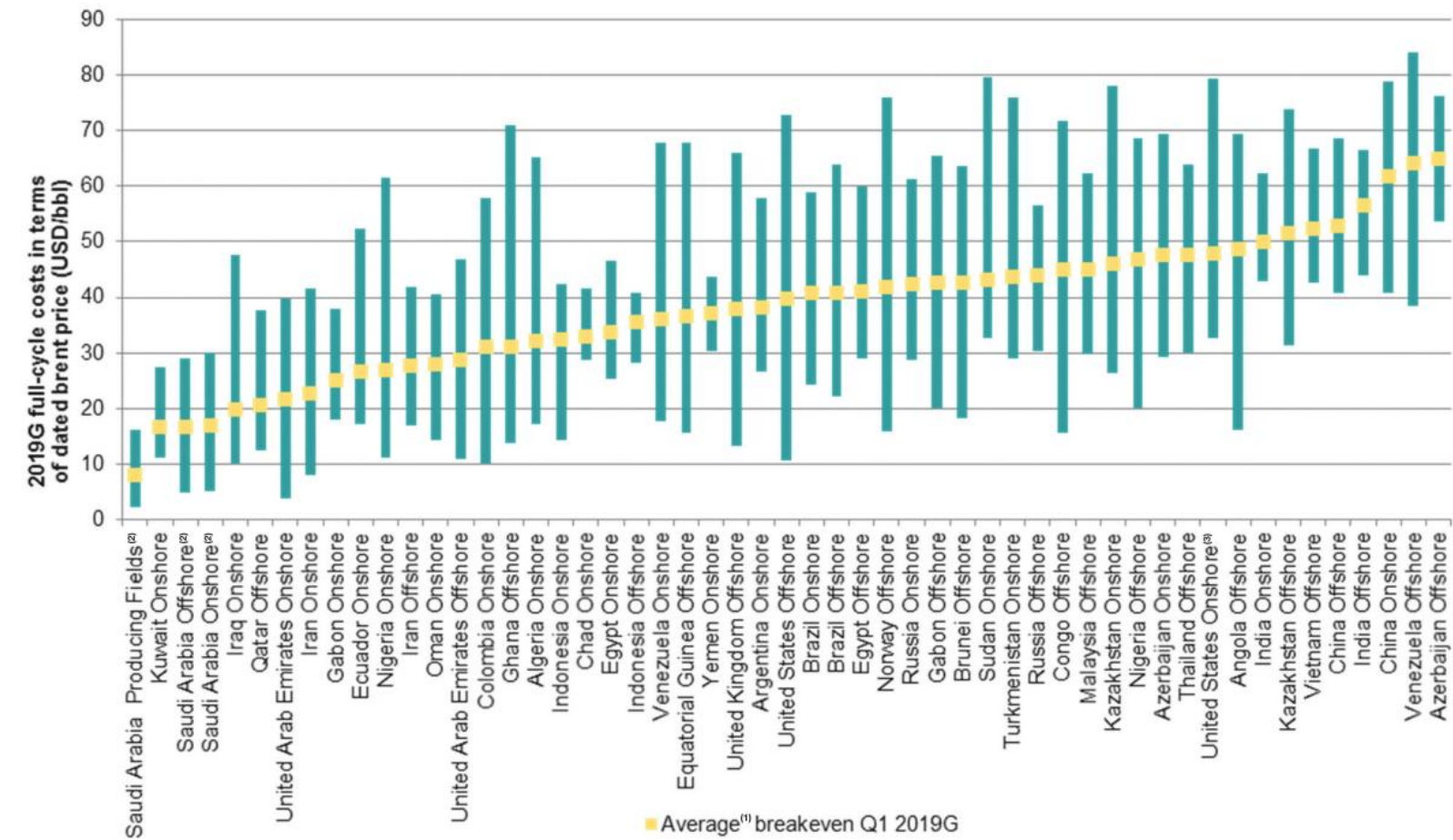


Consumption and production of natural gas

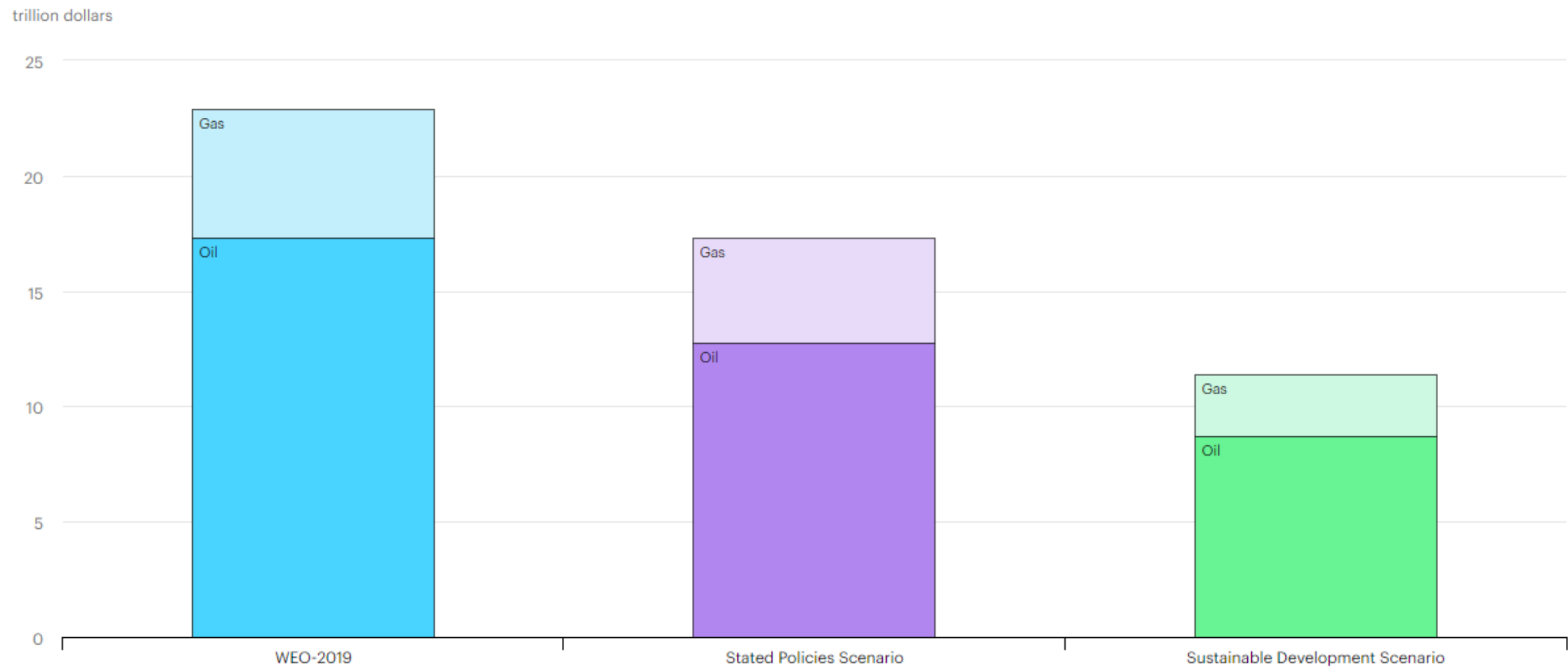


Breakeven Cost for New Oil Projects

Exhibit 6: Post-tax breakeven costs for new oil projects at a 10% rate of return by country through 2030G

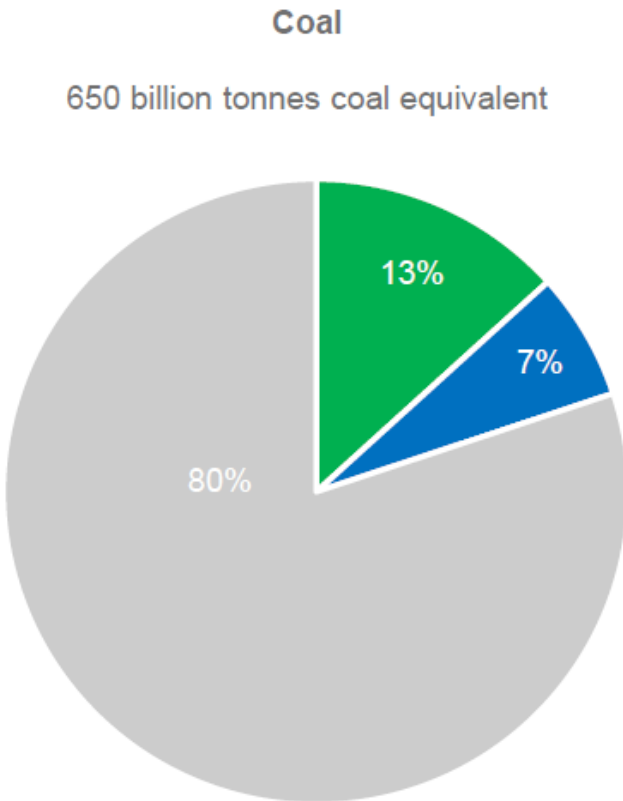
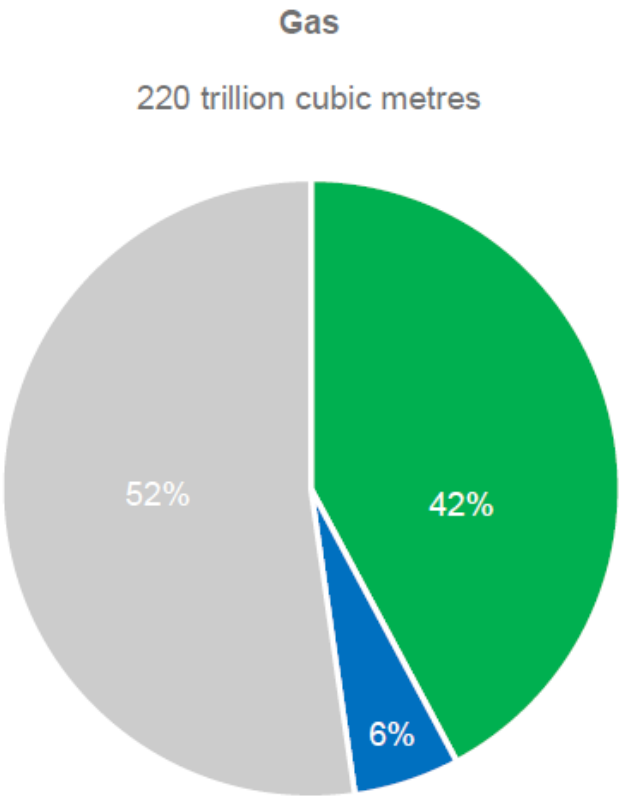
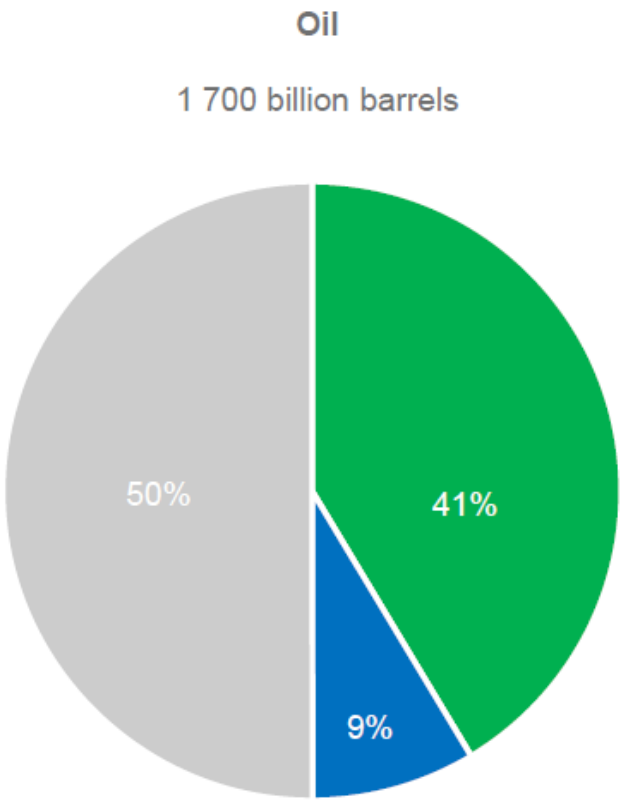


Estimated Present Value of Future Oil and Natural Gas Production to 2040



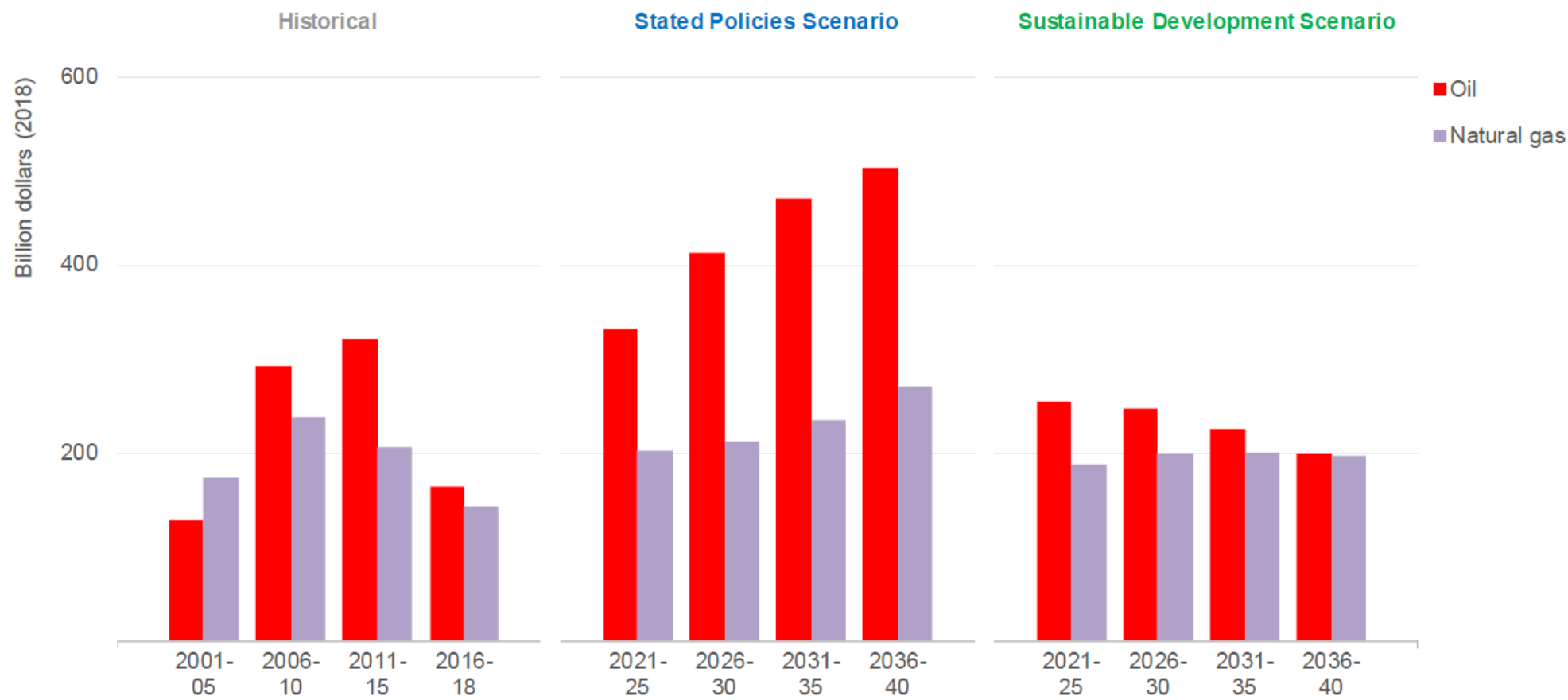
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Stranded Assets



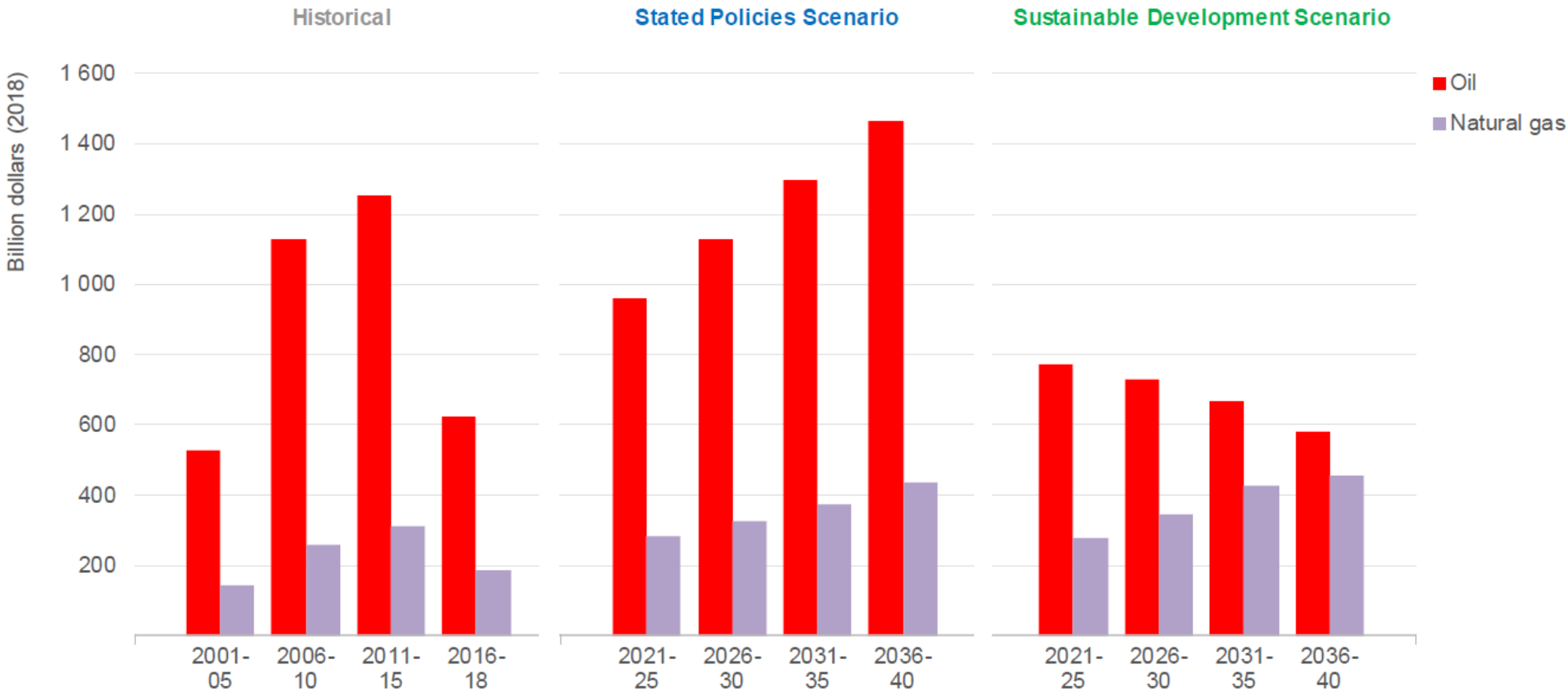
■ Produced in the Sustainable Development Scenario ■ Additionally produced in the Stated Policies Scenario ■ Not produced

Average Annual Net Income for Private Companies



Notes: Net income is revenue minus finding and development costs, operating costs, and government taxes. Estimates are for all private oil and gas companies (Majors and Independents), and are derived from country-level data using a field-by-field database that classifies asset ownership by type of company along with assumptions about the ownership of future discoveries. Assumes no changes in fiscal terms.

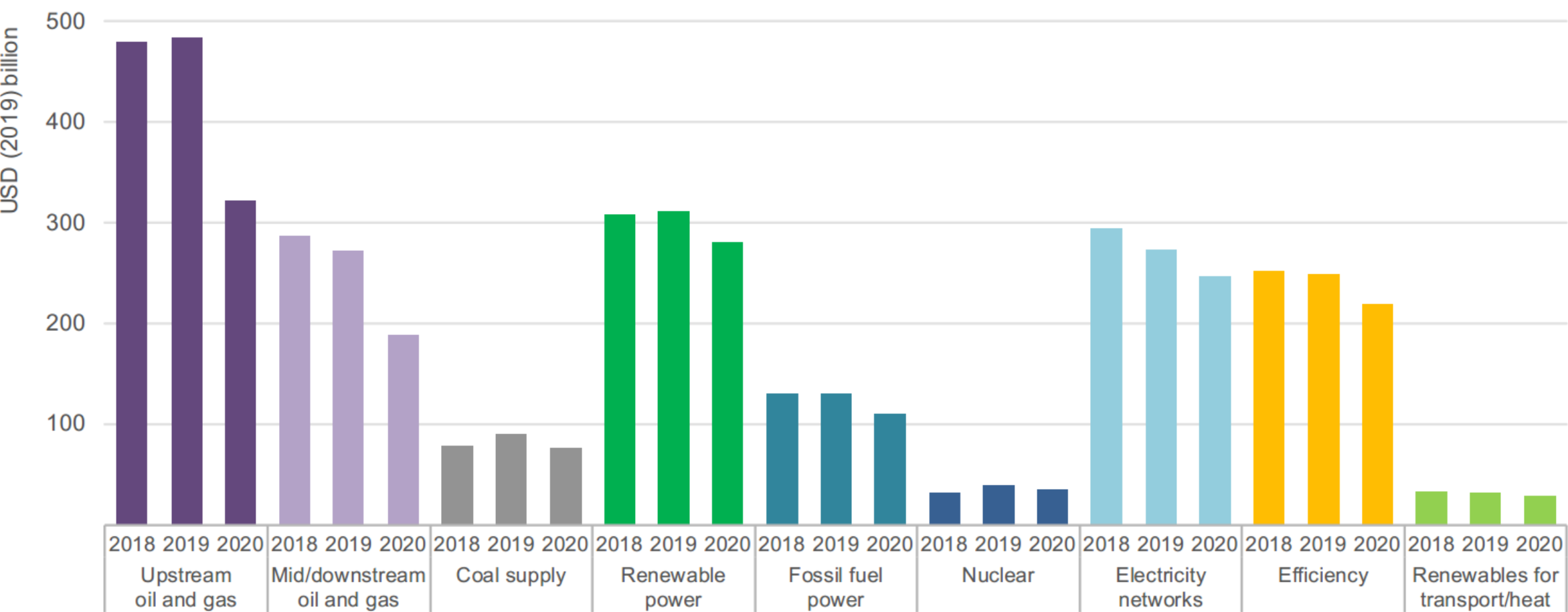
Average Annual Net Oil and Gas Income Before Tax of all NOCs and INOCs



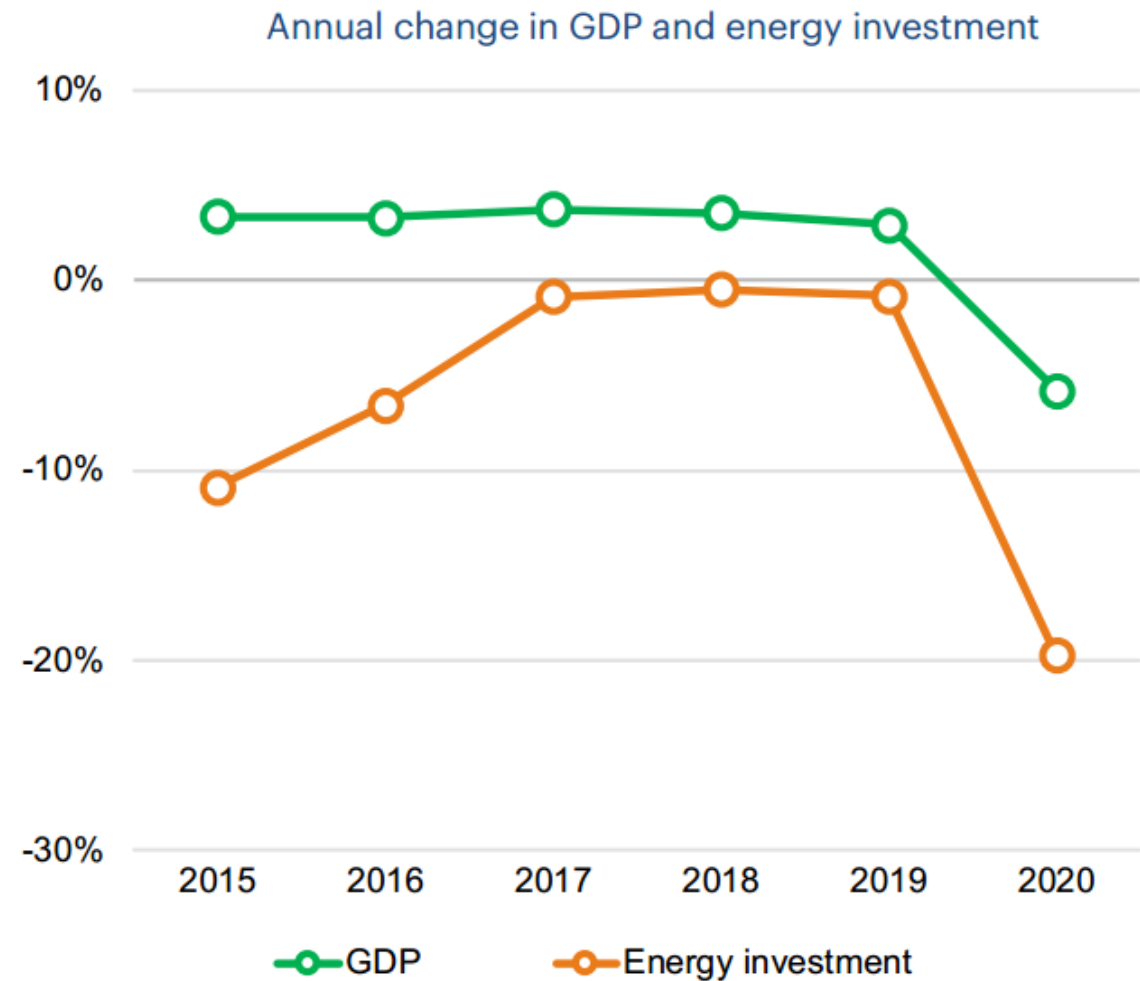
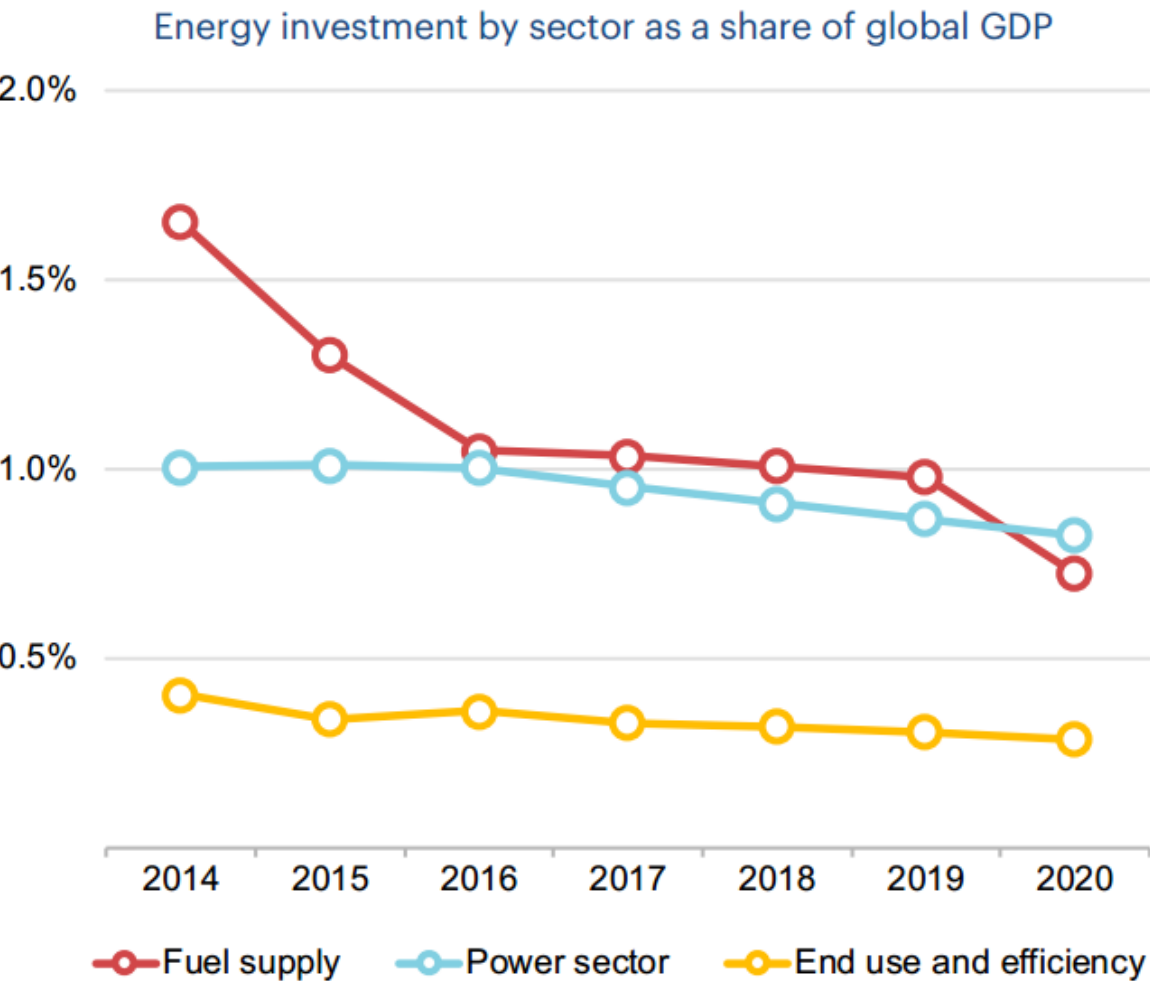
Note: Net income before tax = revenue minus finding and development costs and operating costs.

Trends in Investment & Finance

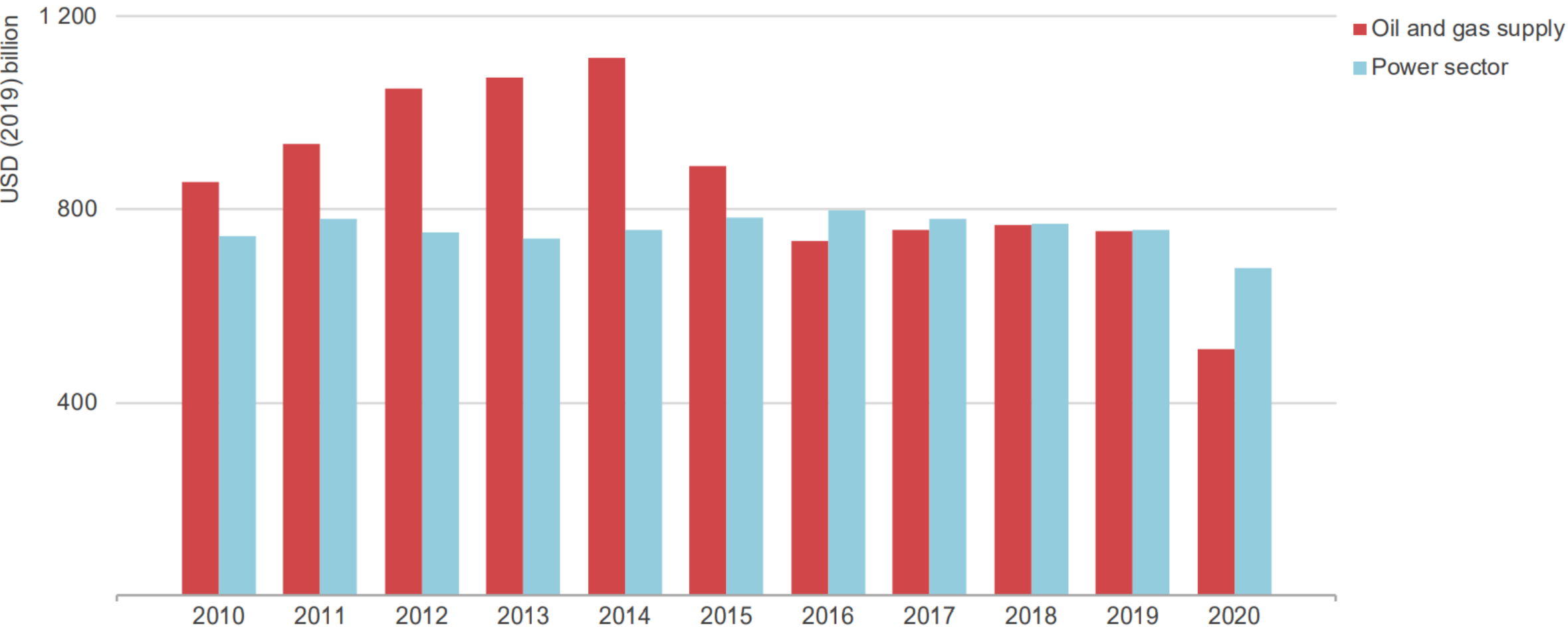
World Energy Investment by Sector



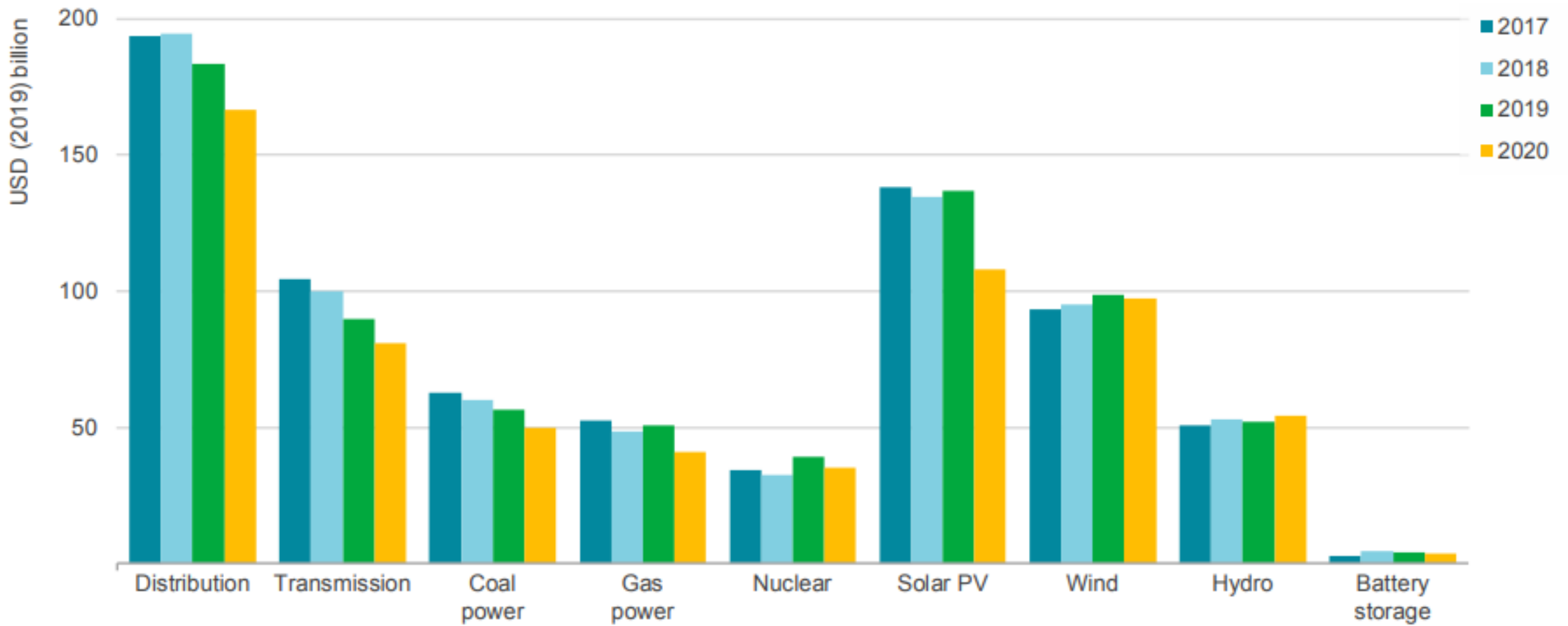
Energy Investment and GDP



Global Investment in Energy Supply

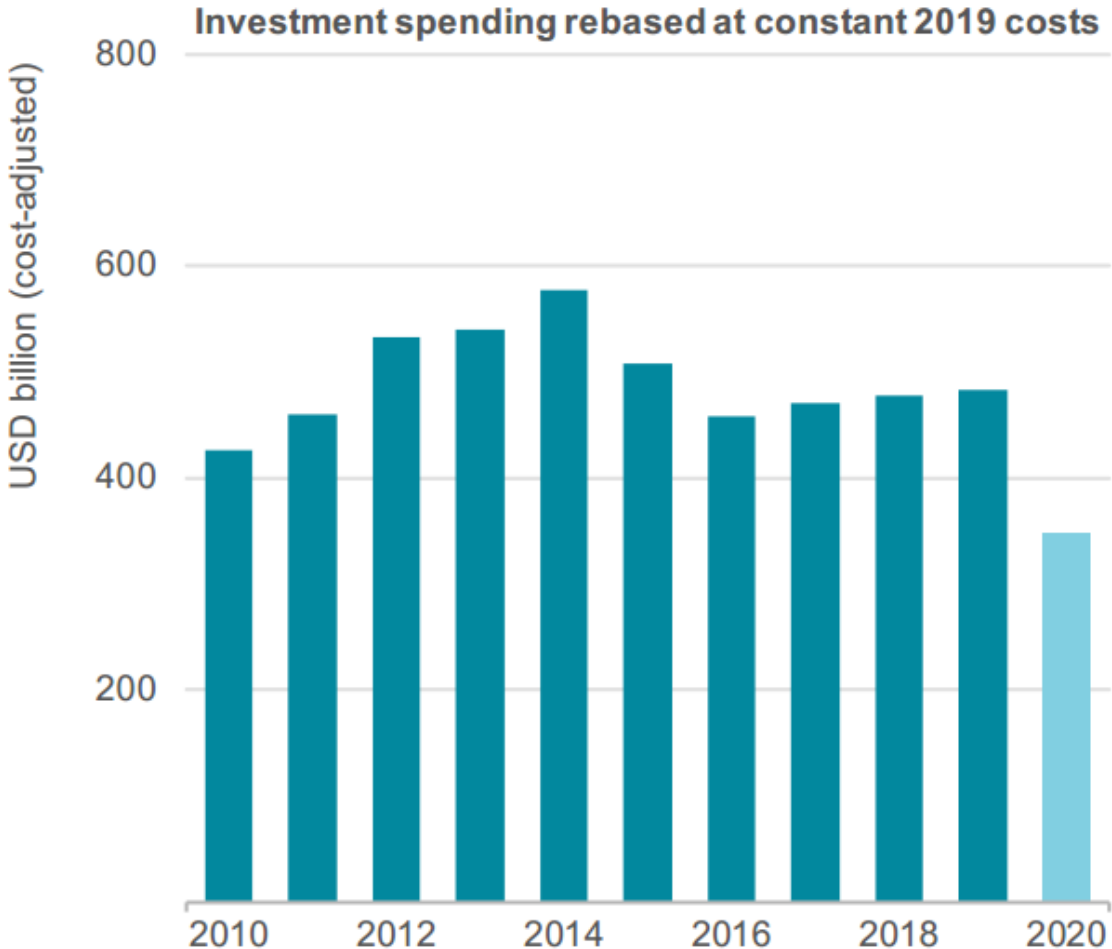
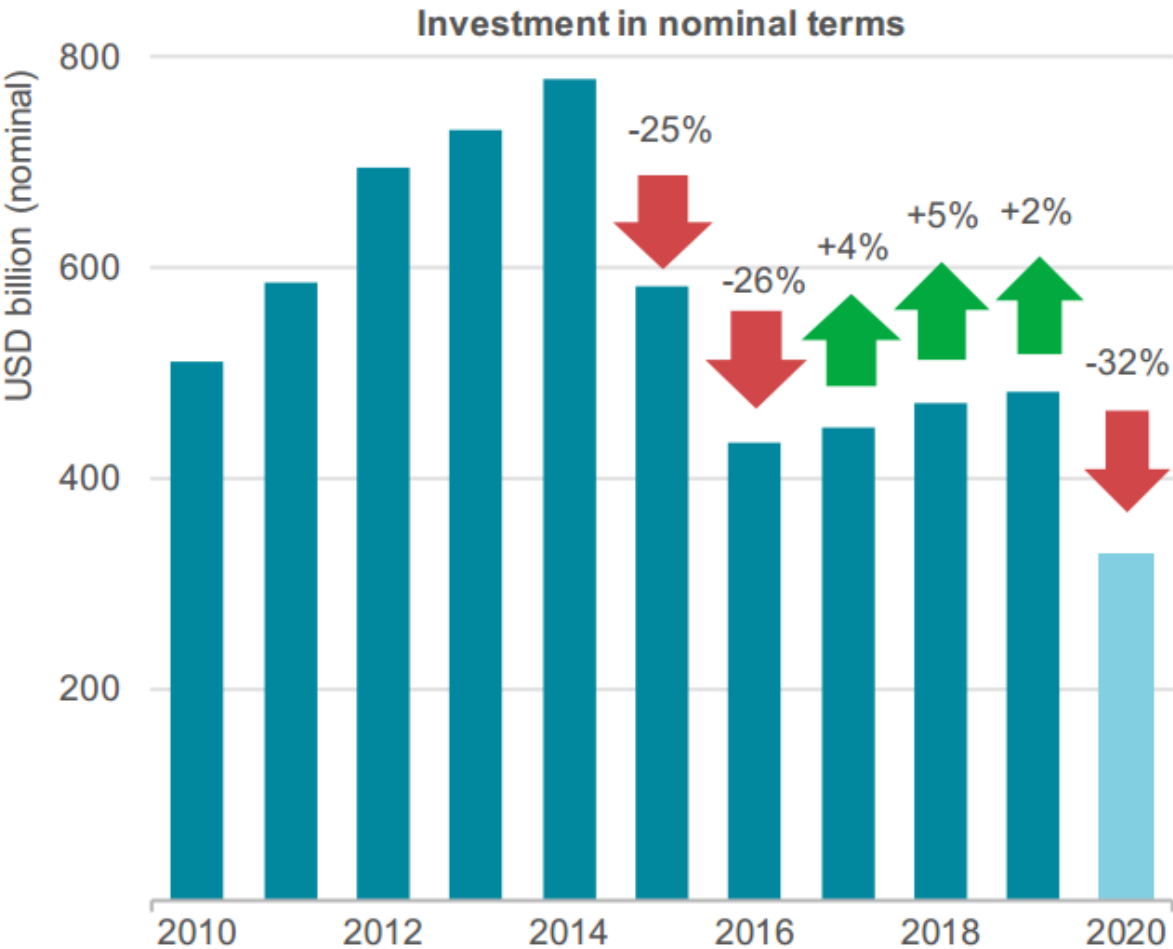


Global Investment in the Power Sector

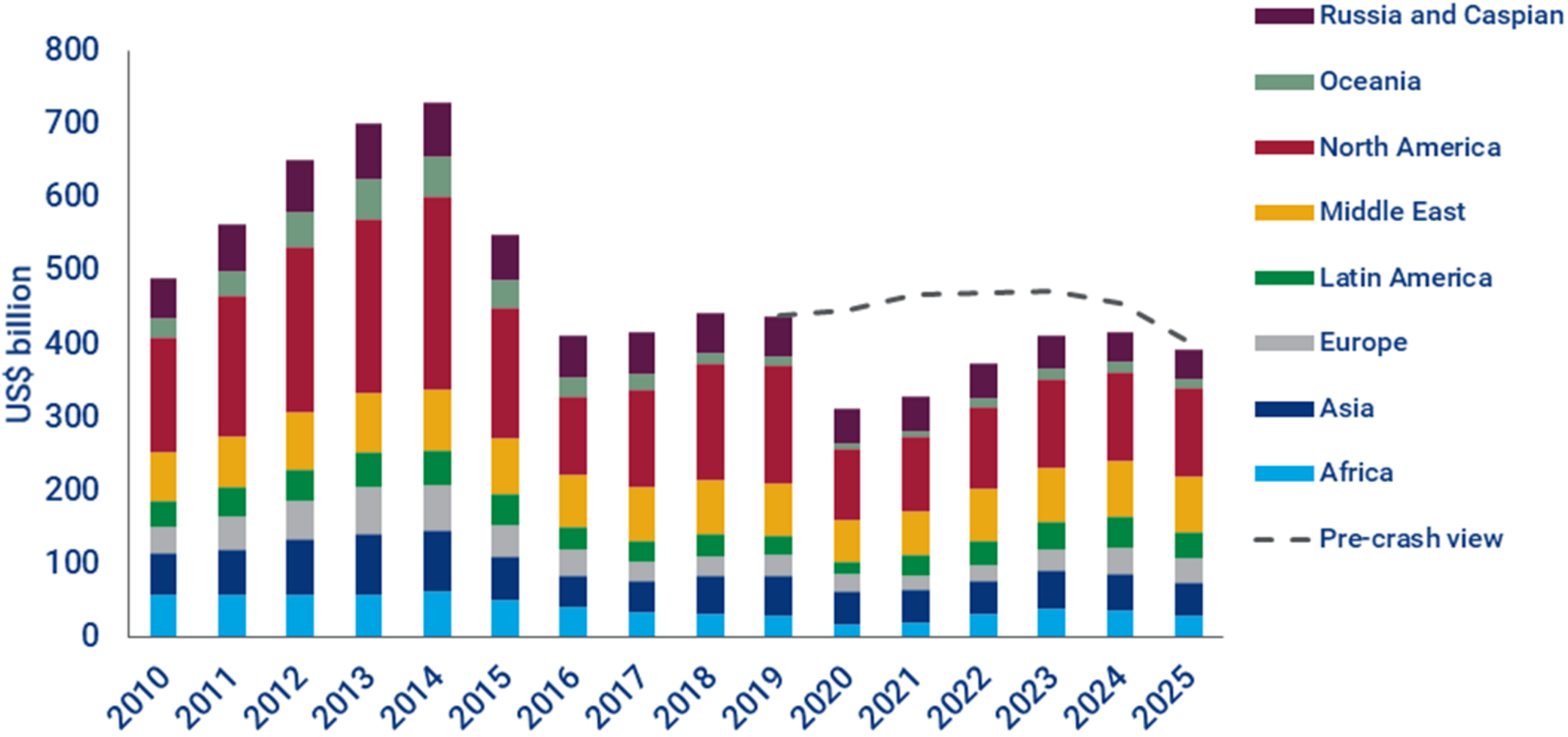


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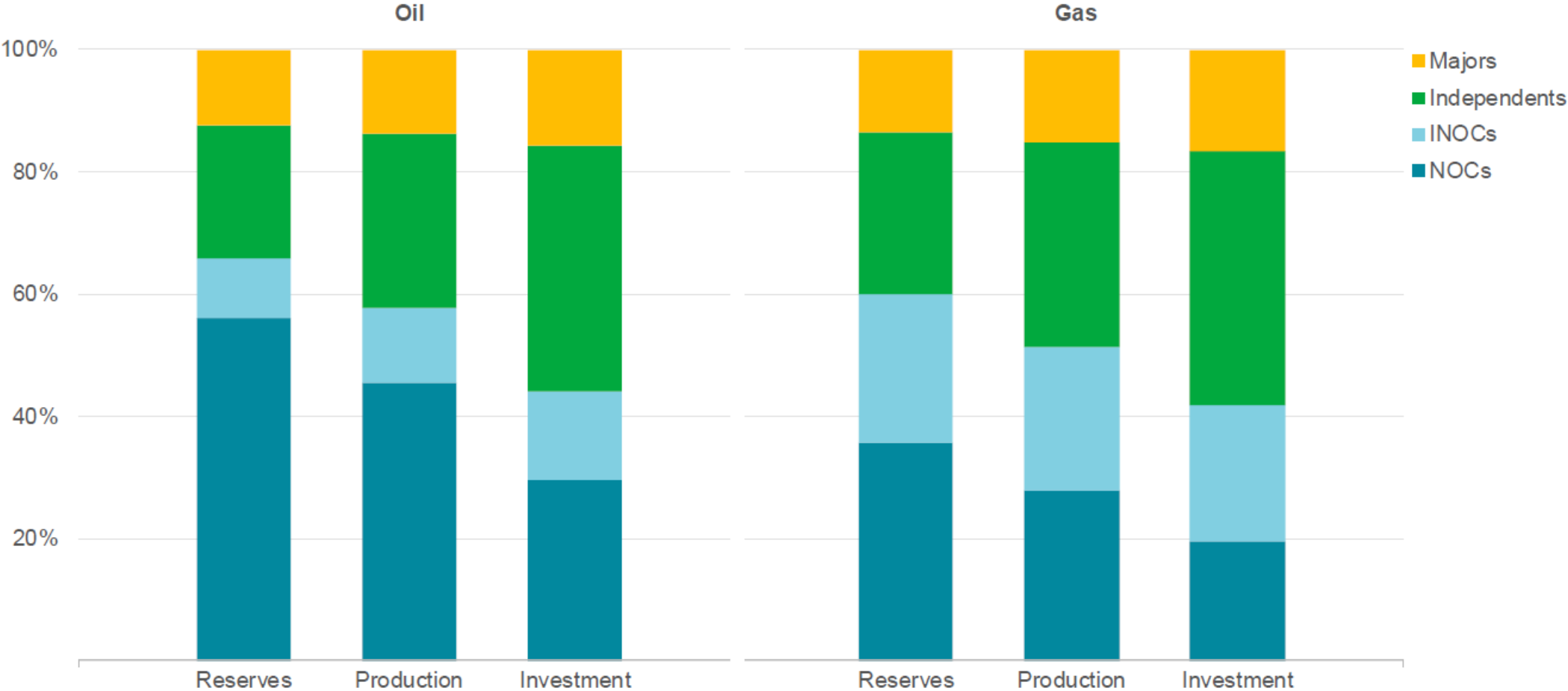
World Upstream Investment



World Upstream Investment

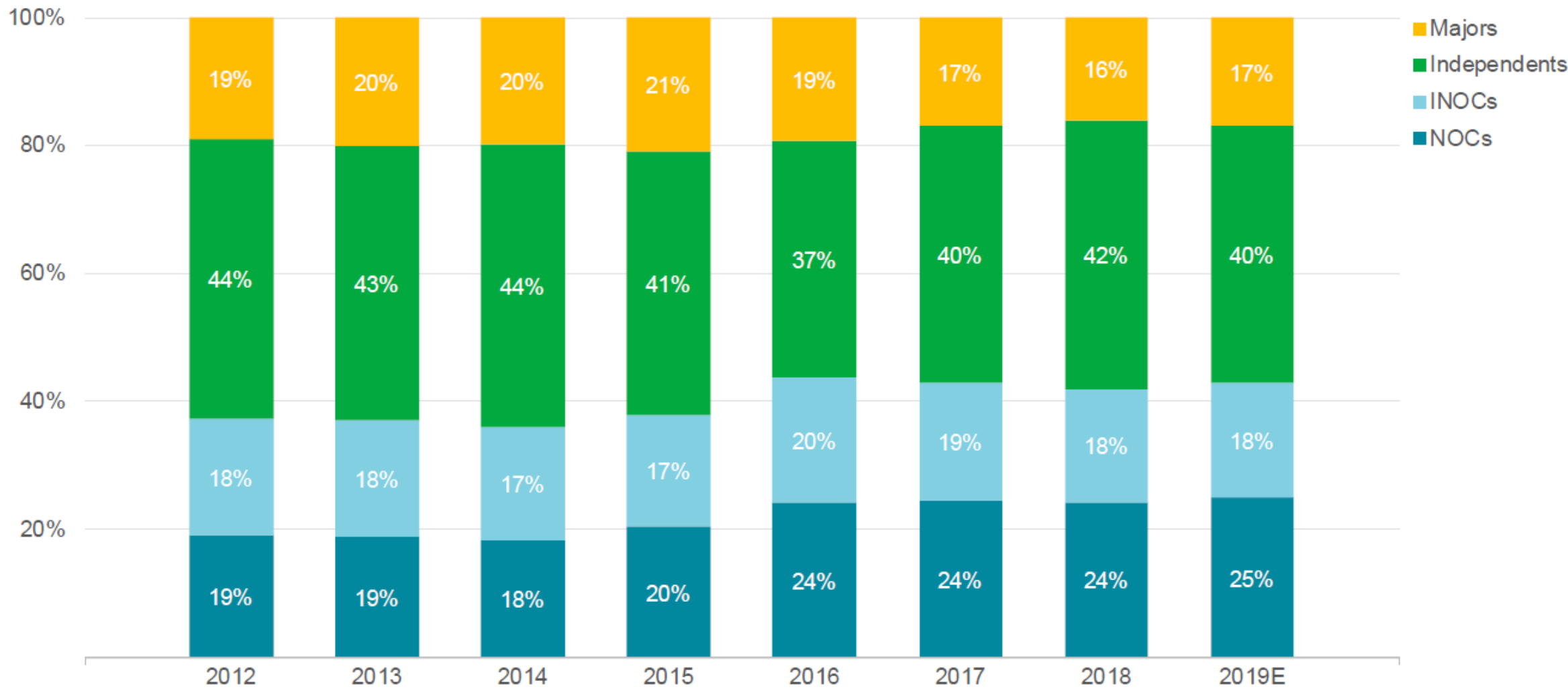


Ownership, Production & Investment



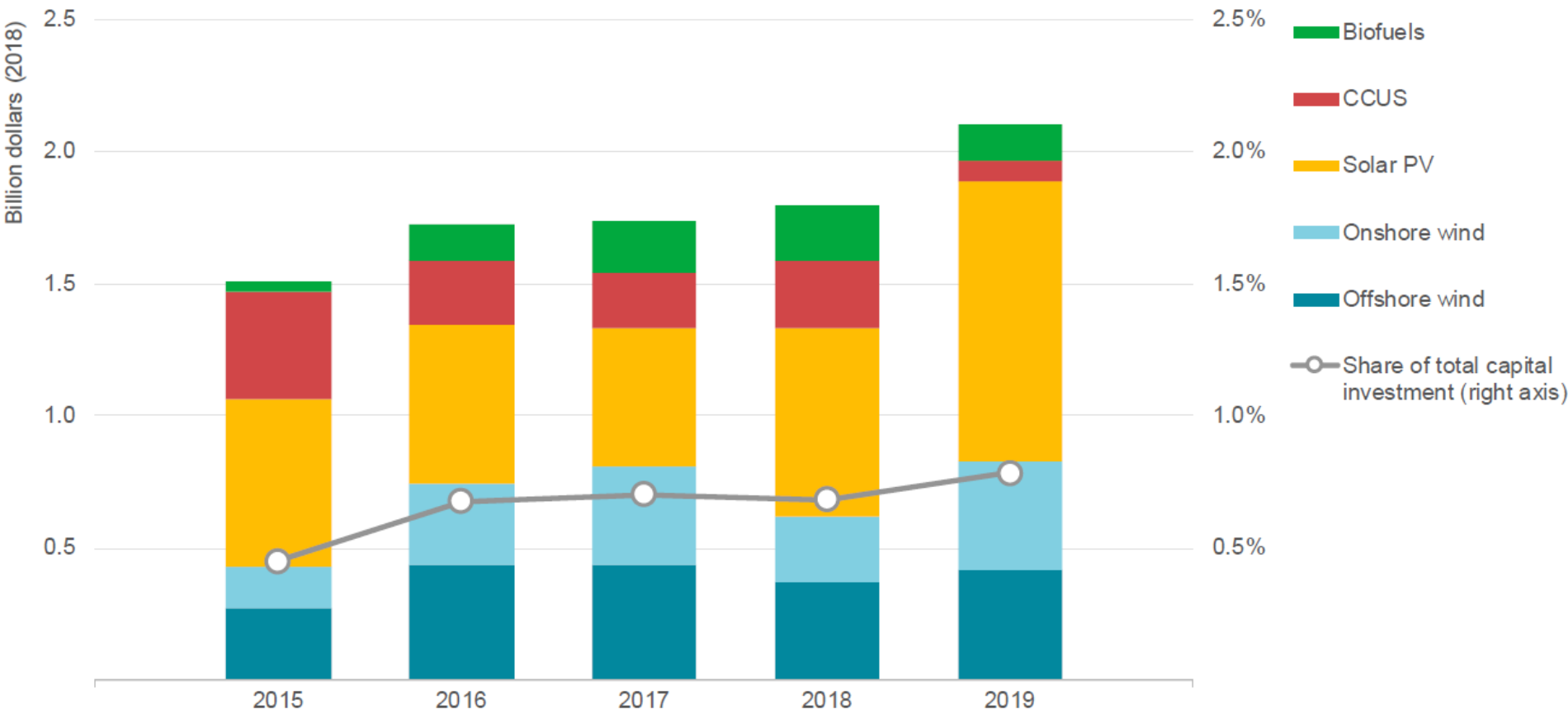
ote: Oil includes crude oil, condensate and natural gas liquids (NGLs).

Global Upstream Investment



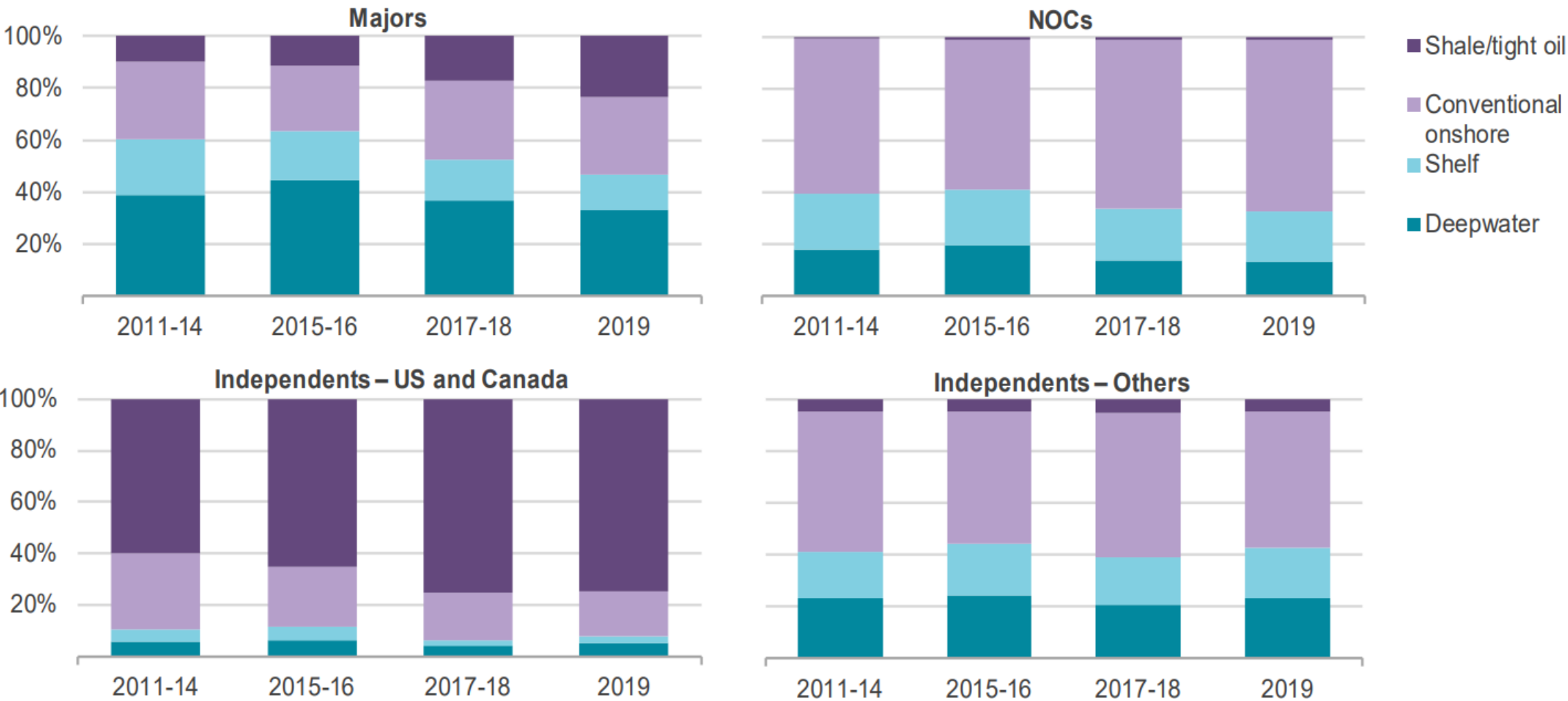
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Capital Investment in Renewables by Large Oil and Gas Companies

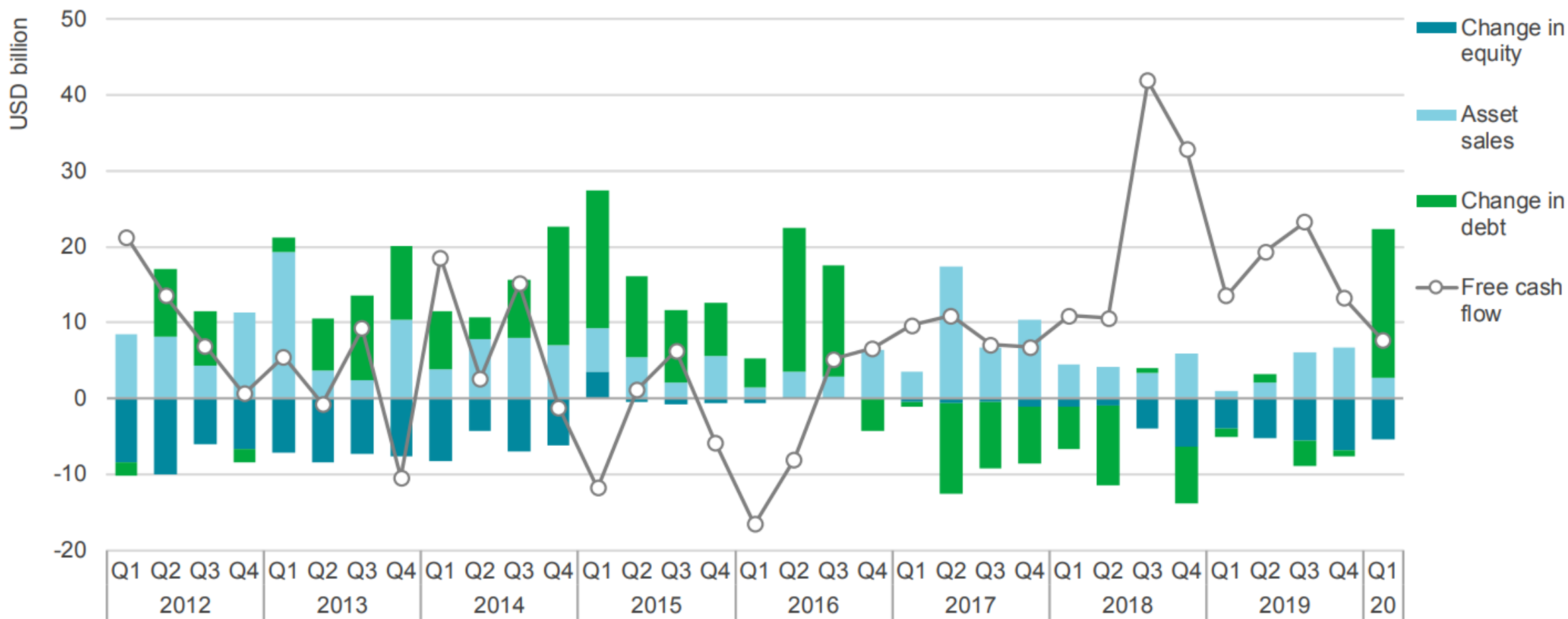


Notes: Capital investment is measured as the ongoing capital spending in new capacity from when projects start construction and are based on the owner's share of the project. Companies include the Majors and selected others (ADNOC, CNPC, CNOOC, Equinor, Gazprom, Kuwait Petroleum Corporation, Lukoil, Petrobras, Repsol, Rosneft, Saudi Aramco, Sinopec, Sonatrach). CCUS investment is in large-scale facilities; it includes developments by independent oil and gas companies in Canada and China and capital spend undertaken with government funds.

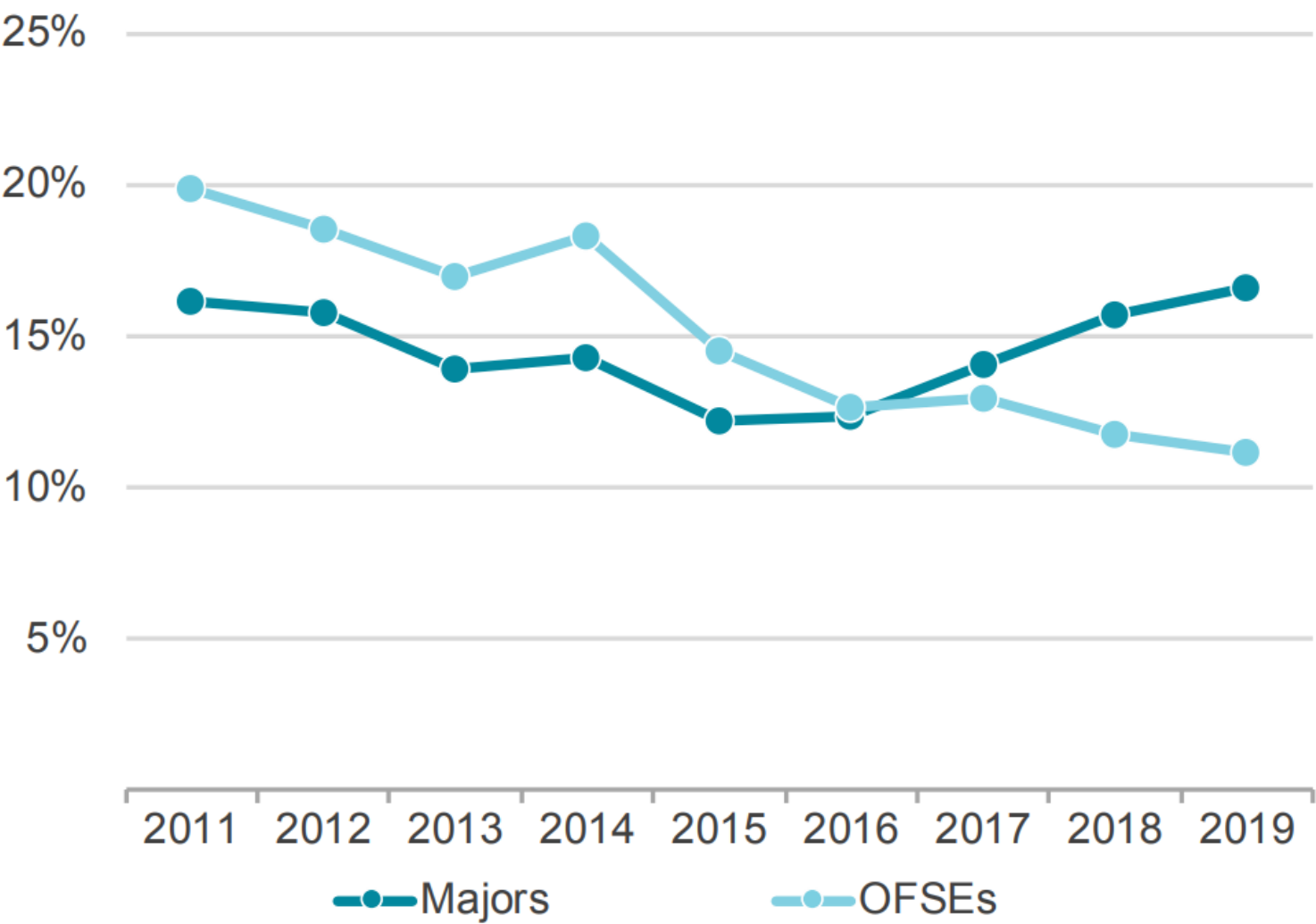
Allocation of Upstream Investment by Resource Type and Company Type



Majors' Indicative Sources of Finance and FCF

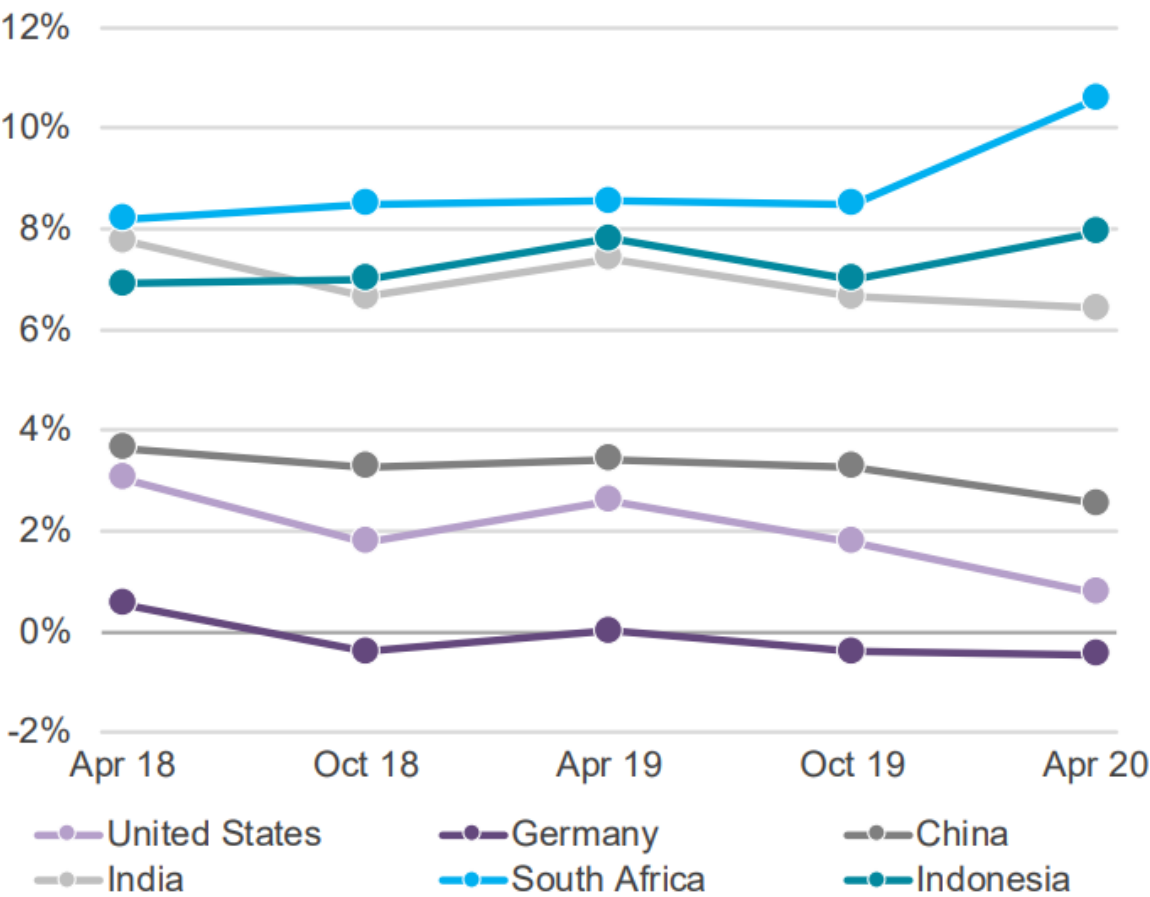
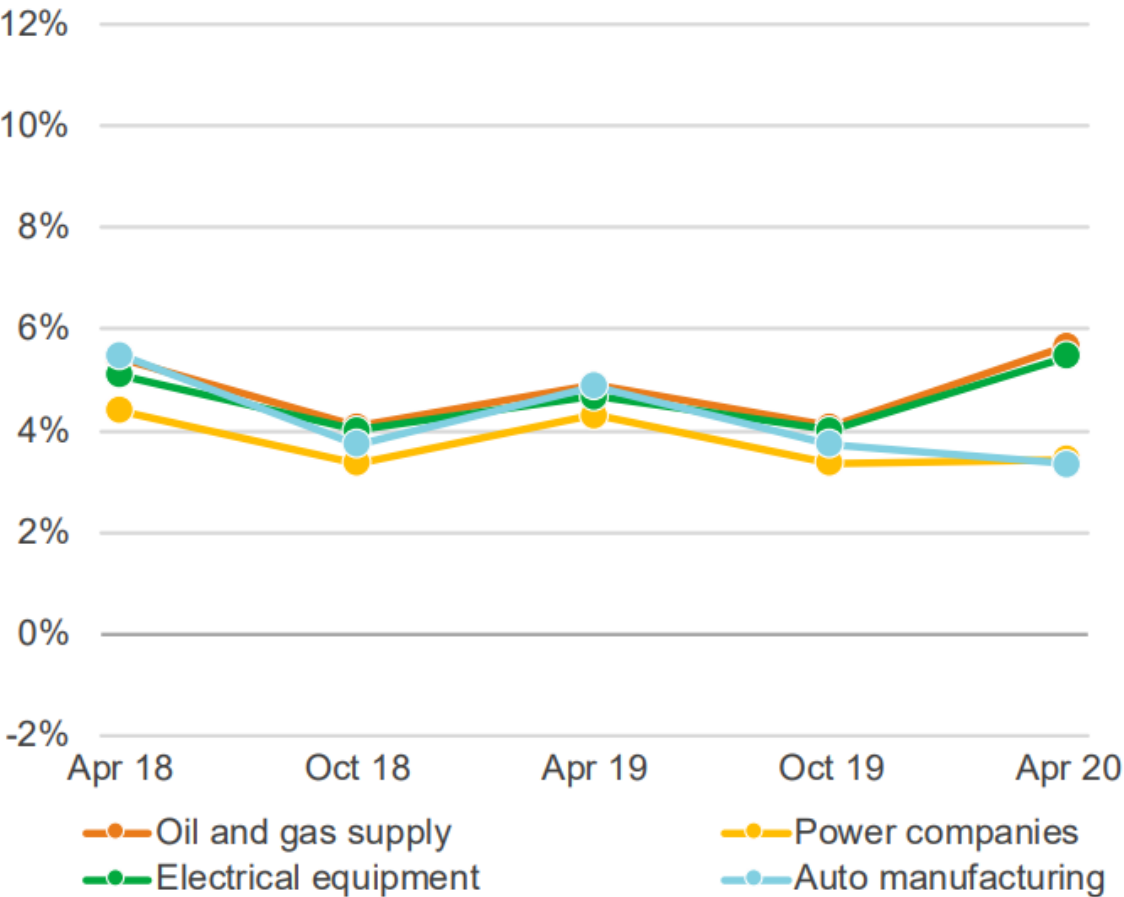


EBITDA Margins by Oil and Gas Company Type



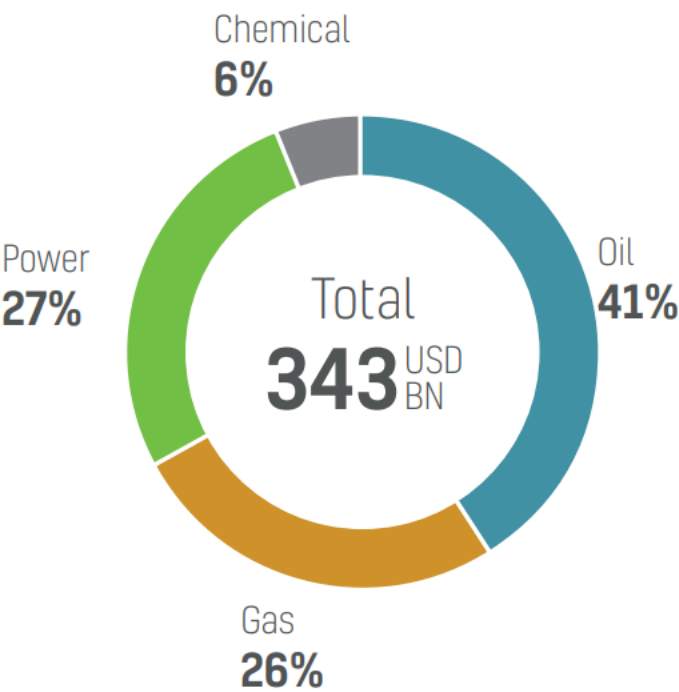
Cost of Debt for Energy Companies

Weighted average cost of long-term debt for top energy companies (left) and government 10-year bond yields (right)

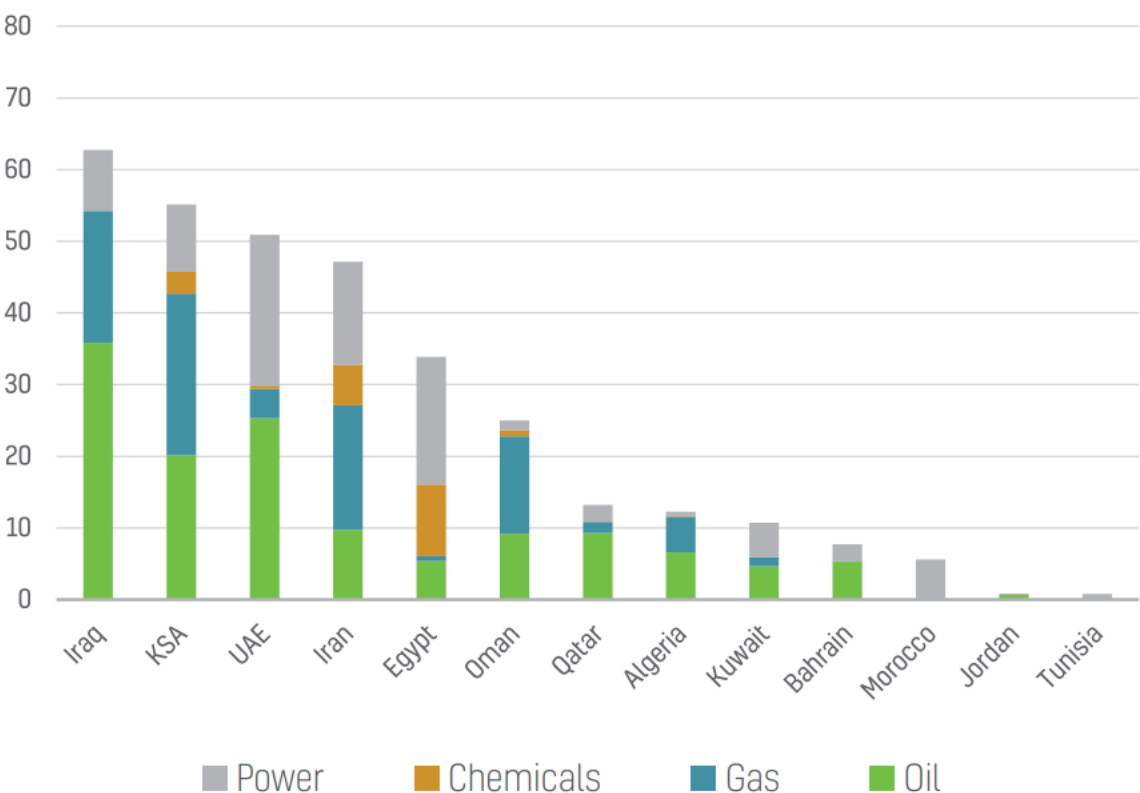


MENA Energy Investment

MENA 2020-24 Committed Projects by Industry



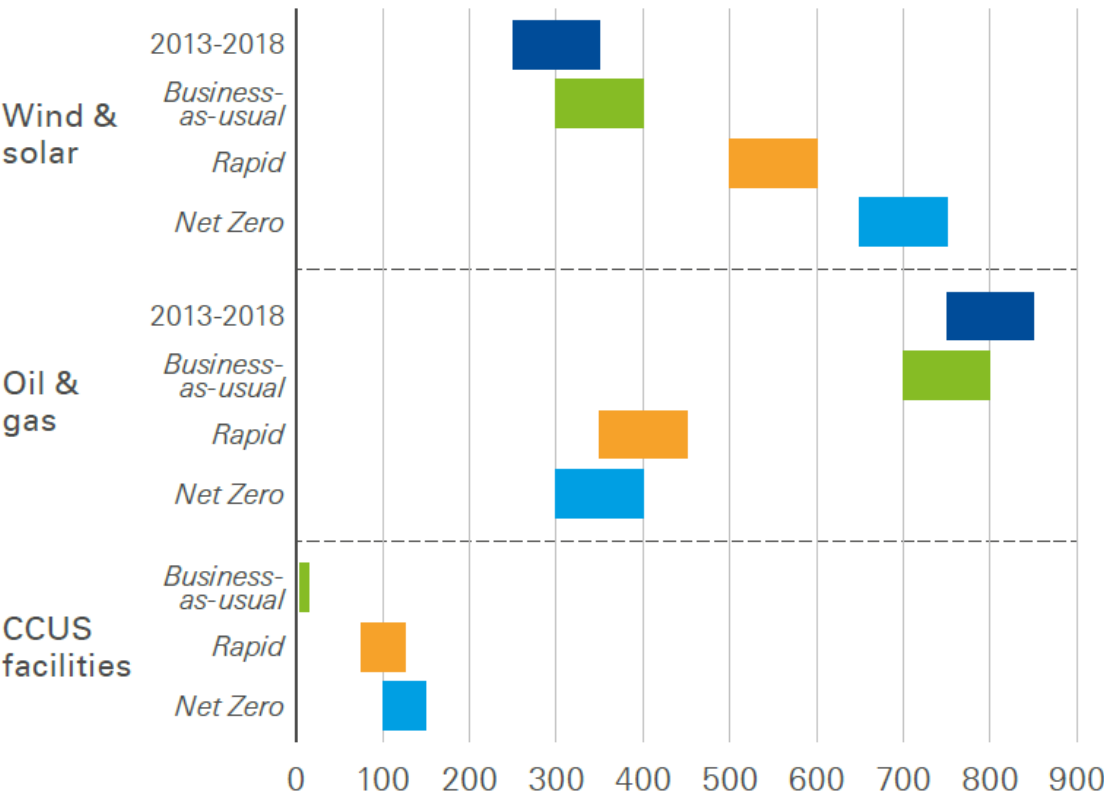
Committed MENA Energy Investment (USD Bn)



Energy Investment Pattern

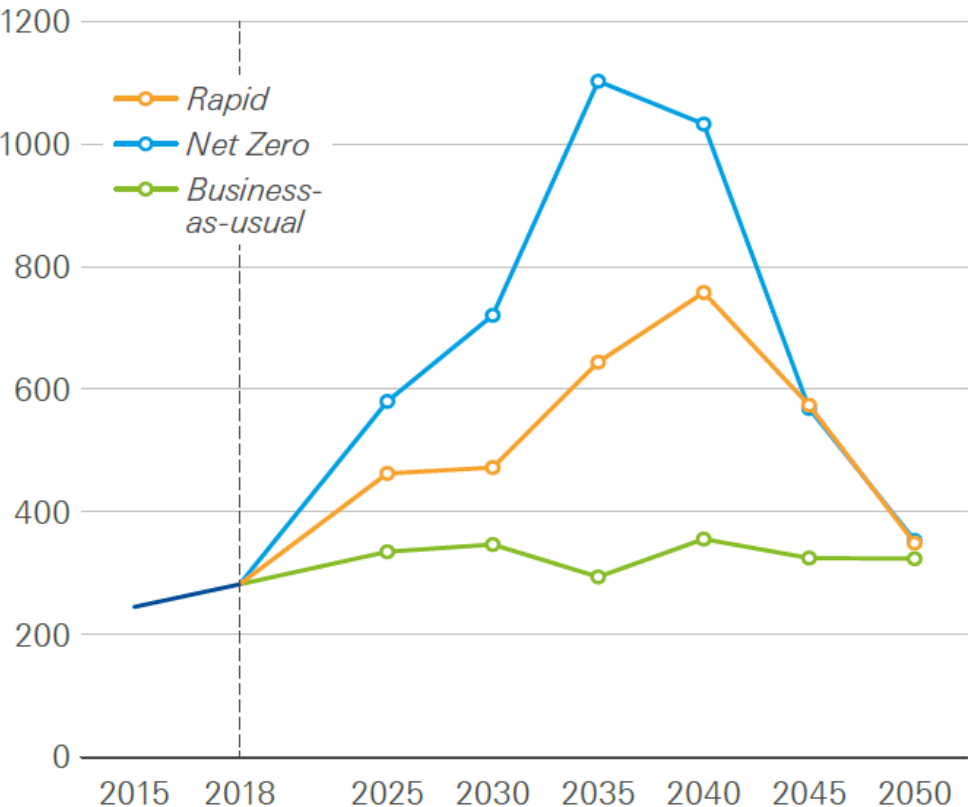
Average annual investment, history and 2020-2050

2018 US\$ Billion

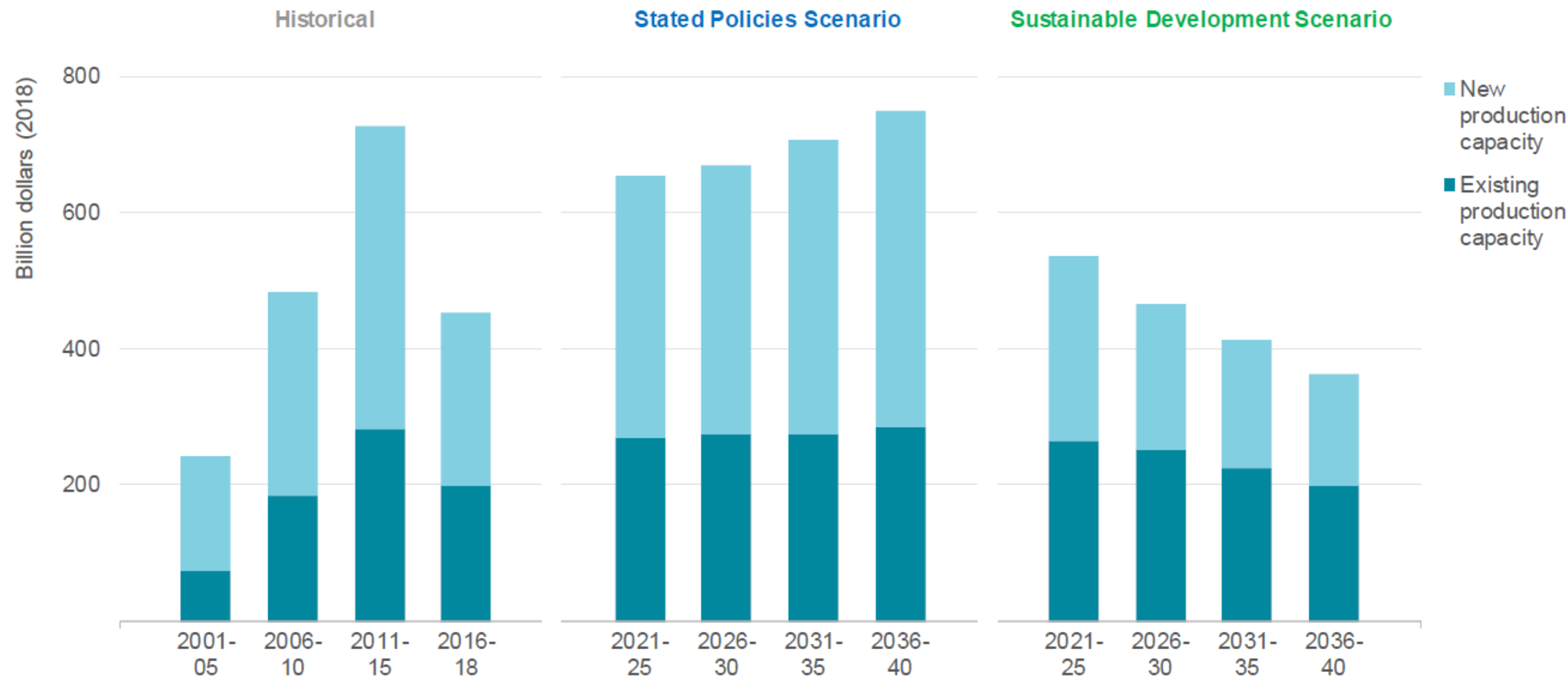


Average annual investment in wind and solar

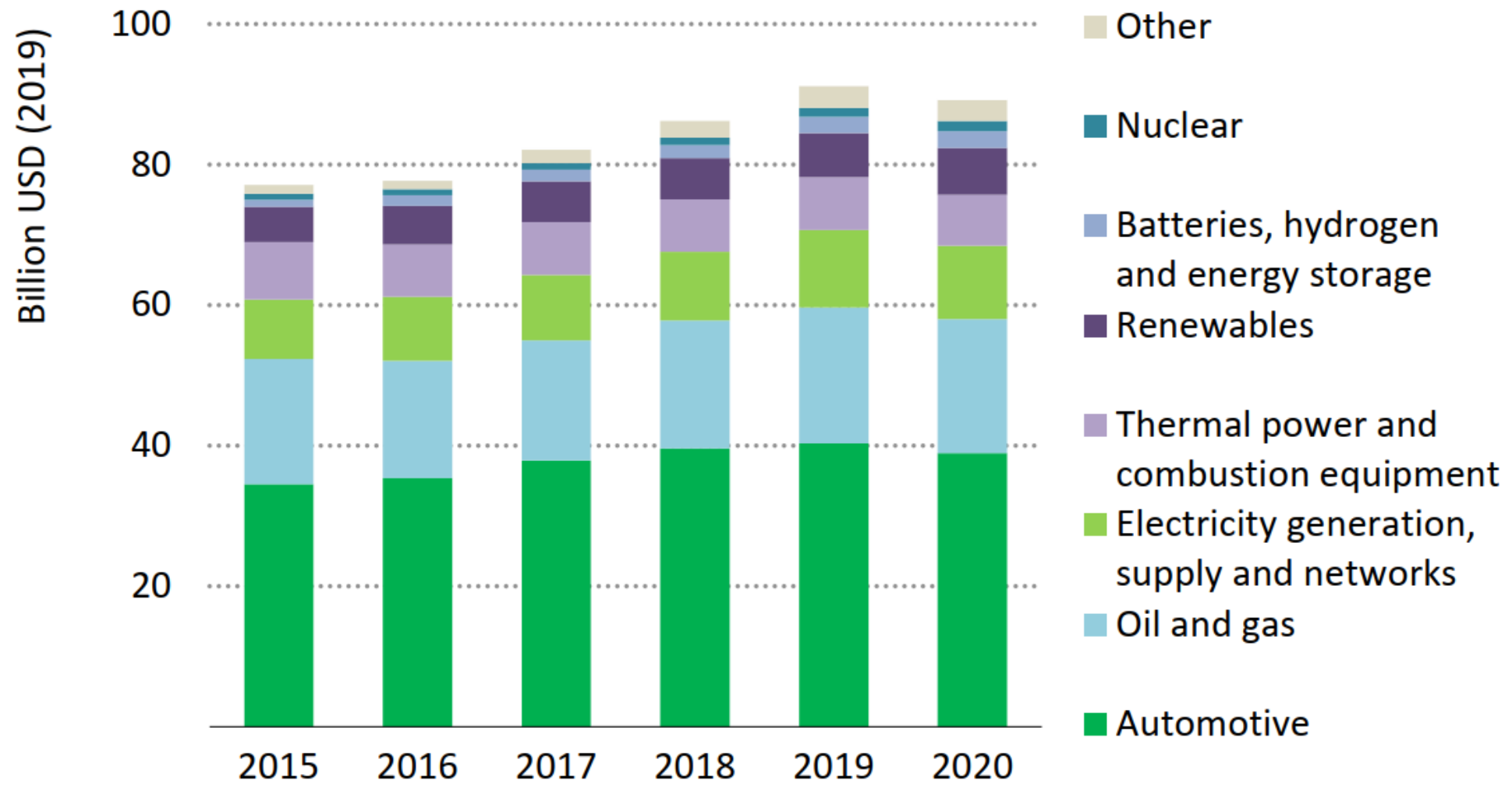
Five-year rolling average, 2018 US\$ Billion



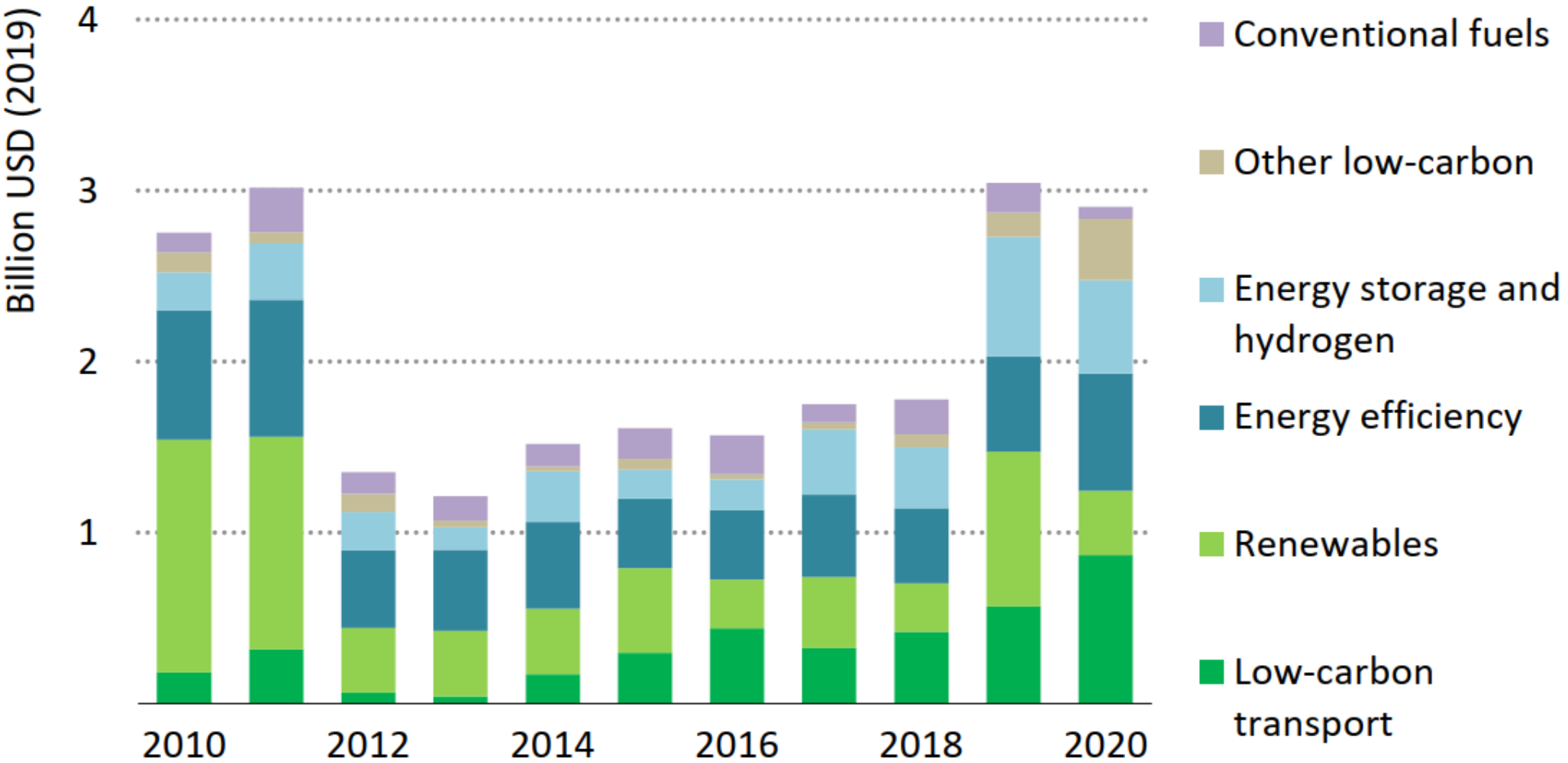
Average Annual Upstream Investment



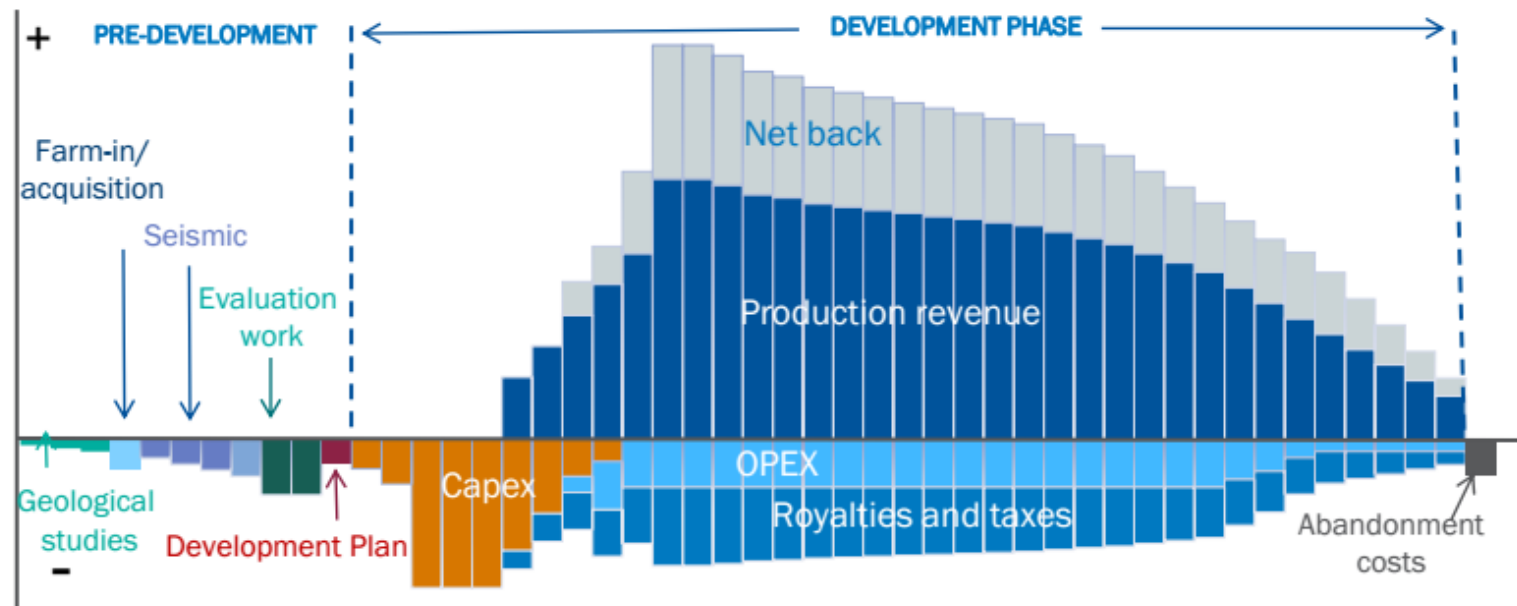
Spending on Energy R&D by Globally Listed Companies



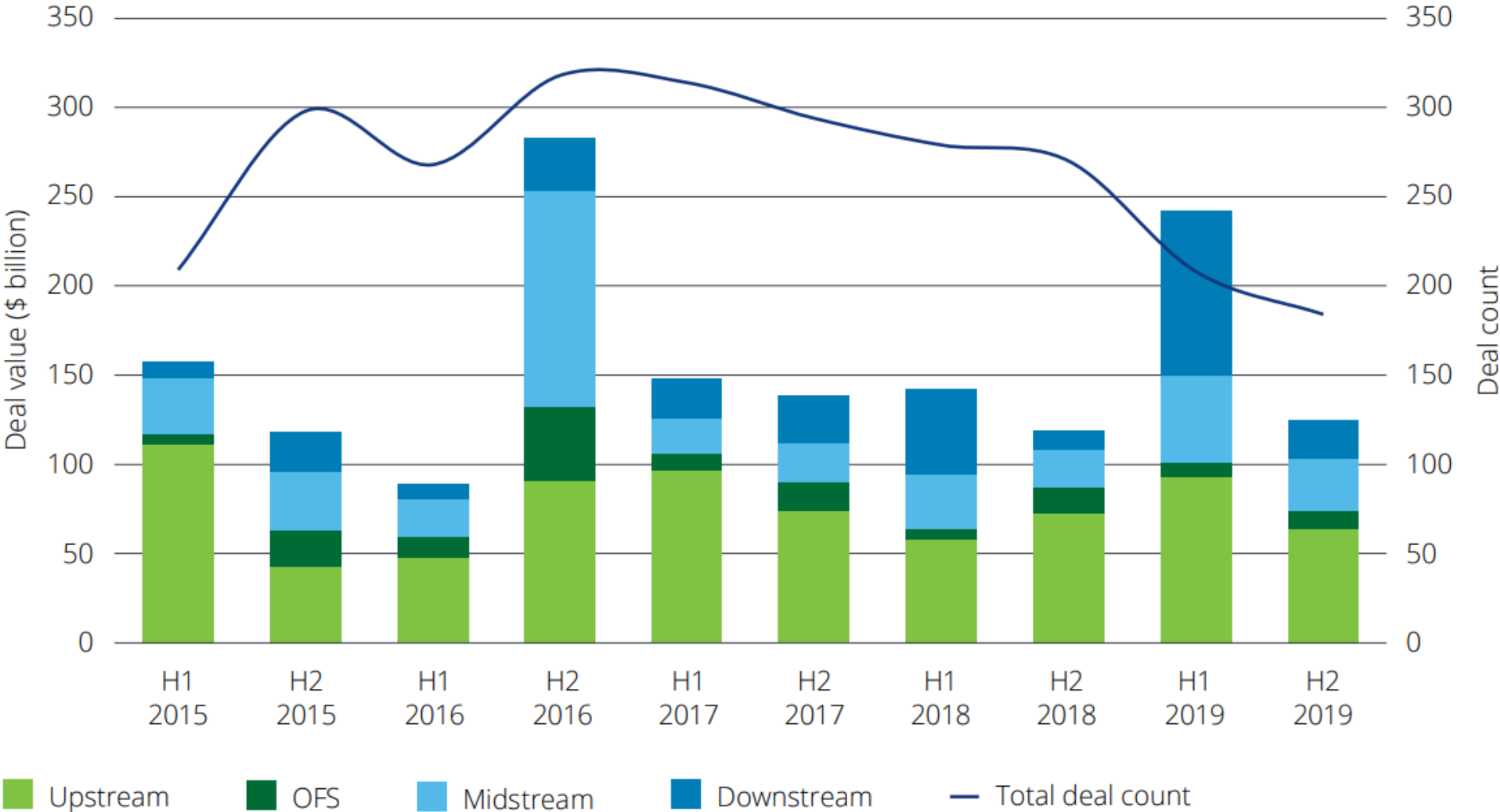
Global Early-stage VC Investments in Clean Energy Technology Start-ups



Typical Upstream Project



M&A in Oil and Gas Industry



M&A Drivers in the Upstream Oil & Gas

Upstream

- Economy of scale
- Regional focus
- Product mix
- Focusing on core assets
- Portfolio optimization

OFS

- Economy of scale
- Regional considerations
- Integrated solutions
- Capital restructuring
- Vertical/Horizontal integrations

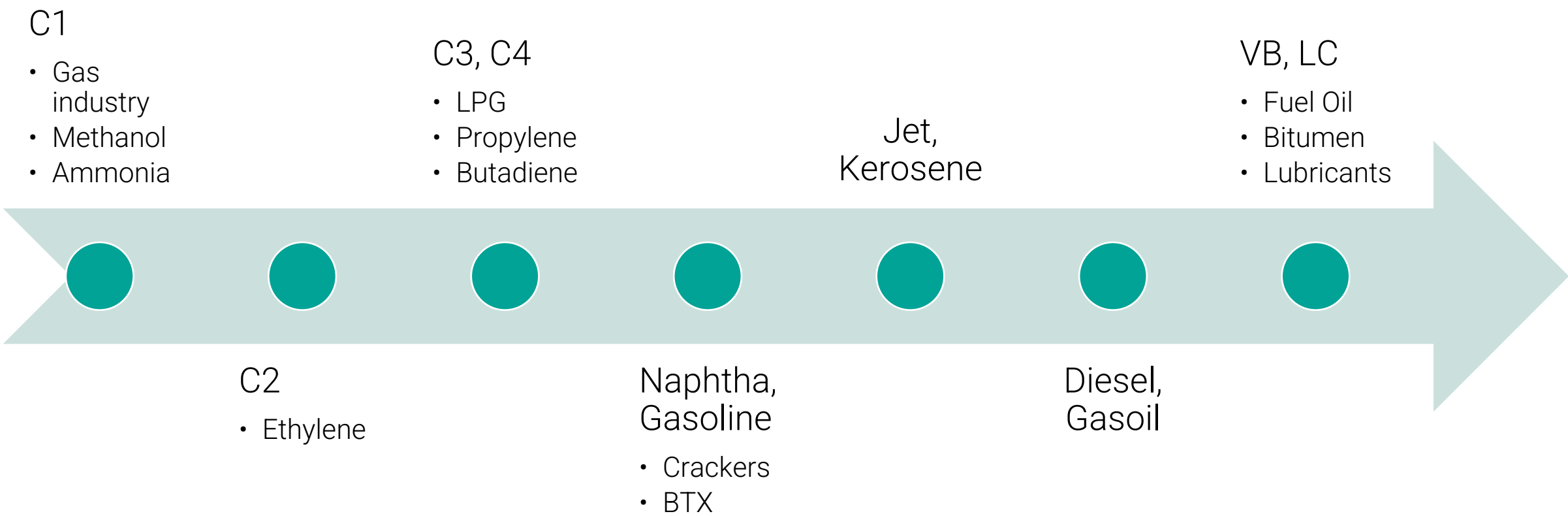
Focus: Iran

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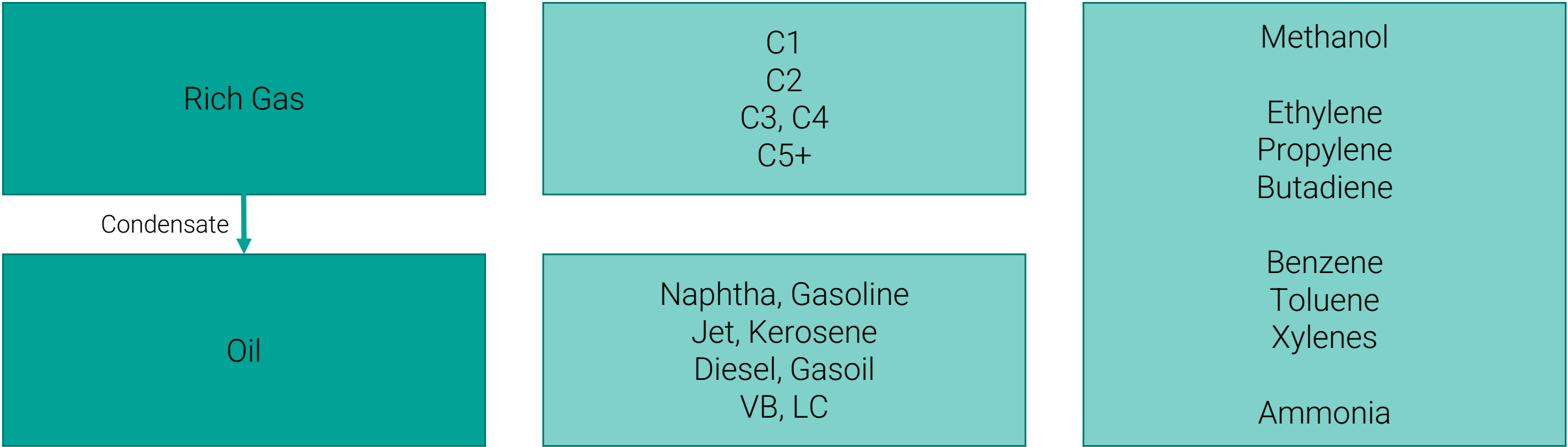


Carbon

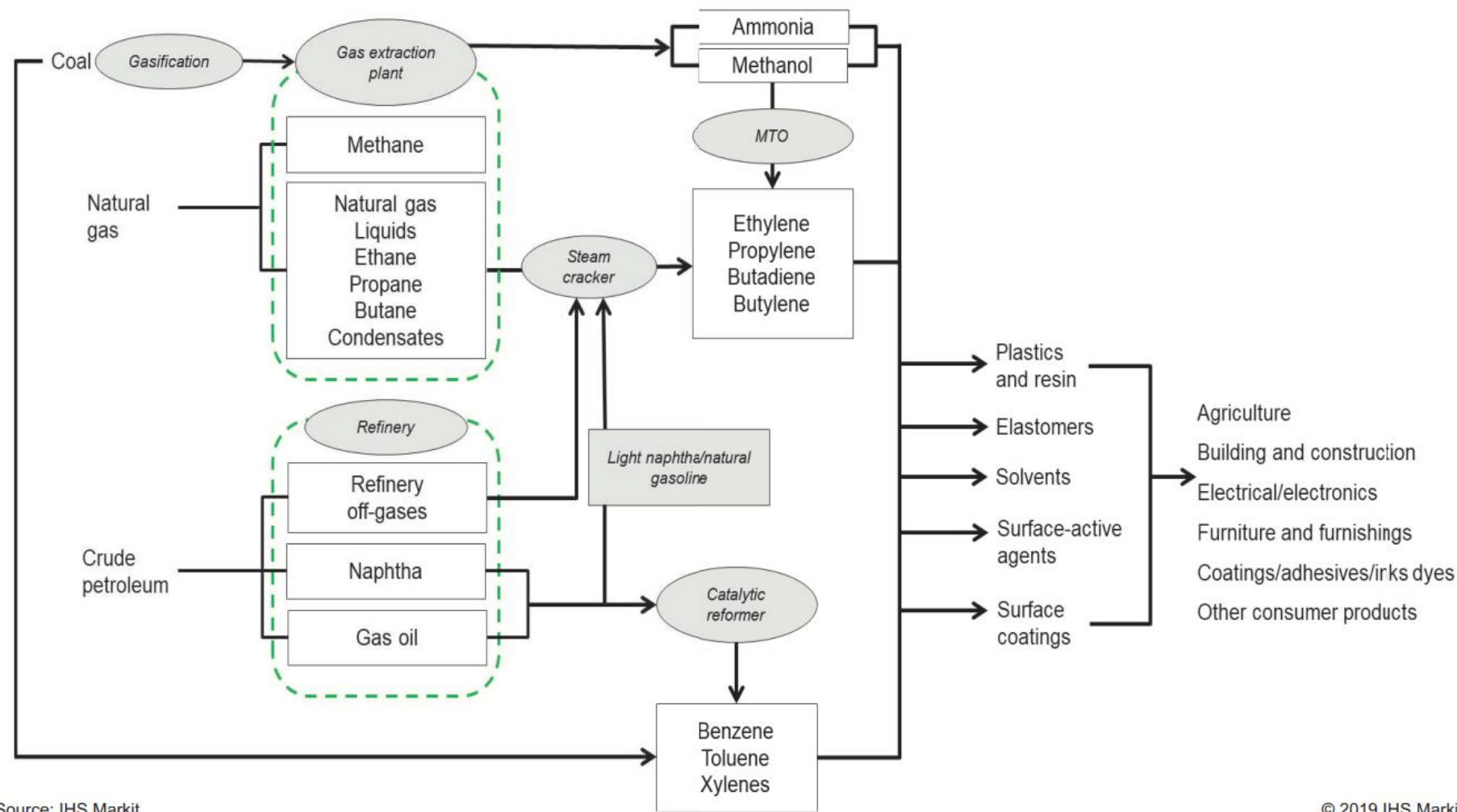
A Simplified Overview of Carbon



Industry Flow



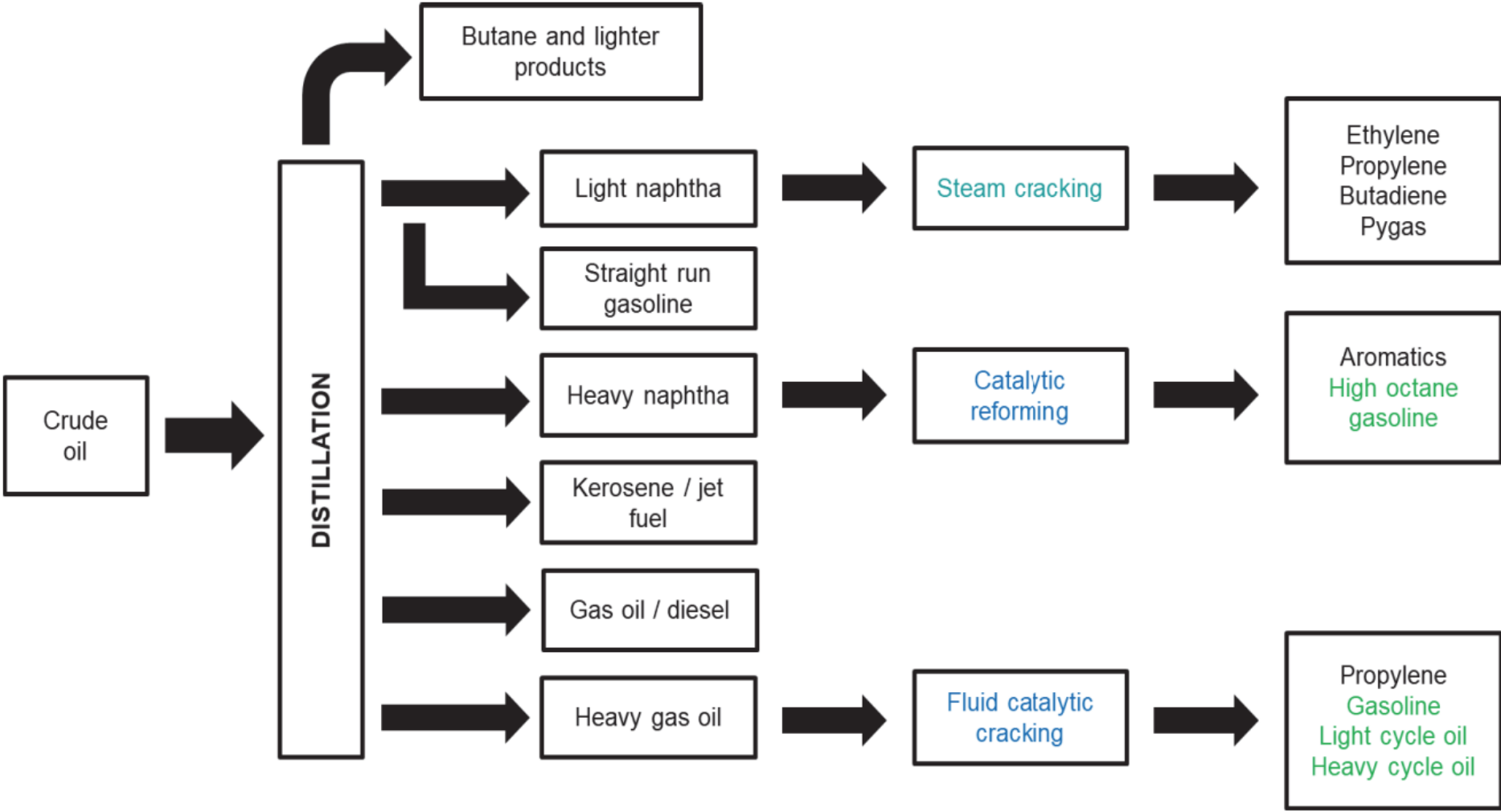
Petrochemical Feedstock and Derivatives



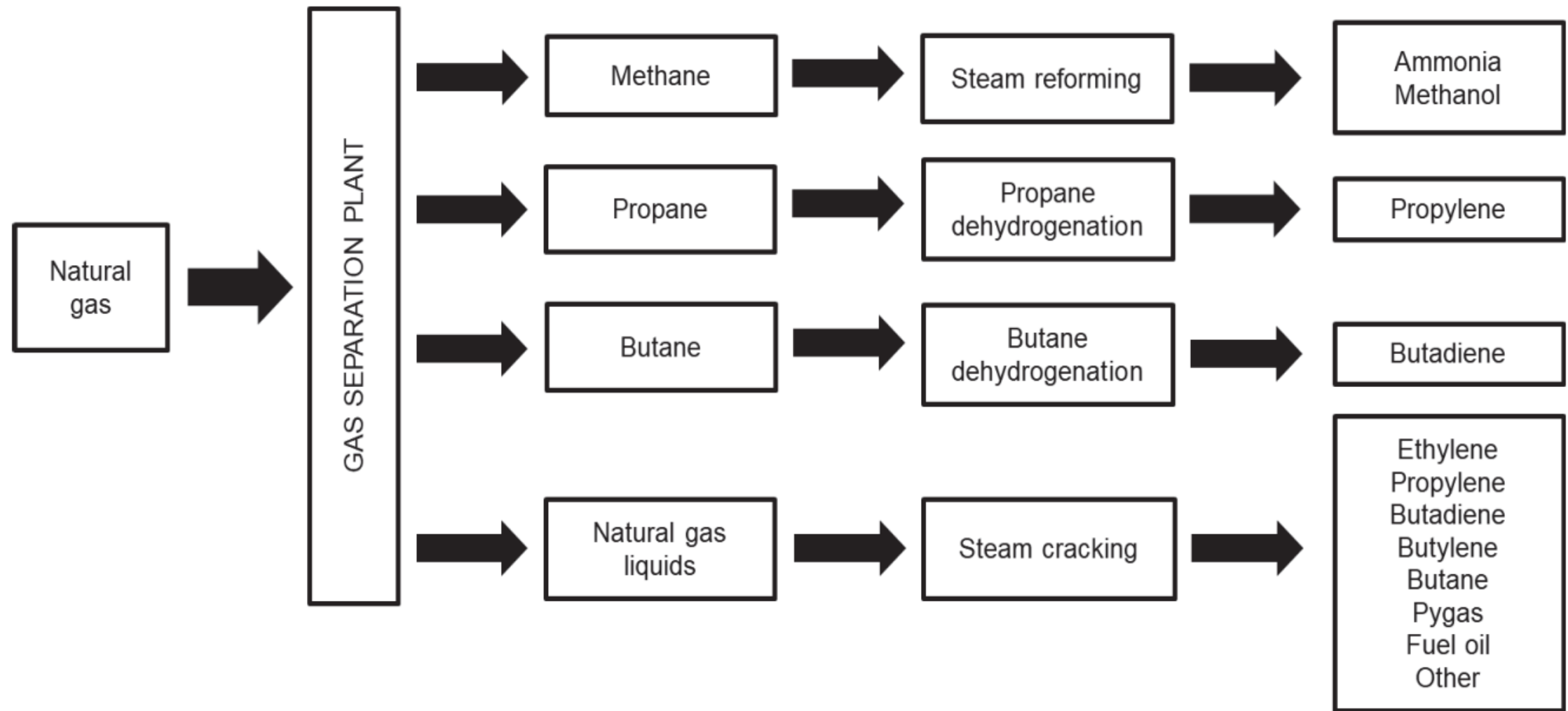
Source: IHS Markit

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From Crude Oil to Basic Petrochemicals



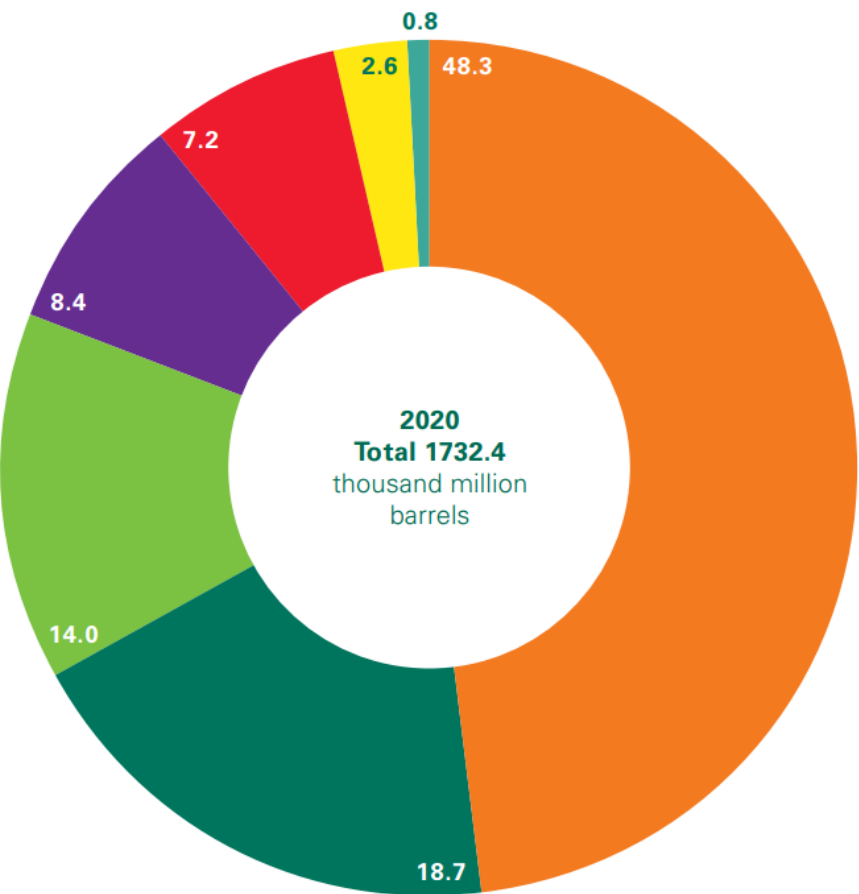
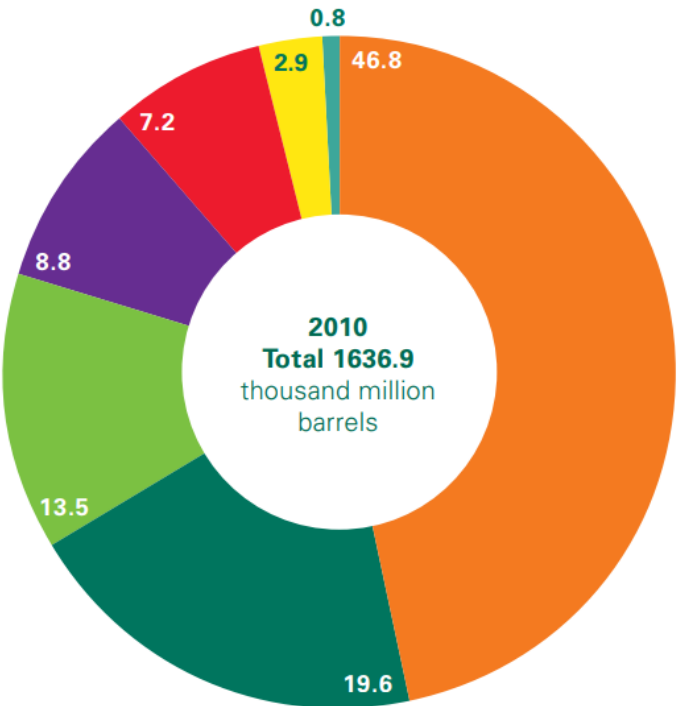
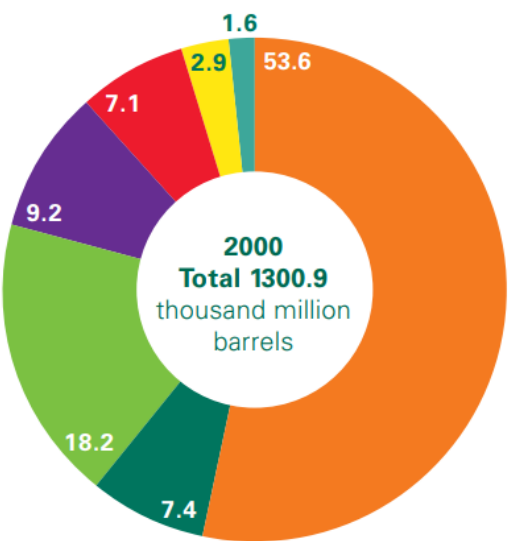
From Natural Gas to Basic Petrochemicals



The Oil Market

Distribution Of Proved Reserves

- Middle East
- S. & Cent. America
- North America
- CIS
- Africa
- Asia Pacific
- Europe



Top Oil Producers, Net Exporters and Net Importers

Producers	Mt	% of world total
United States	706	17.0
Russian Federation	512	12.4
Saudi Arabia	511	12.3
Canada	255	6.2
Iraq	201	4.9
People's Rep. of China	195	4.7
United Arab Emirates	174	4.2
Brazil	153	3.7
Kuwait	131	3.2
Islamic Rep. of Iran	130	3.1
Rest of the world	1 173	28.3
World	4 141	100.0

2020 provisional data

Net exporters	Mt
Saudi Arabia	352
Russian Federation	269
Iraq	195
Canada	154
United Arab Emirates	148
Kuwait	102
Nigeria	99
Kazakhstan	70
Angola	63
Mexico	59
Others	531
Total	2 042

2019 data

Net importers	Mt
People's Rep. of China	505
India	227
United States	202
Japan	149
Korea	145
Germany	86
Spain	66
Italy	65
Netherlands	62
Singapore	53
Others	509
Total	2 069

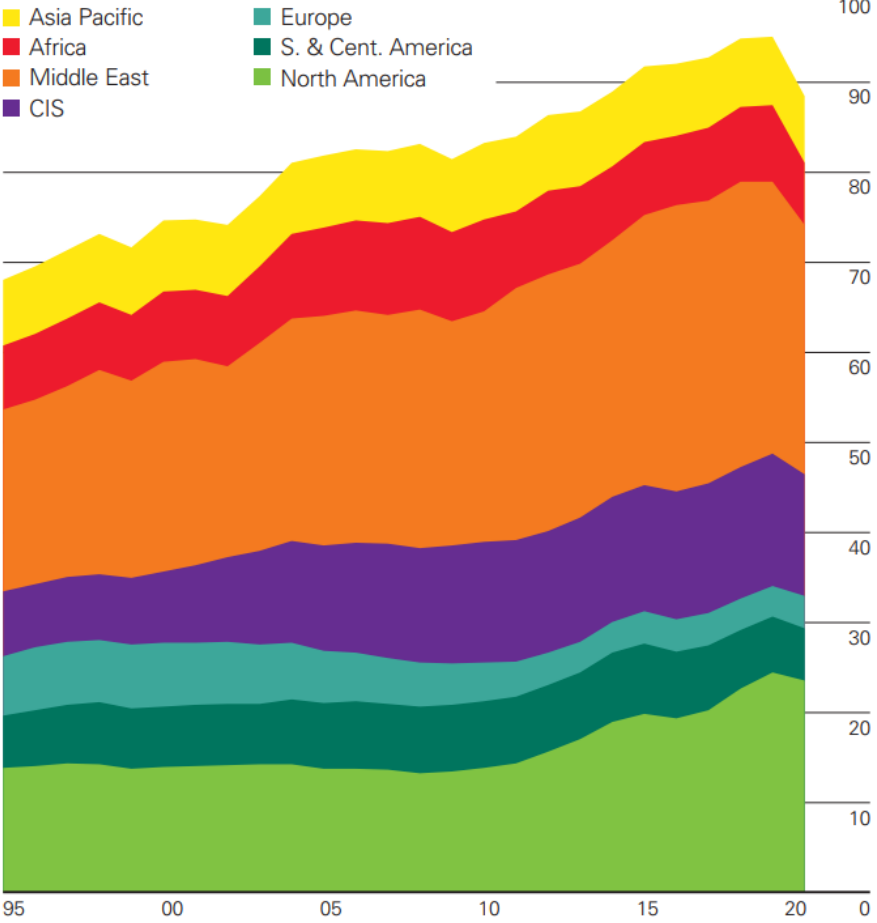
2019 data

The Geopolitics of Oil

Oil: Production by region

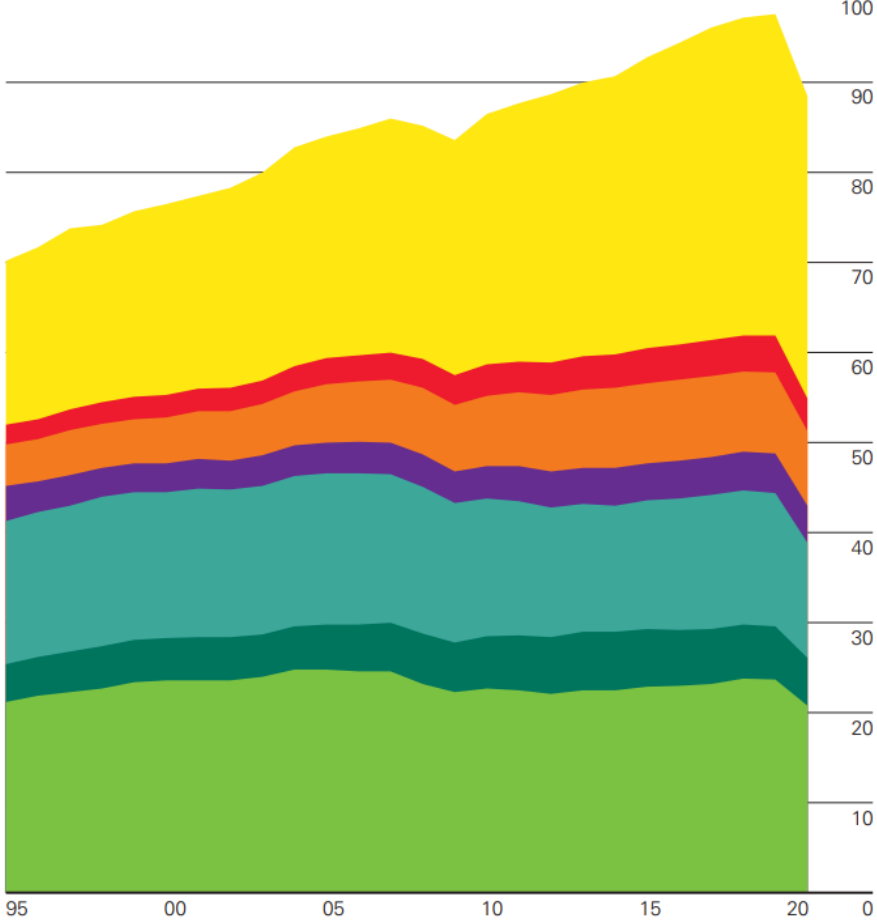
Million barrels daily

- Asia Pacific
- Africa
- Middle East
- CIS
- Europe
- S. & Cent. America
- North America

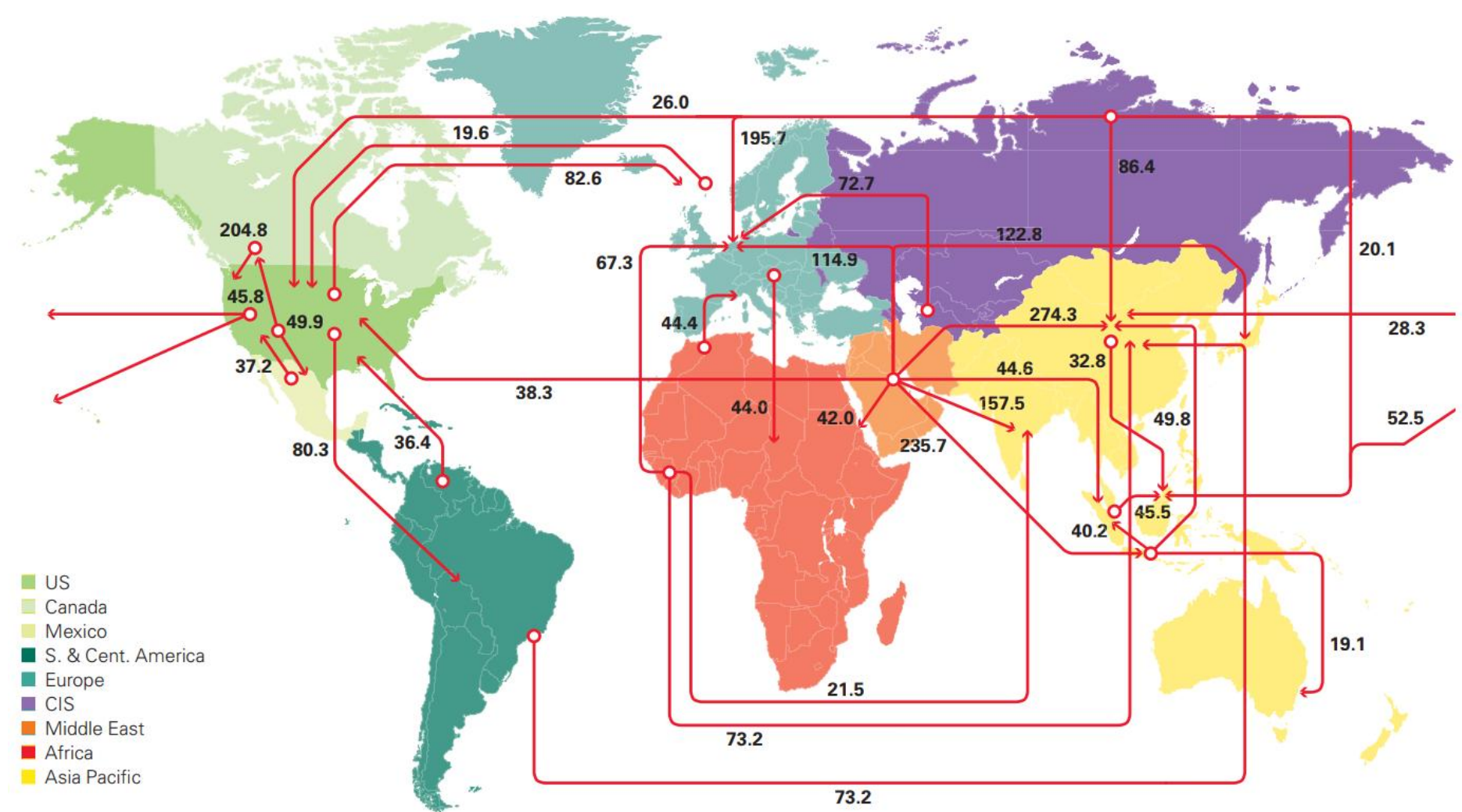


Oil: Consumption by region

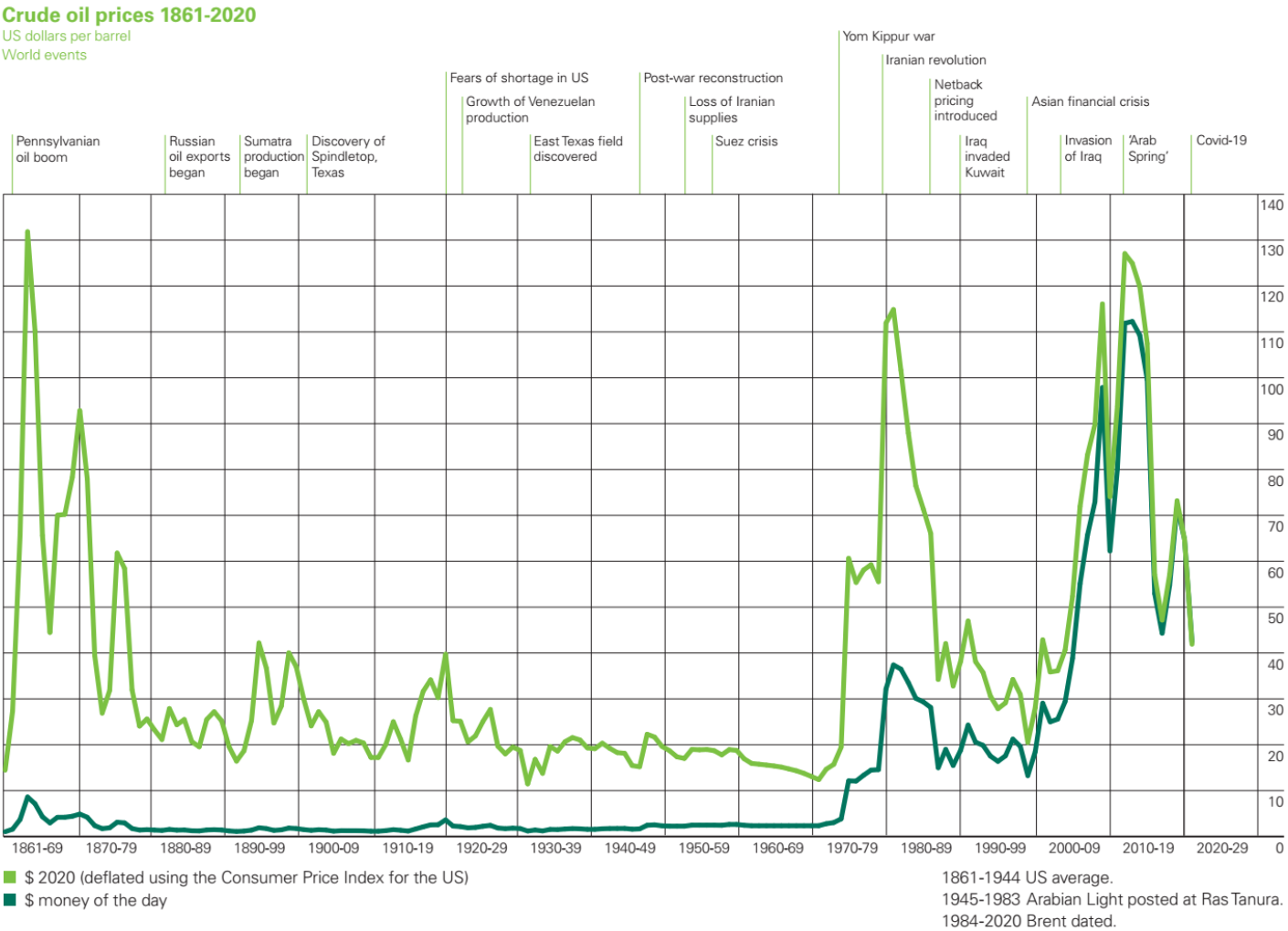
Million barrels daily



Major Trade Movements 2020



Crude Oil Prices (Nominal and Real)



Short-to-medium Term Oil Price Forecast Methodology

Demand

- GDP Growth
- Mobility
- Industry Activity

Stocks

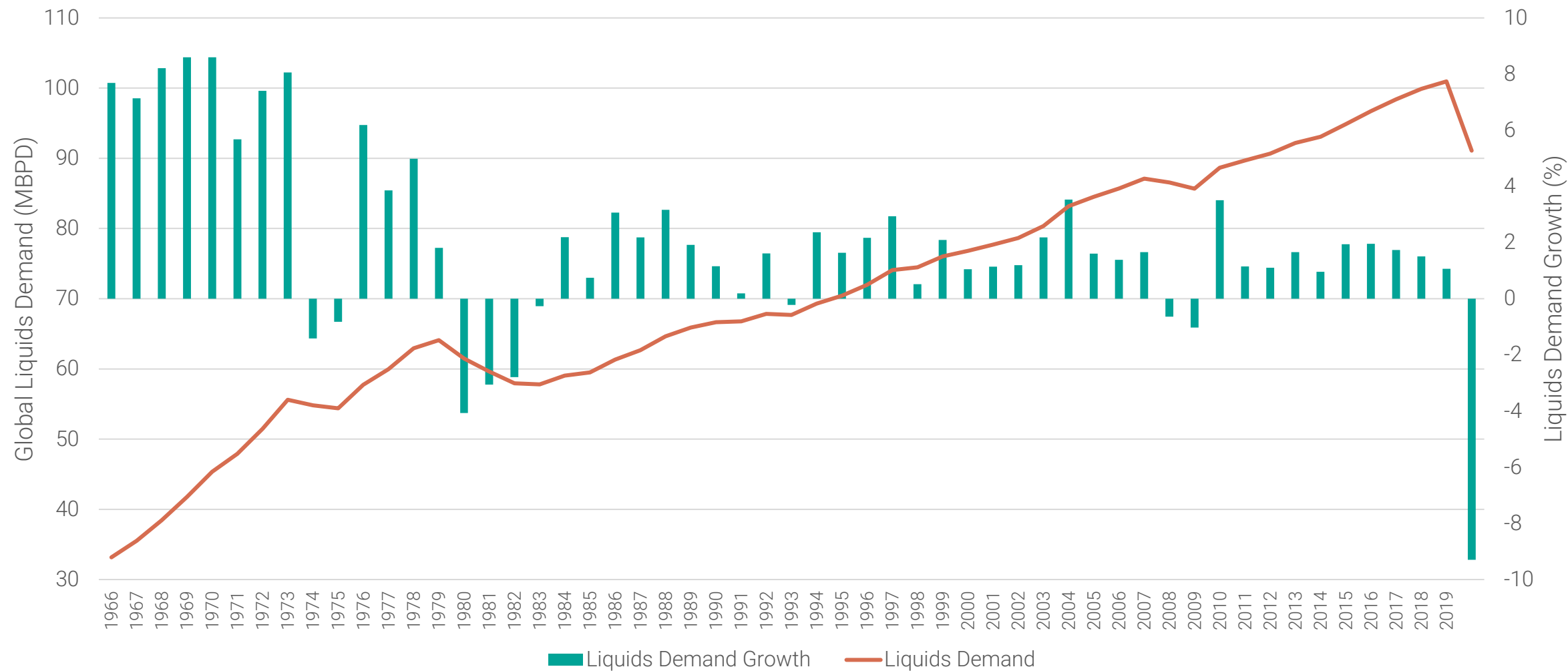
- OECD Commercial Stocks
- SPR
- 5 Major Hubs

Supply

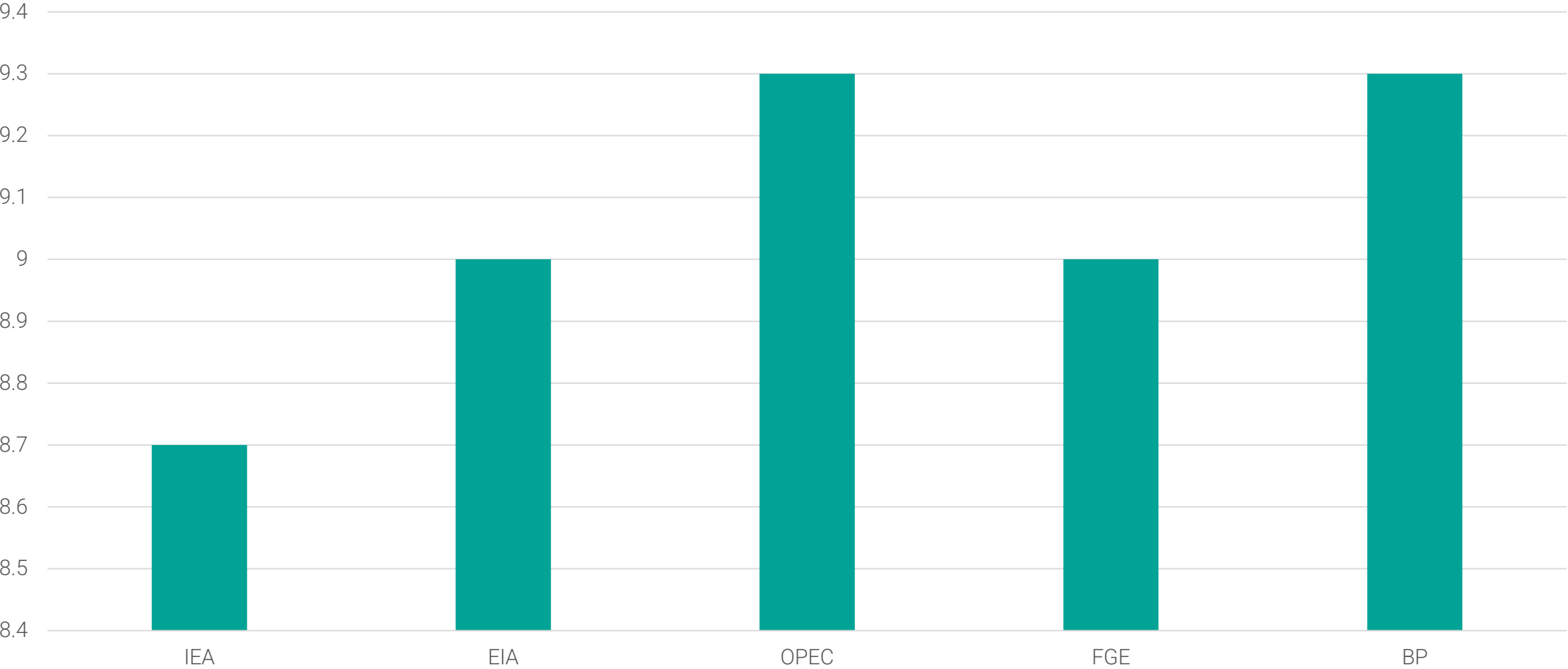
- Non-OPEC+
- Shale Oil
- OPEC+

Outlook

Global Liquids Demand



Demand Destruction In 2020 (MBPD)



World Oil Demand (MBPD)

World oil demand	2021	1Q22	2Q22	3Q22	4Q22	2022	Change 2022/21	
							Growth	%
Americas	24.33	24.10	25.84	26.08	25.52	25.40	1.07	4.39
of which US	19.93	19.80	21.04	21.46	21.17	20.88	0.94	4.74
Europe	13.00	12.55	13.40	14.32	14.09	13.60	0.60	4.61
Asia Pacific	7.37	7.91	7.31	7.30	7.63	7.54	0.17	2.27
Total OECD	44.70	44.56	46.55	47.69	47.25	46.53	1.83	4.10
China	14.32	14.00	15.15	15.32	15.46	14.98	0.66	4.64
India	4.97	5.40	4.82	5.29	5.93	5.36	0.39	7.86
Other Asia	8.60	9.05	9.59	9.07	8.89	9.15	0.55	6.40
Latin America	6.29	6.39	6.34	6.61	6.56	6.48	0.18	2.89
Middle East	7.99	8.29	8.01	8.49	8.20	8.25	0.26	3.31
Africa	4.27	4.57	4.19	4.28	4.61	4.41	0.14	3.27
Russia	3.57	3.67	3.47	3.62	3.79	3.64	0.07	1.83
Other Eurasia	1.21	1.25	1.28	1.17	1.32	1.25	0.05	3.72
Other Europe	0.75	0.80	0.73	0.74	0.81	0.77	0.02	2.18
Total Non-OECD	51.98	53.43	53.60	54.60	55.56	54.30	2.32	4.46
Total World	96.68	97.99	100.15	102.29	102.81	100.83	4.15	4.29
Previous Estimate	96.57	96.83	98.71	101.17	102.62	99.86	3.28	3.40
Revision	0.11	1.16	1.44	1.12	0.19	0.98	0.87	0.89

Note: * 2021-2022 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.

Non-OPEC Liquids Production

Non-OPEC liquids production	2021	1Q22	2Q22	3Q22	4Q22	2022	Change 2022/21	
							Growth	%
Americas	25.11	25.88	26.00	26.09	26.50	26.12	1.01	4.03
of which US	17.69	18.23	18.56	18.42	18.76	18.49	0.81	4.57
Europe	3.86	4.07	3.96	4.02	4.34	4.09	0.24	6.12
Asia Pacific	0.51	0.56	0.55	0.55	0.55	0.55	0.04	7.49
Total OECD	29.48	30.51	30.52	30.66	31.39	30.77	1.29	4.37
China	4.25	4.25	4.25	4.29	4.37	4.29	0.04	1.02
India	0.75	0.77	0.79	0.82	0.84	0.81	0.05	6.90
Other Asia	2.48	2.47	2.44	2.42	2.40	2.43	-0.05	-2.01
Latin America	6.17	6.52	6.46	6.40	6.61	6.50	0.33	5.36
Middle East	3.23	3.31	3.32	3.33	3.33	3.32	0.09	2.89
Africa	1.36	1.30	1.28	1.25	1.22	1.26	-0.10	-7.43
Russia	10.78	11.51	11.83	11.88	11.88	11.78	1.00	9.27
Other Eurasia	2.95	3.09	3.11	3.15	3.22	3.14	0.19	6.35
Other Europe	0.11	0.10	0.10	0.10	0.09	0.10	-0.01	-7.35
Total Non-OECD	32.08	33.32	33.57	33.64	33.98	33.63	1.55	4.82
Total Non-OPEC production	61.57	63.83	64.09	64.30	65.37	64.40	2.83	4.60
Processing gains	2.28	2.39	2.39	2.39	2.39	2.39	0.11	4.91
Total Non-OPEC liquids production	63.85	66.22	66.48	66.69	67.76	66.79	2.95	4.61
Previous estimate	64.00	66.39	66.63	66.83	67.89	66.94	2.94	4.60
Revision	-0.15	-0.17	-0.15	-0.14	-0.13	-0.15	0.00	0.02

Note: * 2021-2022 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.

OPEC Crude Oil Production

Table 5 - 6: OPEC crude oil production based on secondary sources, tb/d

Secondary sources	2019	2020	4Q20	1Q21	2Q21	Jun 21	Jul 21	Aug 21	Change Aug/Jul
Algeria	1,022	897	857	870	886	902	911	920	9
Angola	1,401	1,255	1,172	1,141	1,110	1,103	1,067	1,110	43
Congo	324	288	273	271	263	264	262	249	-14
Equatorial Guinea	117	115	112	107	109	110	101	101	0
Gabon	208	195	191	185	186	176	180	180	1
IR Iran	2,356	1,988	2,003	2,214	2,443	2,470	2,493	2,485	-8
Iraq	4,678	4,049	3,817	3,881	3,940	3,926	3,965	4,056	90
Kuwait	2,687	2,432	2,293	2,328	2,356	2,383	2,424	2,441	17
Libya	1,097	367	911	1,175	1,151	1,163	1,158	1,163	5
Nigeria	1,786	1,579	1,434	1,413	1,423	1,401	1,385	1,271	-114
Saudi Arabia	9,794	9,182	8,962	8,445	8,503	8,906	9,420	9,488	69
UAE	3,094	2,802	2,515	2,610	2,644	2,681	2,722	2,777	55
Venezuela	796	500	408	517	511	544	523	523	0
Total OPEC	29,361	25,650	24,948	25,156	25,525	26,029	26,611	26,762	151

Notes: Totals may not add up due to independent rounding, given available secondary sources to date. Source: OPEC.

Table 5 - 7: OPEC crude oil production based on direct communication, tb/d

Direct communication	2019	2020	4Q20	1Q21	2Q21	Jun 21	Jul 21	Aug 21	Change Aug/Jul
Algeria	1,023	899	862	874	886	901	915	921	6
Angola	1,373	1,271	1,186	1,136	1,125	1,073	1,103	1,129	26
Congo	329	300	285	275	264	262	247	272	25
Equatorial Guinea	110	114	106	104	99	100	100	101	1
Gabon	218	207	178	183	179	183	185	179	-6
IR Iran	..	..	..	..	..	..	..	..	..
Iraq	4,576	3,997	3,796	3,846	3,890	3,862	3,886	3,961	75
Kuwait	2,678	2,438	2,293	2,327	2,355	2,384	2,423	2,445	22
Libya	..	389	972	1,214	1,213	1,243	1,273	1,223	-50
Nigeria	1,737	1,493	1,301	1,404	1,343	1,313	1,323	1,239	-85
Saudi Arabia	9,808	9,213	8,975	8,473	8,535	8,928	9,474	9,562	88
UAE	3,058	2,779	2,501	2,610	2,645	2,681	2,722	2,768	46
Venezuela	1,013	569	463	533	556	633	614	641	27
Total OPEC	..	..	..	..	..	..	..	..	..

Notes: .. Not available. Totals may not add up due to independent rounding. Source: OPEC.

Market Balance by OPEC

Table 10 - 1: Supply/demand balance for 2021*, mb/d

	2020	1Q21	2Q21	3Q21	4Q21	2021	Change 2021/20
(a) World oil demand	90.73	92.82	95.62	98.46	99.70	96.68	5.96
Non-OPEC liquids production	62.93	62.43	63.22	64.13	65.56	63.85	0.92
OPEC NGL and non-conventionals	5.05	5.11	5.11	5.22	5.23	5.17	0.12
(b) Total non-OPEC liquids production and OPEC NGLs	67.98	67.54	68.33	69.36	70.79	69.01	1.04
Difference (a-b)	22.75	25.28	27.29	29.10	28.92	27.67	4.92
OPEC crude oil production	25.65	25.16	25.53				
Balance	2.90	-0.12	-1.77				

Note: * 2021 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.

Table 10 - 2: Supply/demand balance for 2022*, mb/d

	2021	1Q22	2Q22	3Q22	4Q22	2022	Change 2022/21
(a) World oil demand	96.68	97.99	100.15	102.29	102.81	100.83	4.15
Non-OPEC liquids production	63.85	66.22	66.48	66.69	67.76	66.79	2.95
OPEC NGL and non-conventionals	5.17	5.25	5.28	5.31	5.33	5.29	0.13
(b) Total non-OPEC liquids production and OPEC NGLs	69.01	71.47	71.76	72.00	73.09	72.09	3.07
Difference (a-b)	27.67	26.52	28.39	30.29	29.71	28.75	1.08

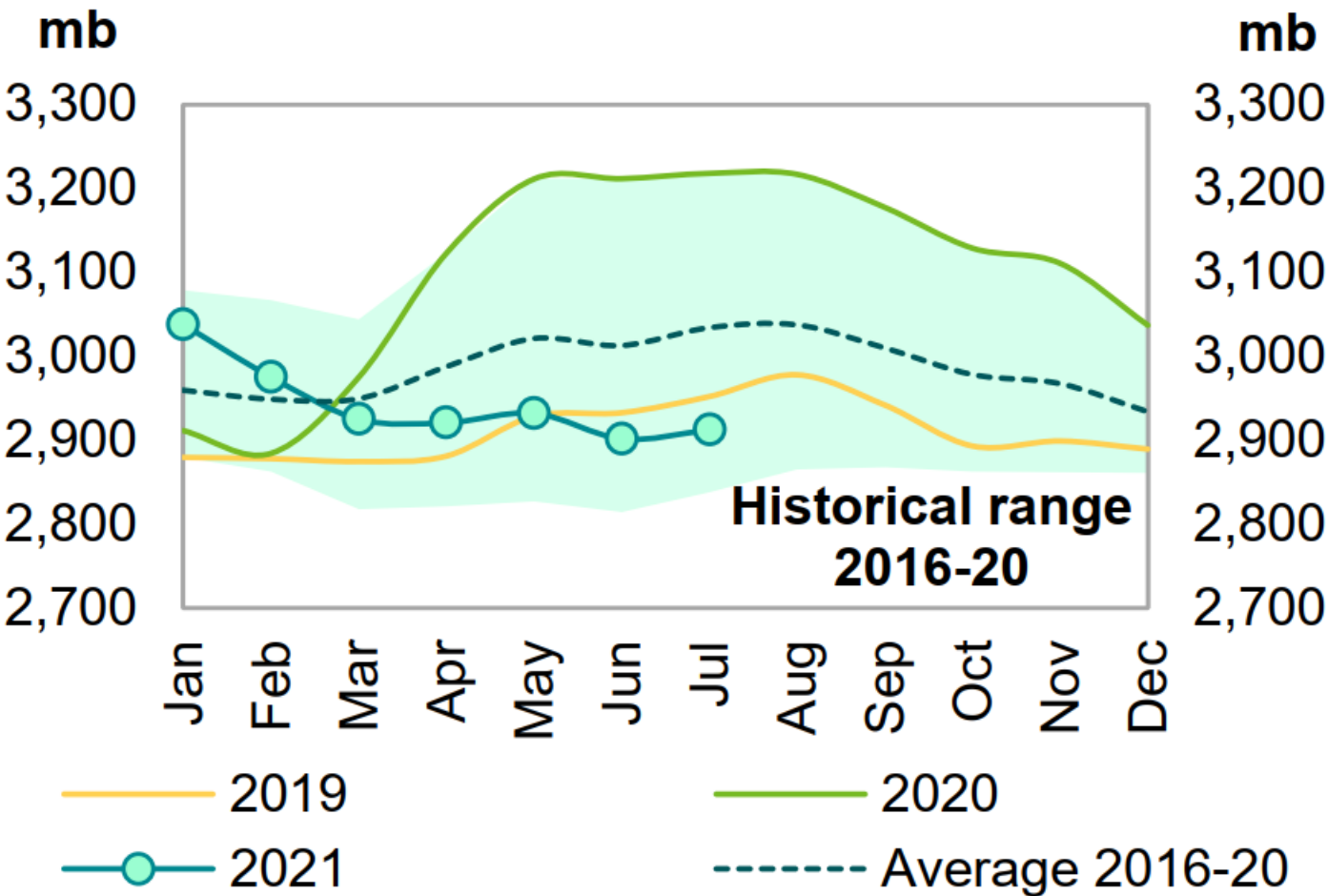
Note: * 2021-2022 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.

Market Balance by IEA

World oil demand and supply (mb/d)

	2019	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	2022	2023	2024	2025	2026
DEMAND																
Total OECD	47.7	45.4	37.6	42.3	43.1	42.1	43.3	43.8	45.4	46.5	44.7	45.8	46.2	46.2	46.0	45.8
Total Non-OECD	52.0	48.3	45.3	50.4	51.7	48.9	50.7	51.1	52.3	52.7	51.7	53.7	55.0	56.1	57.2	58.3
Total Demand ¹	99.7	93.8	82.9	92.7	94.7	91.0	93.9	94.9	97.7	99.2	96.5	99.4	101.2	102.3	103.2	104.1
SUPPLY																
Total OECD	28.5	29.9	26.9	27.1	27.8	27.9	27.8	28.1	28.3	28.7	28.2	29.0	29.6	29.9	29.9	29.7
Total Non-OECD	32.0	32.3	30.0	29.7	29.9	30.5	30.3	30.8	30.8	30.7	30.6	31.5	32.0	32.0	32.1	32.1
Processing Gains ²	2.4	2.3	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.4	2.4	2.4	2.5	2.5
Global Biofuels	2.8	2.2	2.5	3.1	2.6	2.6	2.3	2.9	3.2	2.9	2.8	3.0	3.1	3.2	3.3	3.3
Total Non-OPEC ³	65.6	66.7	61.3	61.9	62.4	63.1	62.5	63.9	64.5	64.6	63.9	66.0	67.1	67.5	67.7	67.6
OPEC																
Crude	29.5	28.2	25.6	24.1	24.9	25.7										
OPEC NGLs	5.4	5.4	5.2	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.5	5.5	5.6	5.6	5.7
Total OPEC ³	34.9	33.6	30.8	29.2	30.0	30.9										
Total Supply	100.5	100.2	92.1	91.1	92.4	93.9										
Memo items:																
Call on OPEC crude + Stock ch. ⁴	28.7	21.7	16.4	25.7	27.2	22.8	26.2	25.7	27.9	29.3	27.3	28.0	28.6	29.2	29.9	30.8

OECD Commercial Stocks



Sources: Argus, EIA, Euroilstock, IEA, METI and OPEC.



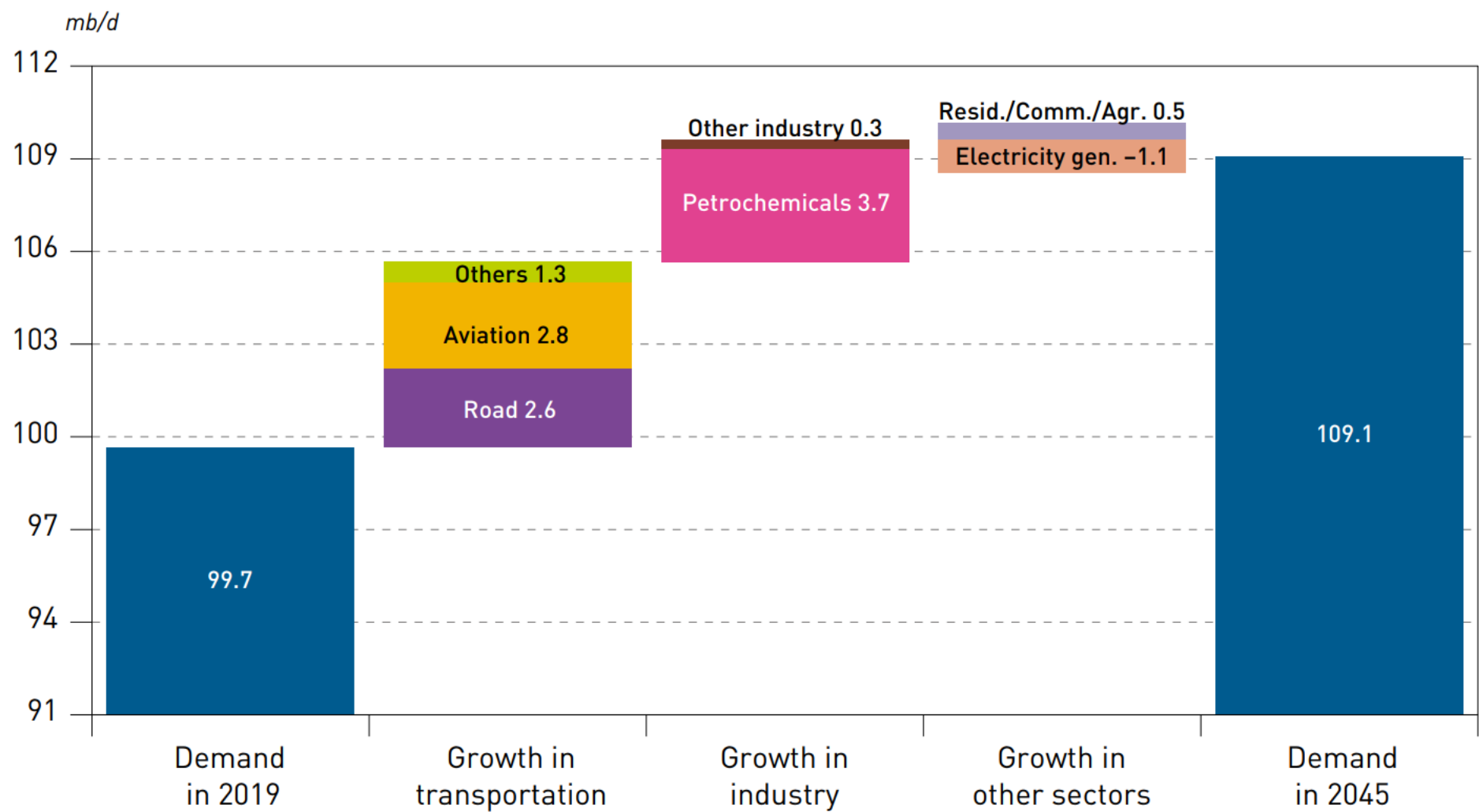
Long-term Oil Demand Outlook by Region

								Growth
	2019	2020	2025	2030	2035	2040	2045	2019–2045
OECD Americas	25.6	23.3	25.7	24.8	23.1	21.2	19.3	–6.3
OECD Europe	14.3	12.6	13.7	12.9	12.0	11.1	10.2	–4.1
OECD Asia Oceania	7.9	7.1	7.4	6.9	6.4	5.8	5.2	–2.7
OECD	47.9	43.0	46.8	44.6	41.5	38.0	34.8	–13.1
Latin America	6.2	5.8	6.6	7.1	7.4	7.6	7.9	1.6
Middle East & Africa	4.3	3.9	4.8	5.5	6.2	6.9	7.6	3.3
India	4.8	4.3	5.8	7.2	8.6	9.9	11.1	6.3
China	13.1	12.1	14.4	15.5	16.2	16.7	17.1	4.0
Other Asia	9.0	8.5	9.9	10.9	11.7	12.4	13.0	3.9
OPEC	8.7	8.2	9.5	10.5	11.3	11.7	11.7	3.0
Russia	3.6	3.2	3.7	3.8	3.8	3.8	3.7	0.1
Other Eurasia	2.0	1.8	2.1	2.2	2.3	2.3	2.3	0.2
Non-OECD	51.8	47.8	56.9	62.6	67.4	71.2	74.3	22.5
World	99.7	90.7	103.7	107.2	108.9	109.3	109.1	9.4

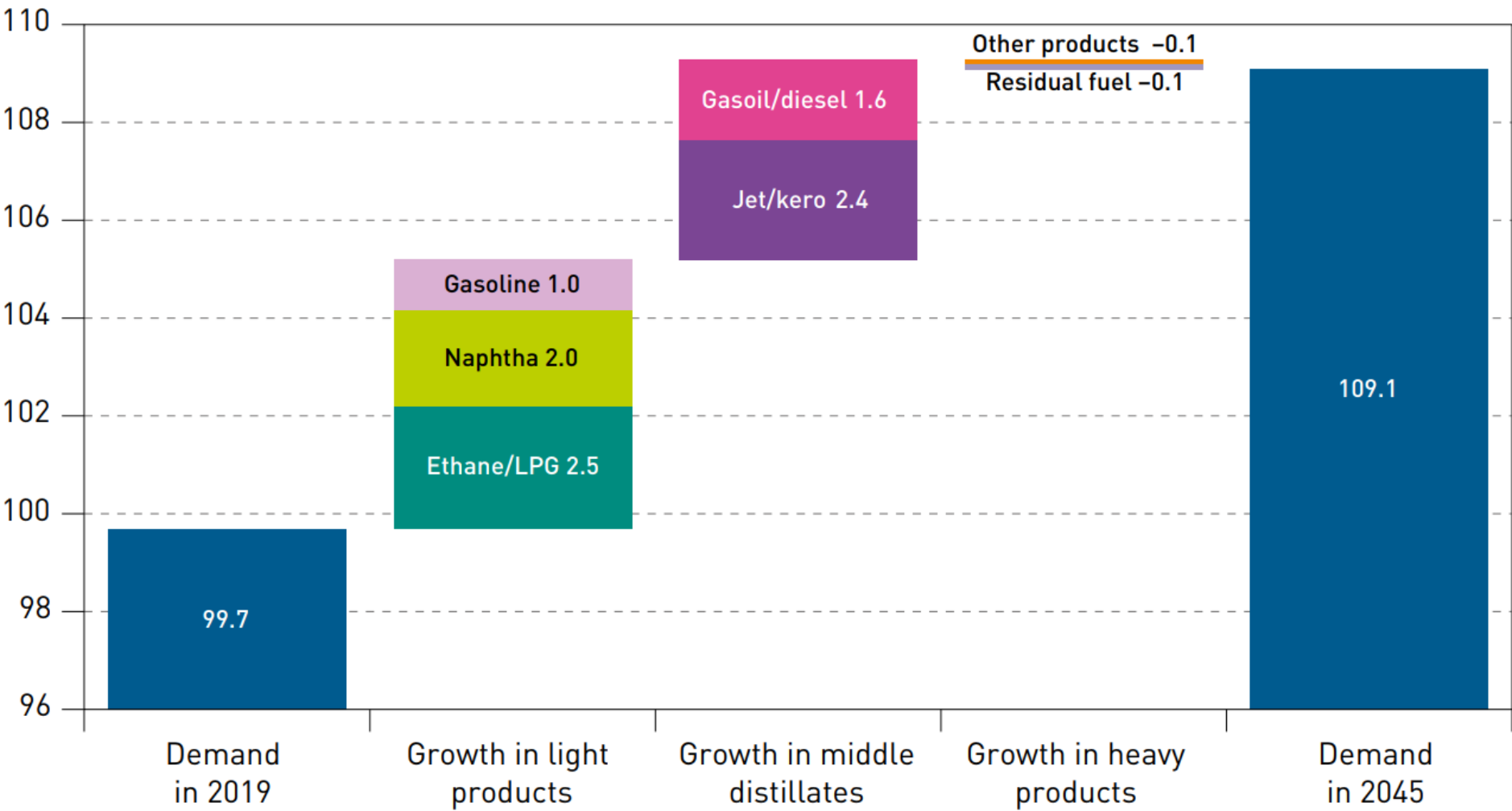
Long-term Oil Demand Outlook by Sector

								Growth
	2019	2020	2025	2030	2035	2040	2045	2019–2045
Road	44.4	40.1	46.3	46.9	47.1	47.1	47.0	2.6
Aviation	6.7	3.5	7.1	7.7	8.4	8.9	9.4	2.8
Rail/waterways	1.9	1.8	1.9	2.0	2.1	2.1	2.0	0.2
Marine bunkers	4.2	4.0	4.4	4.6	4.7	4.7	4.6	0.5
Transportation	57.2	49.4	59.7	61.2	62.2	62.8	63.2	6.0
Petrochemicals	13.7	12.9	14.7	15.9	16.7	17.0	17.3	3.7
Other industry	12.8	12.7	13.0	13.5	13.5	13.3	13.1	0.3
Industry	26.5	25.6	27.8	29.4	30.2	30.3	30.4	4.0
Resid./Comm./Agric.	11.1	10.8	11.4	12.0	12.2	12.1	11.6	0.5
Electricity generation	4.9	4.9	4.8	4.6	4.3	4.1	3.9	–1.1
Other uses	16.0	15.7	16.1	16.6	16.5	16.1	15.5	–0.5
World	99.7	90.7	103.7	107.2	108.9	109.3	109.1	9.4

Oil Demand Growth By Sector



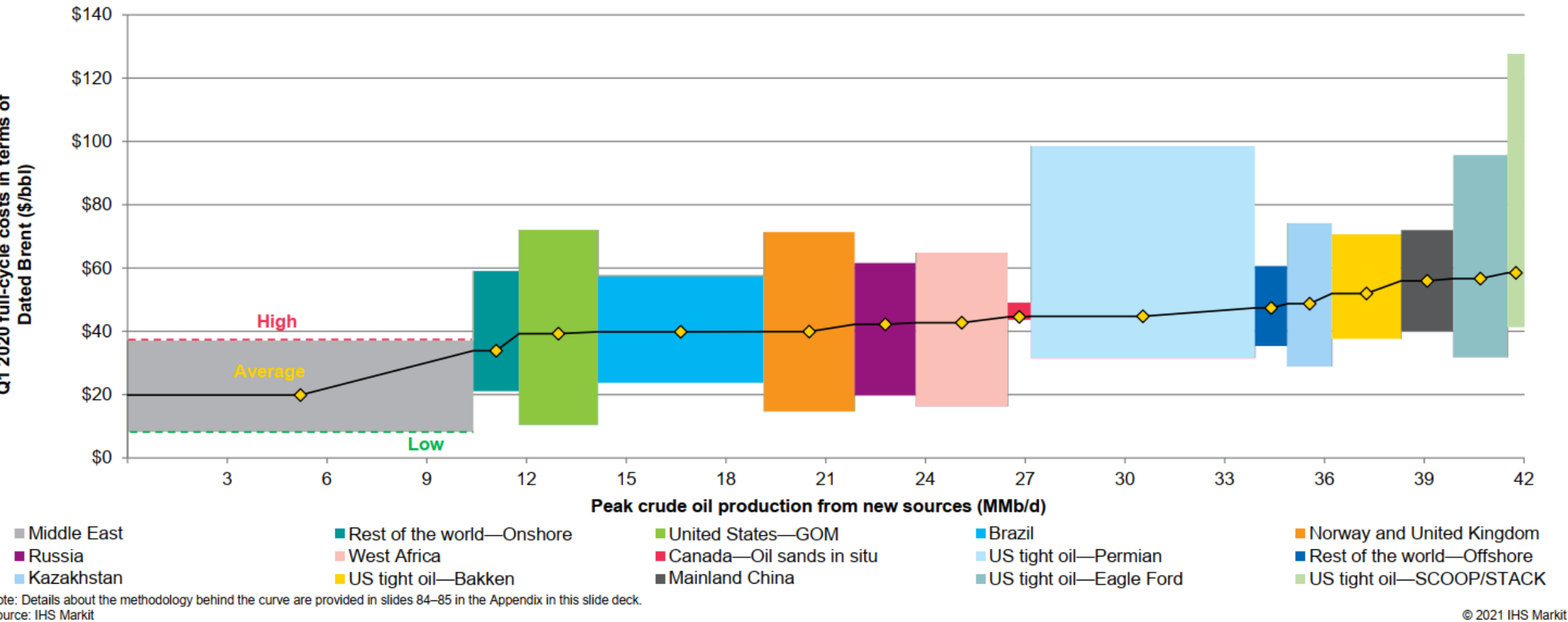
Demand Growth By Product Category



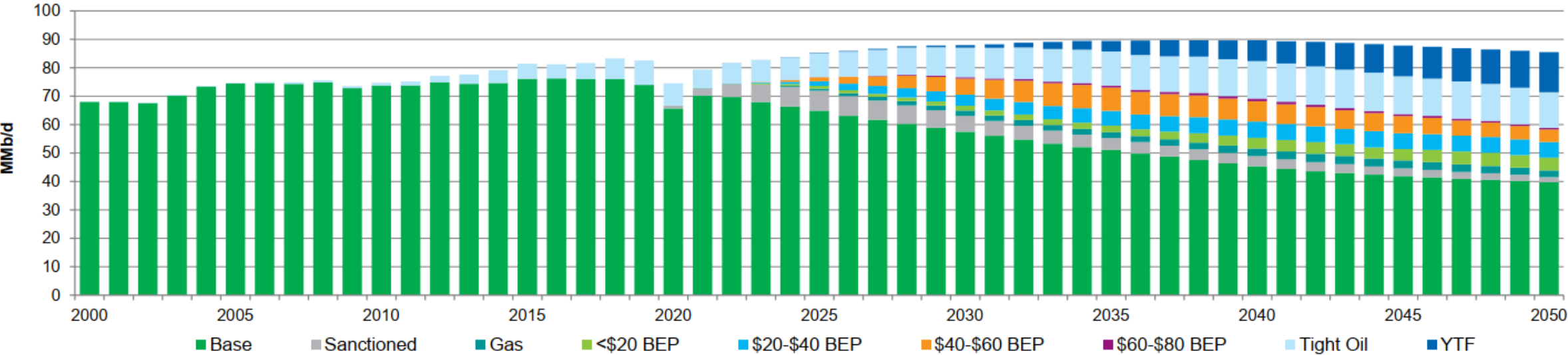
Long-term Global Liquids Supply Outlook

	2019	2020	2025	2030	2035	2040	2045	Change 2019–2045
OECD	30.0	28.5	32.5	32.3	30.8	29.1	27.7	–2.3
<i>of which: US</i>	18.4	17.0	19.8	20.3	19.1	17.7	16.6	–1.8
<i>of which: tight liquids</i>	11.7	10.9	14.5	15.8	15.4	14.3	13.3	1.6
Non-OECD	32.8	31.2	35.9	36.7	36.5	35.7	34.7	2.0
Processing gains	2.3	2.1	2.4	2.6	2.7	2.8	3.0	0.7
Non-OPEC	65.0	61.8	70.7	71.5	69.9	67.6	65.4	0.4
<i>of which*: crude</i>	45.9	43.5	50.0	48.9	46.0	43.0	40.3	–5.6
<i>NGLs</i>	10.5	10.3	11.3	12.5	13.0	13.2	13.2	2.7
<i>global biofuels</i>	2.5	2.3	2.8	3.1	3.3	3.5	3.6	1.0
<i>other liquids</i>	3.8	3.6	4.3	4.6	4.9	5.1	5.4	1.6
Total OPEC liquids	33.8	30.7	33.2	35.9	39.2	41.9	43.9	10.1
World	98.9	92.4	103.9	107.4	109.1	109.5	109.3	10.4

Cost Curve Of New Global Crude Oil Supply In Select Areas To 2040



Global Crude And Condensate Production By Break-even Price



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US Shale Oil

مجله ی 29 - توصیه های پسران اخبار بین الملل (انرژی)

چگونه ذخایر نامتعارف، تولید انرژی در آمریکا را متحول کرده است؟

انقلاب رُسی

رامین فروزنده

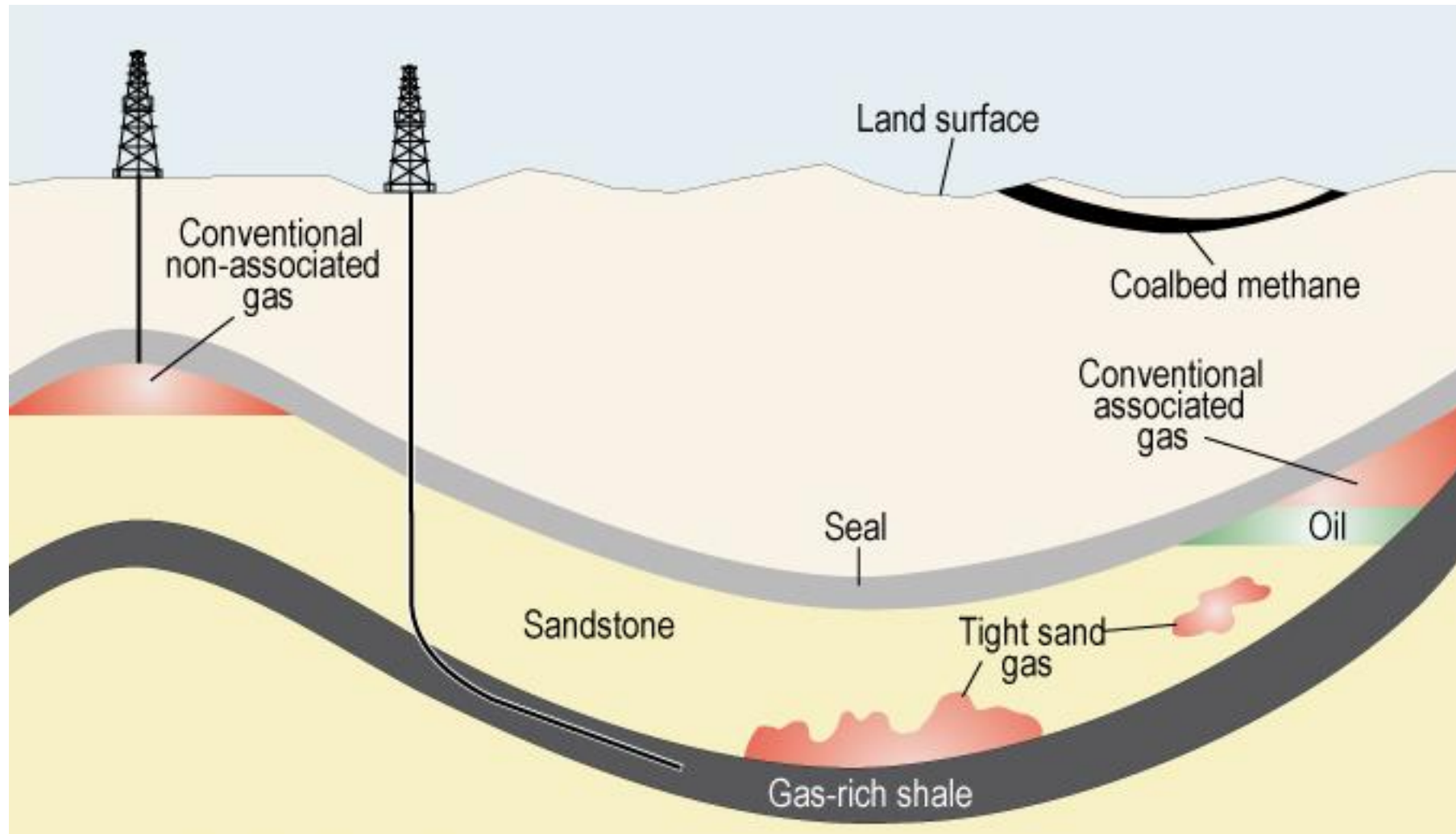
«آمریکا احتمالاً در سال ۲۰۱۳ با پشت سر گذاشتن روسیه و عربستان، به بزرگ‌ترین تولیدکننده سوخت‌های مایع در جهان تبدیل خواهد



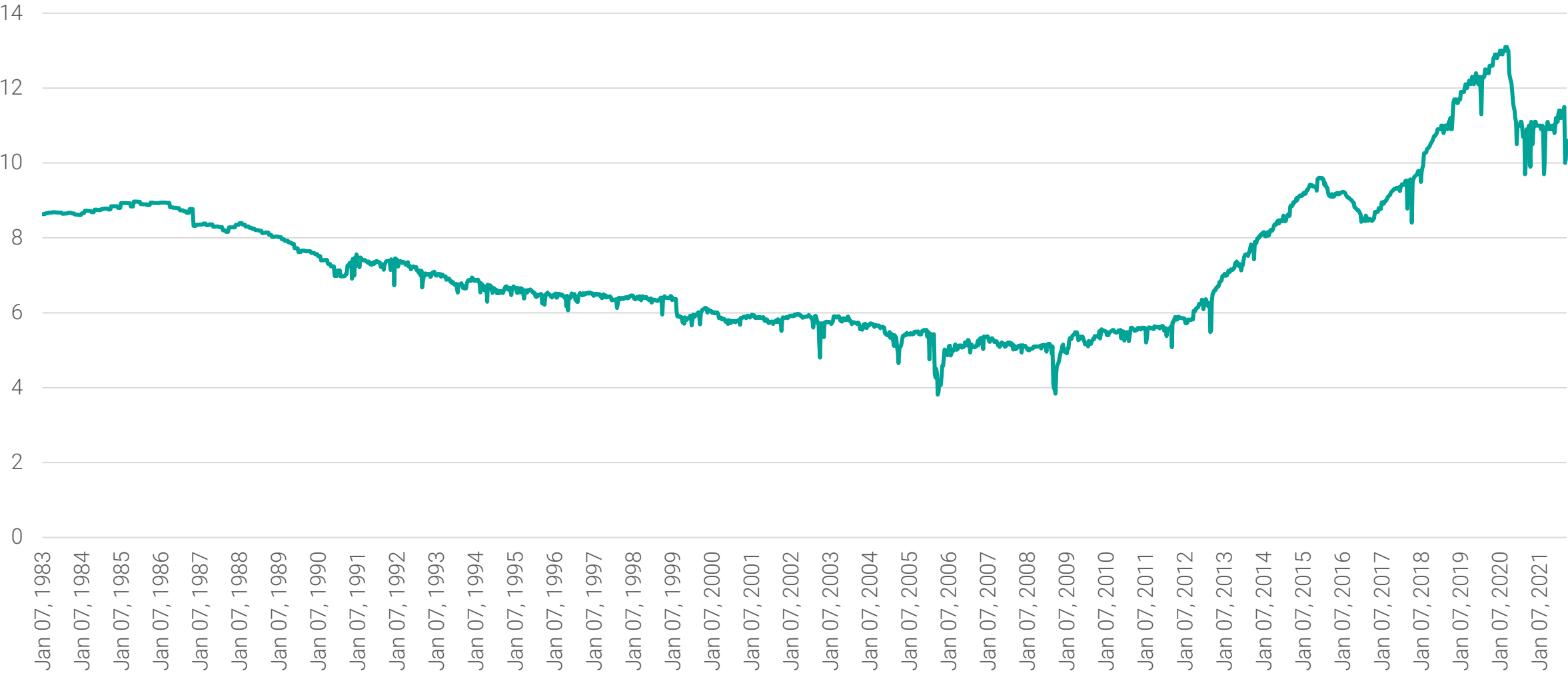
شد.»

«آمریکا احتمالاً در سال 2013 با پشت سر گذاشتن روسیه و عربستان، به بزرگ‌ترین تولیدکننده سوخت‌های مایع در جهان تبدیل خواهد شد.» این جمله، شاید مهم‌ترین پیش‌بینی گزارش جدید شرکت بریتیش پترولیوم باشد؛ به خصوص اگر بدانیم سهم اصلی در افزایش تولید نفت و گاز را در آمریکا، ذخایر نامتعارف خواهند داشت. گزارش چشم‌انداز انرژی 2030 که در اواسط ژانویه سال جدید میلادی منتشر شد، نخستین گزارشی نیست که بر نقش تولید نفت و گاز از منابعی مثل شیل1 (سنگ حاوی ذخایر هیدروکربن که از رُس تشکیل شده است) متمرکز شده است. گفته می‌شود تولید از ذخایر نامتعارف که با افزایش قیمت‌های جهانی انرژی و بهبود فناوری‌های صنعت نفت اقتصادی همراه شده است، چشم‌انداز جدیدی را به روی صنعت نفت و گاز جهان گشوده است که می‌توان از آن به «انقلاب رُسی» یاد کرد.

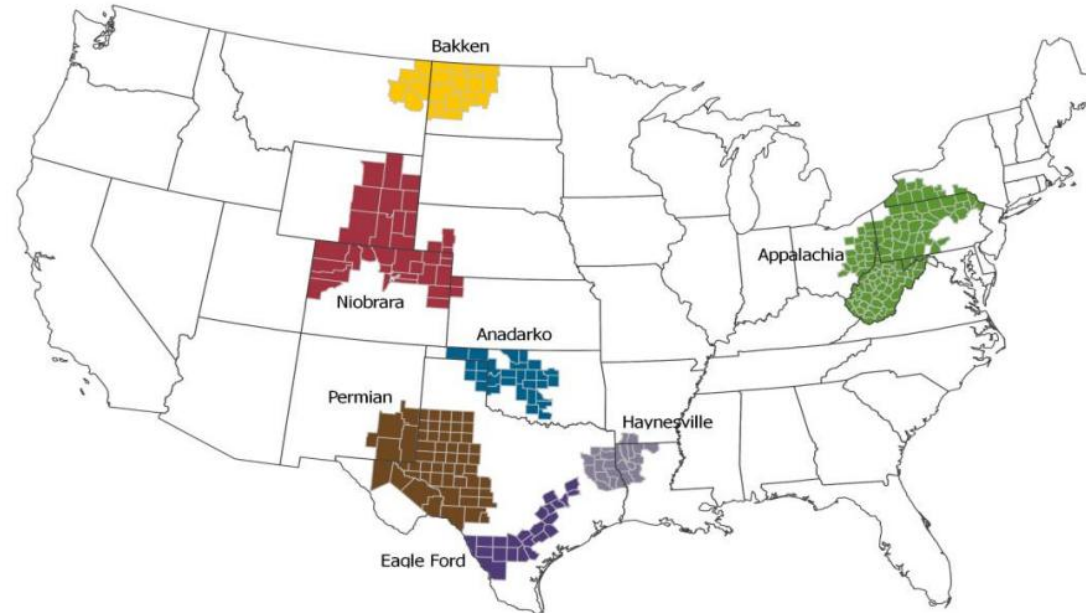
Definition



Weekly US Crude Oil Production (MBPD)



EIA Drilling Productivity Report

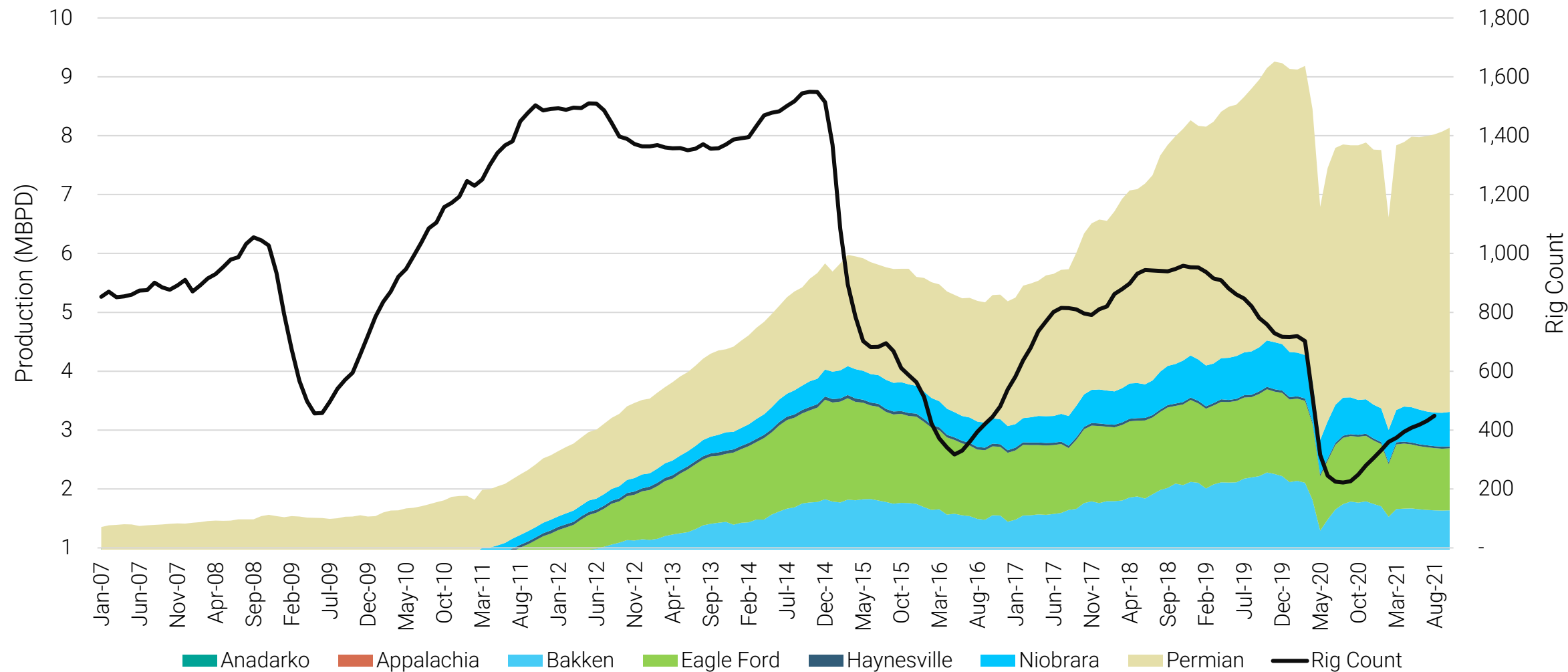


Note:

The DPR rig productivity metric *new-well oil/gas production per rig* can become unstable during periods of rapid decreases or increases in the number of active rigs and well completions. The metric uses a fixed ratio of estimated total production from new wells divided by the region's monthly rig count, lagged by two months. The metric does not represent new-well oil/natural gas production per newly completed well.

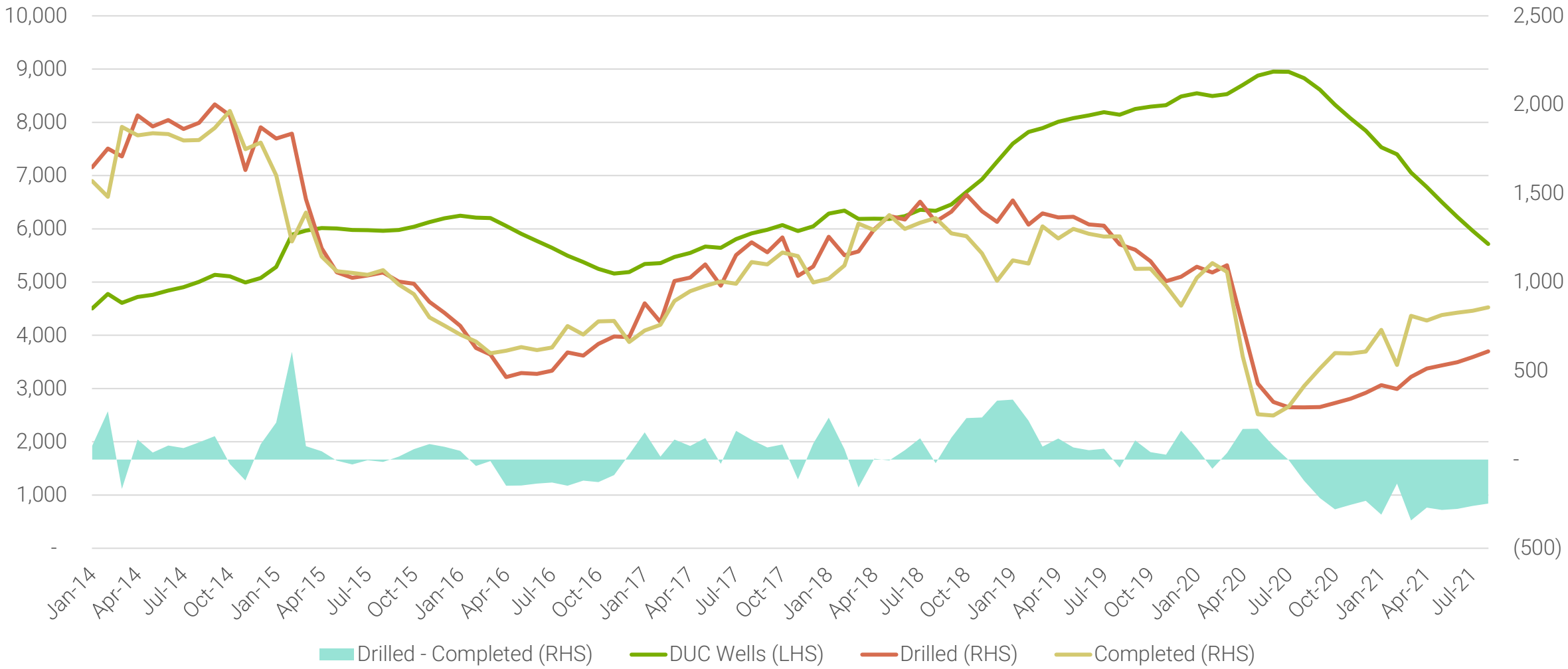
The DPR metric *legacy oil/gas production change* can become unstable during periods of rapid decreases or increases in the volume of well production curtailments or shut-ins. This effect has been observed during winter weather freeze-offs, extreme flooding events, and the 2020 global oil demand contraction. The DPR methodology involves applying smoothing techniques to most of the data series because of inherent noise in the data.

US Tight Oil Production & Total Rig Count

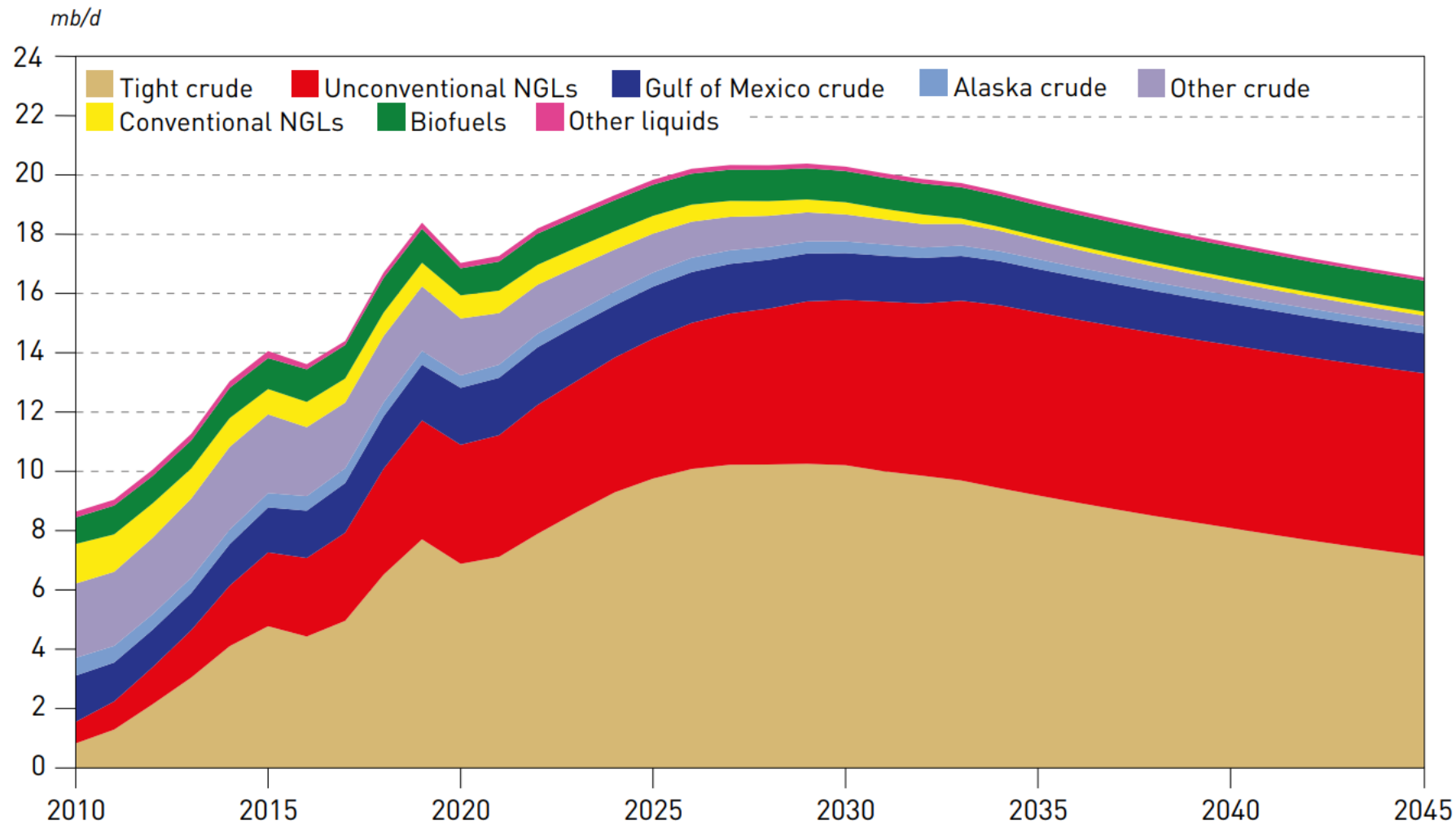


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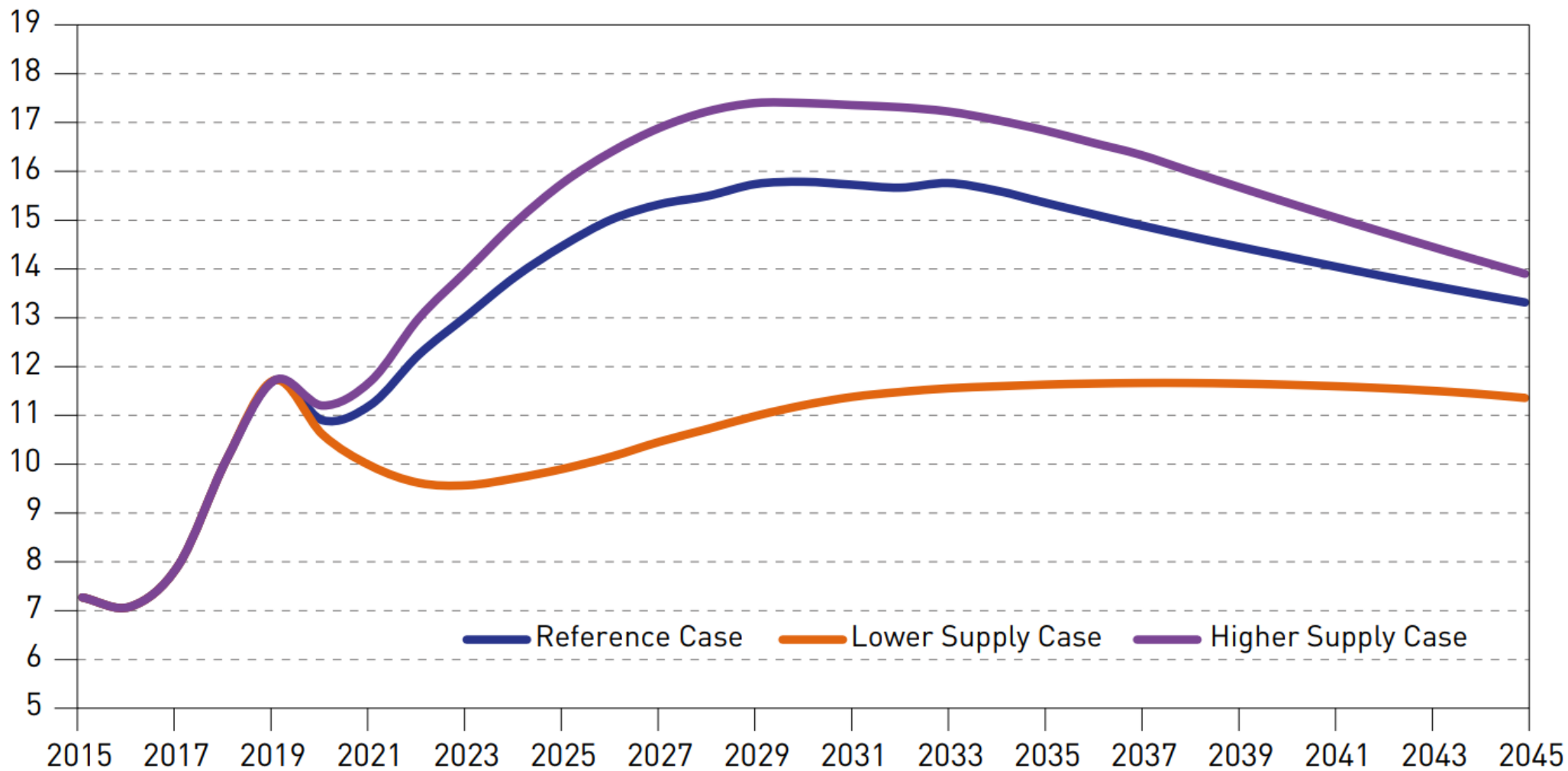
DUC Wells



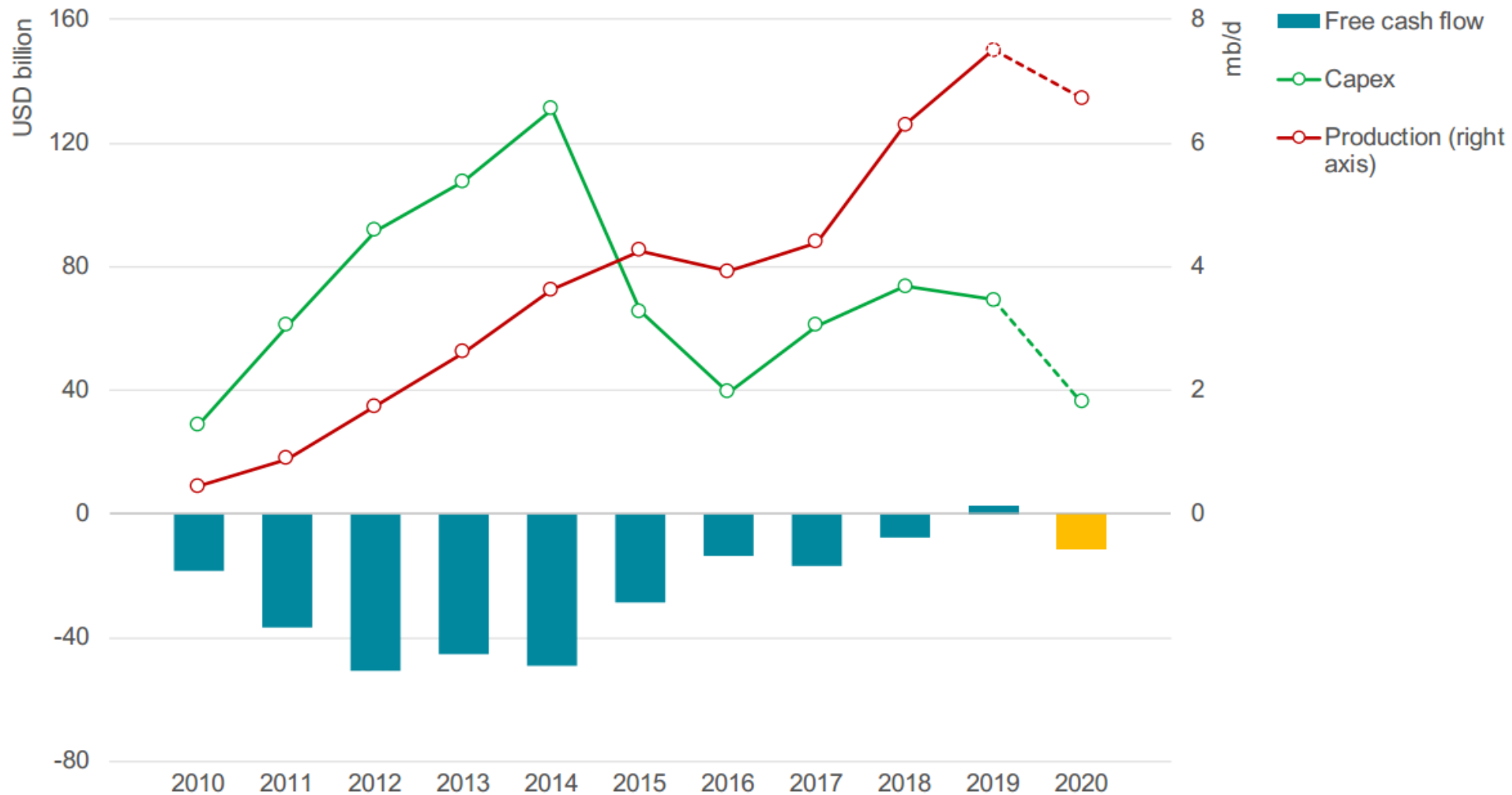
US Liquids Supply Outlook



Long-term US Tight Oil Sensitivities

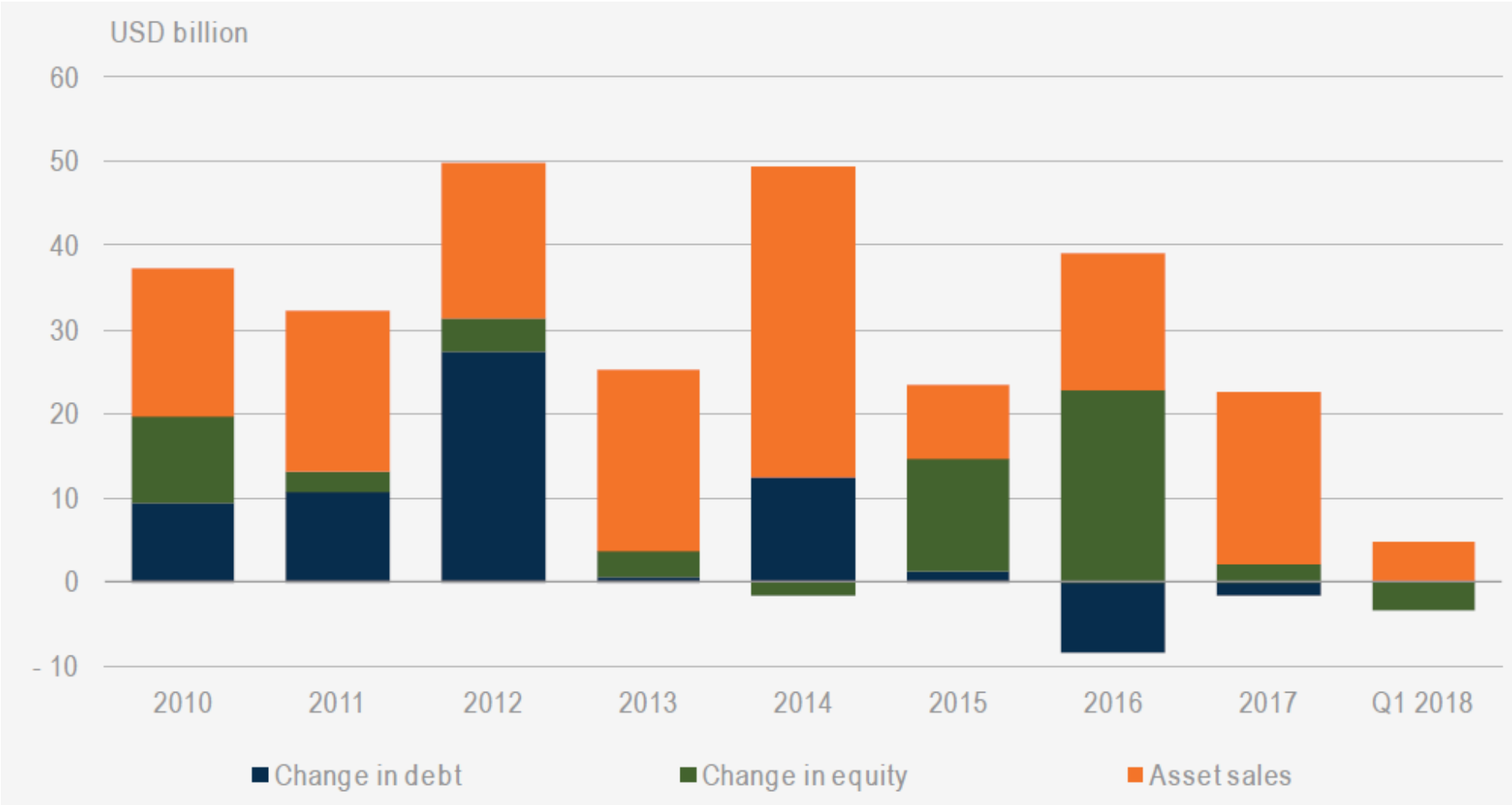


US Tight Oil Production, Investment and FCF



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US Shale Finance



Breakeven Reduction

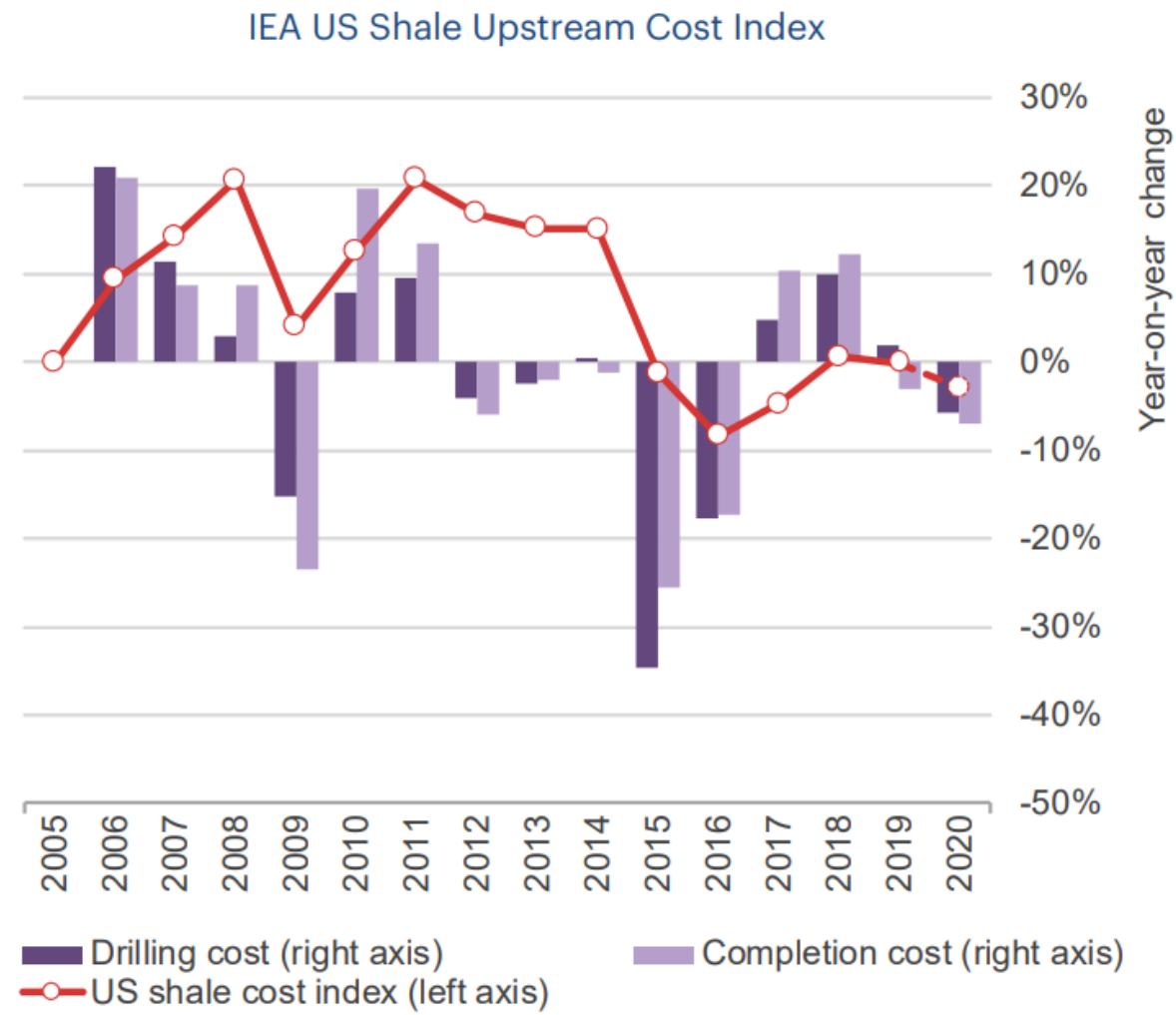
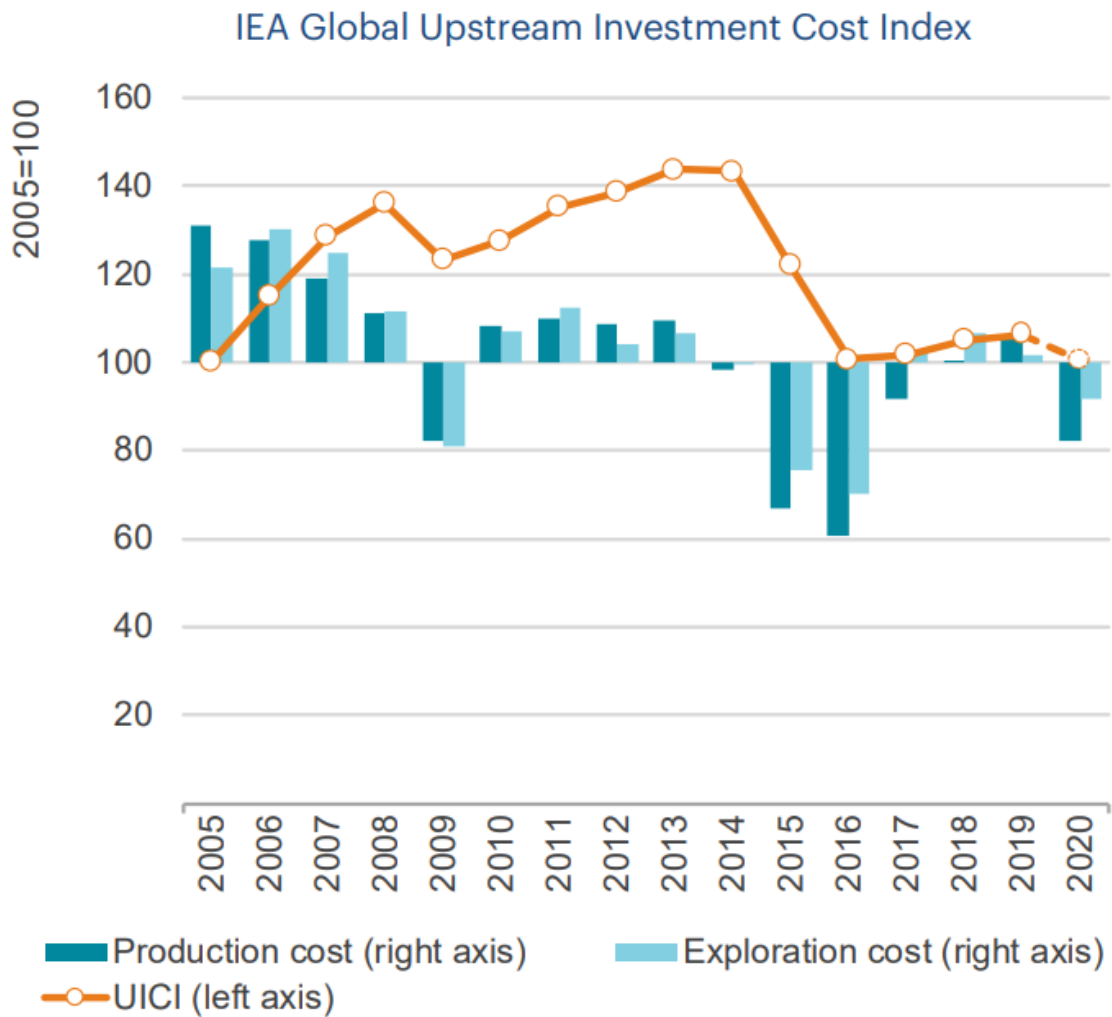
Structural

- Well Productivity
- Drilling & Completion Efficiency

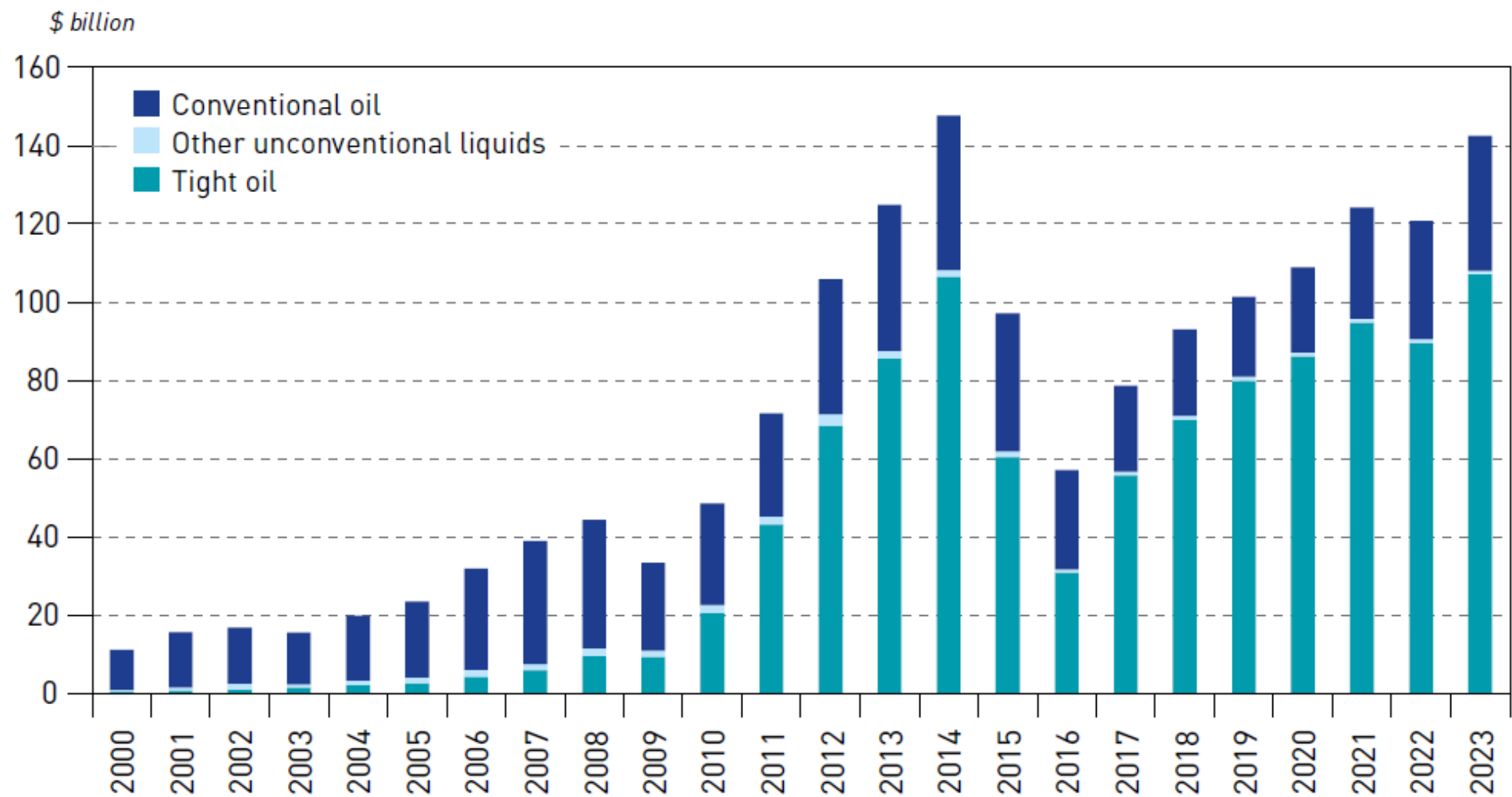
Cyclical

- Cost of Drilling
- High-grading
- Lease Operating Expenses

Upstream Investment Cost Index



US upstream investment



Oil and Energy Companies

BP Business Model



Key Players Classification by IEA

NOC



INOC



Majors



Independents



OFS Co. Schlumberger



Pure Downstream Co



Trading Co. Vitol



The Old and New Seven Sisters

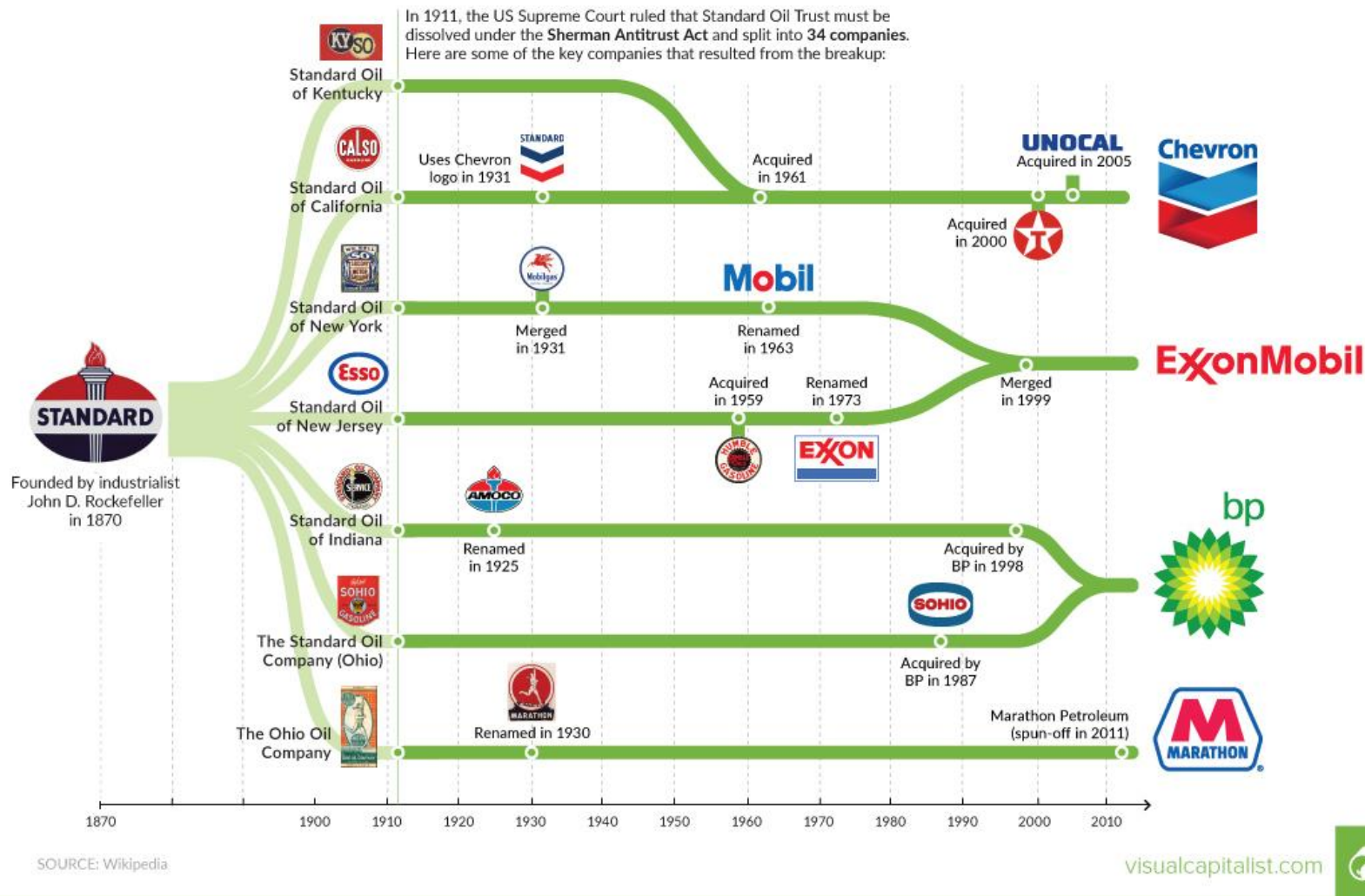
The Old Seven Sisters



The New Seven Sisters



The Evolution of Standard Oil

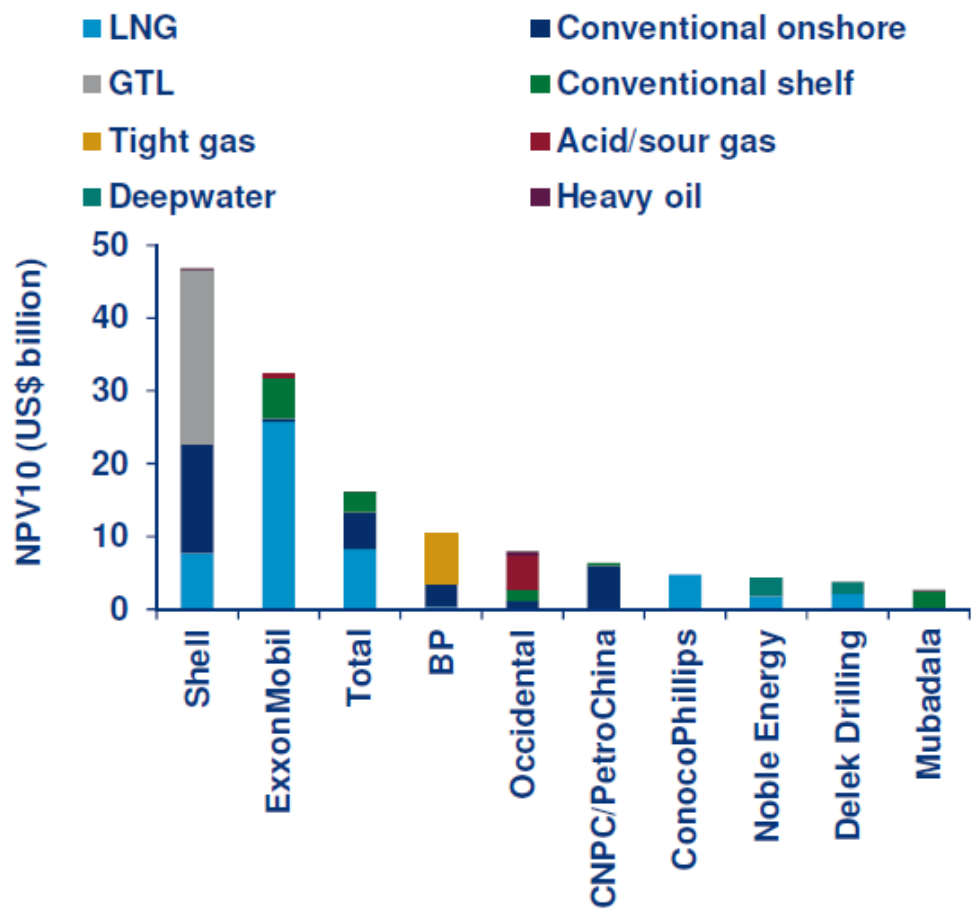


Key Success Factors for Internationalization of NOCs

1. Compelling value proposition
2. Clear and focused strategy
3. Unequivocal shareholder commitment
4. Robust international business development capabilities
5. Rigorous screening and portfolio management
6. Agile decision-making
7. Leveraging cultural and geopolitical advantages
8. Organizational effectiveness

Middle East IOC value

Middle East IOC value by resource theme



Post JCPOA E&P Players in Iran

European majors

Favoured by NIOC for their technology and know-how



European mid-caps

Specific expertise can be a plus for specific mid-size projects



Asians

Political relations and Iran's will to secure market share will help, but technical reputation can disserve some



Russians

Political relations and part of Moscow's strategy to increase its influence in MENA oil and gas



Iranian E&Ps

Name	Major shareholder	Name	Major shareholder
Petro Pars	Government	PEDC	Private sector *
OIEC	Public sector	PGFK	Government
Dana Energy	Private sector	IOEC	Public sector
PEDCO	Government	Kayson	Private sector
MAPNA	Public sector	Iran Ofogh	Private sector
Khatam-ol-Anbia	Public sector	Pars Petro Zagros	Private sector
IDRO	Government	Global Petro Tech	Private sector *
Persia	Public sector	NDCO	Government
Ghadir	Public sector		

Main Decisions

Business model

- What do we want to be known for in the future?

Growth objectives & portfolio structure

- How big do we want to be?

Operatorship targets

- What is our target balance between operatorship and non-operatorship of portfolio assets?

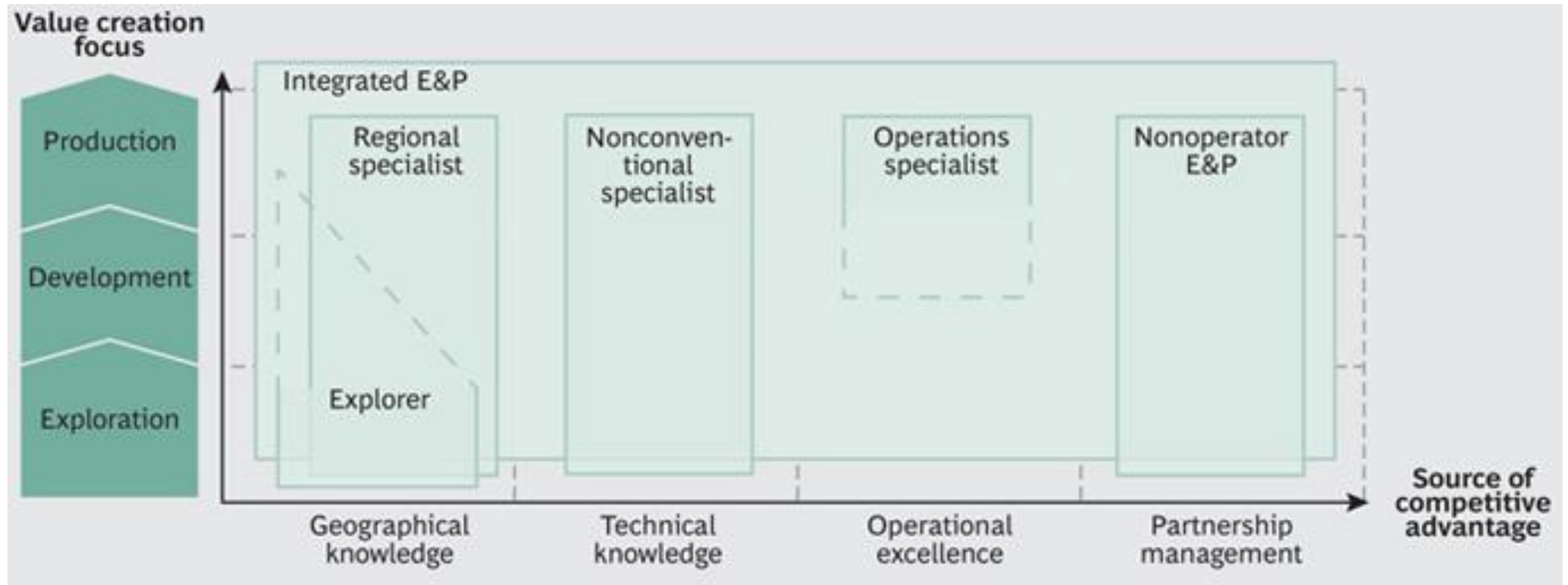
Risk appetite

- What is our appetite for risk?

Financing approach

- What financing approach is needed to support our growth strategy?

6 business models



6 E&P Business Models

Integrated E&P players (Anadarko, Premier Oil, & Apache):

- Balanced portfolio across technologies, geographies, and phases life cycle.

Explorers (Cairn Energy, Kosmos Energy, & Cove Energy)

- Concentrate on exploration of frontier areas and early monetization of discoveries.

Regional specialists (Pacific Rubiales Energy, Afren, & Pluspetrol):

- Specific countries with established presence & high degree of familiarity.

Nonconventional specialists (Chesapeake Energy, Canadian Oil Sands, & Husky Energy):

- Such as heavy oil, shale oil, and oil sands.

Operations specialists (including Perenco, Black Elk Energy, & Occidental Petroleum):

- Efficient extraction from existing fields.

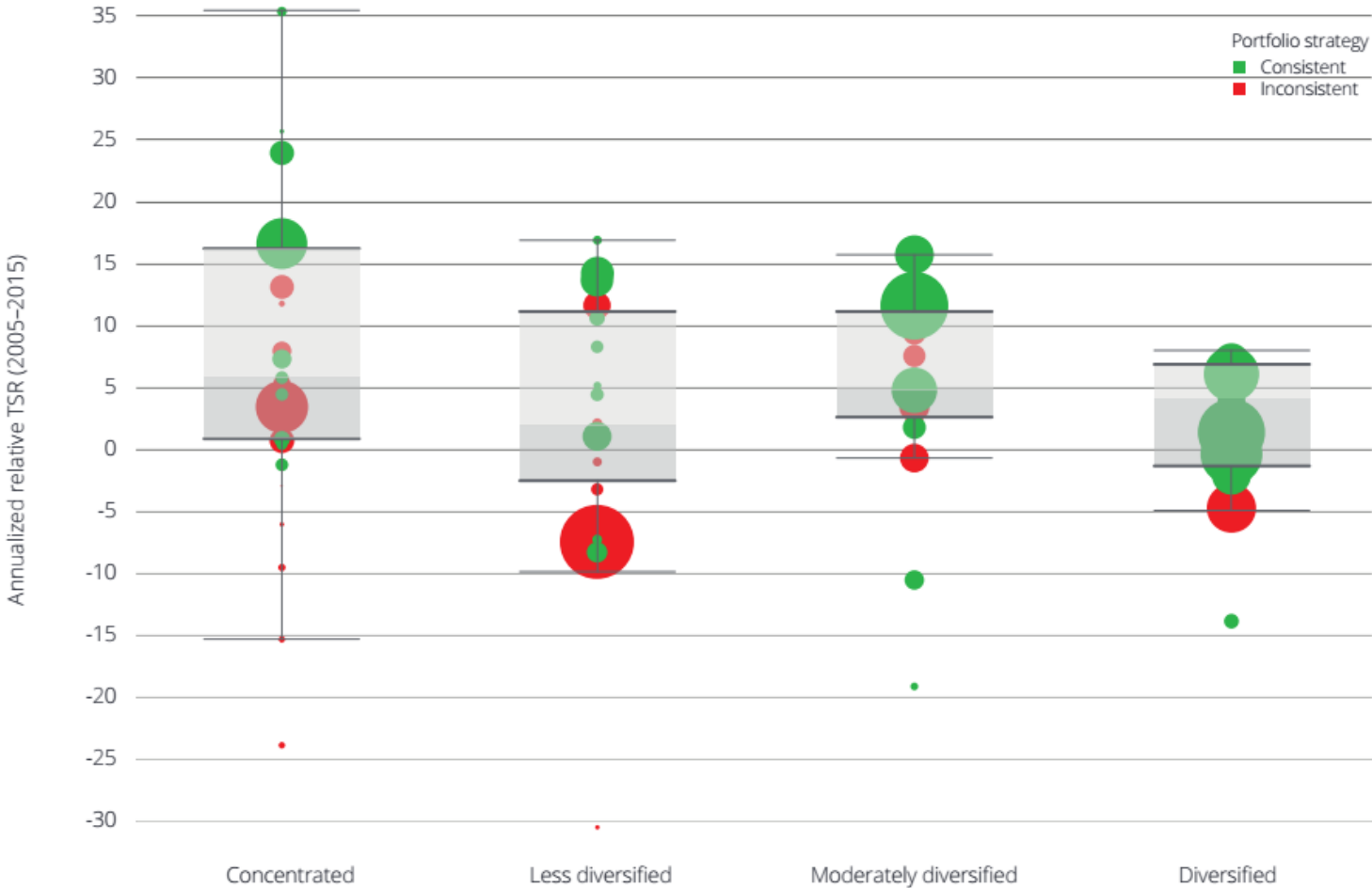
Non-operator E&P players (Mitsui & Co. & Galp Energia)

- Use their relationships with NOC's and governments to gain access to high-quality assets & manage those assets but do not act as operators.

Deloitte Upstream Diversification Index

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- Production Mix
- Region
- Resource
- Basin
- Investment Cycle



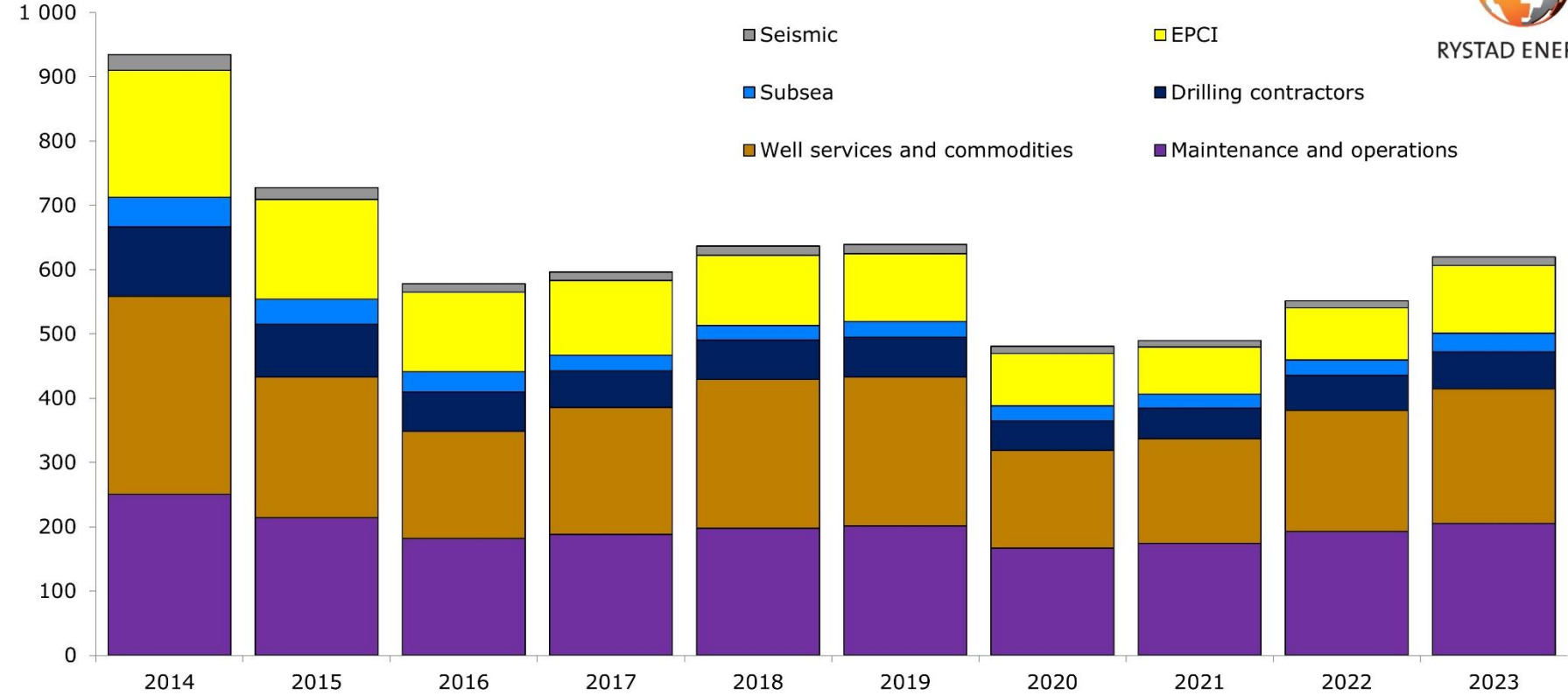
Oil and gas capability areas

Capability Area	Description	Example
E&P value chain	Capabilities with respect to a particular part of the E&P value chain	Occidental Enhanced oil recovery
Core region	Capabilities with respect to operating in a particular geographic area	Lundin Norwegian North Sea
Play types	Capabilities regarding exploration in particular geological play types	Tullow Oil Rift basins, stratigraphic traps
Technology	Capabilities in application of a particular specific technology	Statoil Harsh environments
Operational	Capabilities to combine various technologies and operating practices	EOG U.S. shale plays
Product	Capabilities relating primarily to one particular product	BG Gas value chain
Partnerships	Capabilities in establishing and leveraging partnerships	Wintershall Gazprom partnership
Political situation	Capabilities to operate under particular political circumstances	BP Russia
Commercial situation	Capabilities to secure assets in particular commercial situations	Apache Bilateral negotiations

Oilfield Services Companies

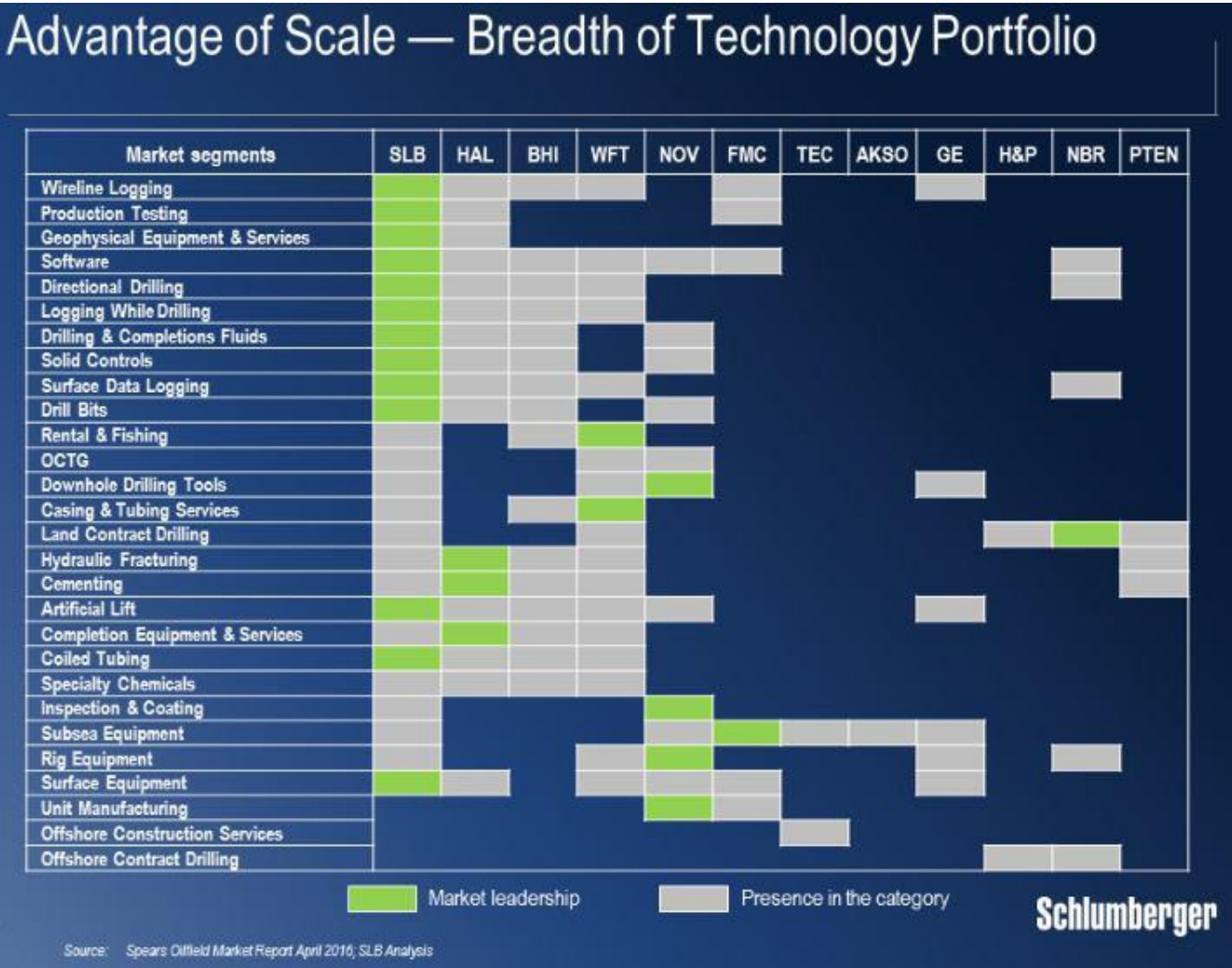
Oilfield Services Market

Oilfield Service yearly demand forecast by segment
Billion USD



Players Portfolio

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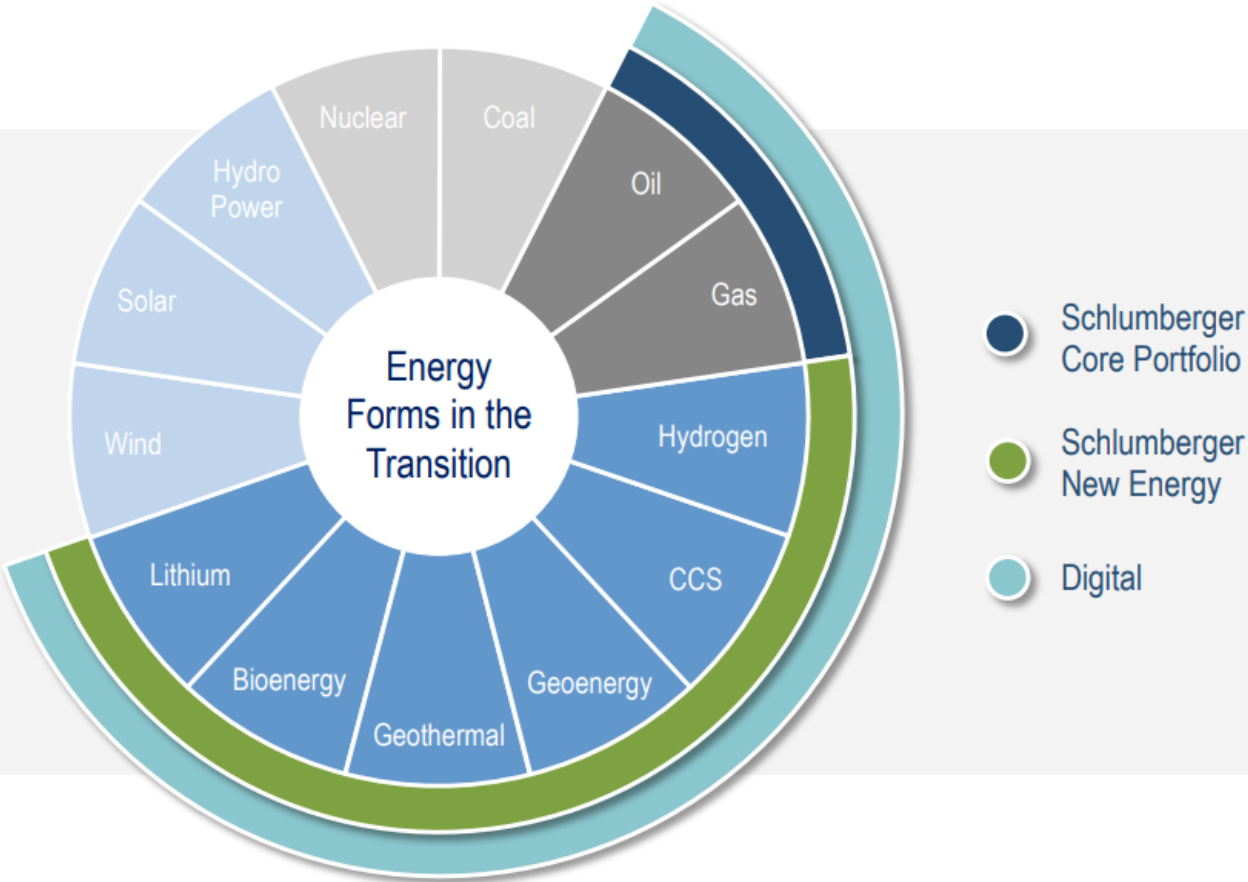


Long-term Growth in Schlumberger New Energy

Diversified
Exposure to multiple adjacent, high-growth sectors

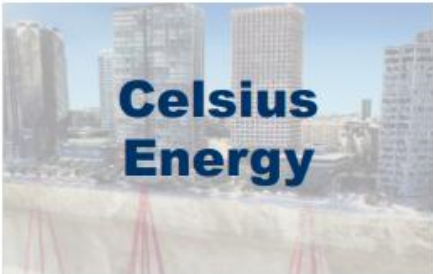
Technology Driven
Leveraging our strengths, combining our global footprint and technology industrialization capabilities

Preferred Partner
Accessing markets with unique partnerships, a strong reputation, and recognized track record as industry leader



Schlumberger New Energy Sectors

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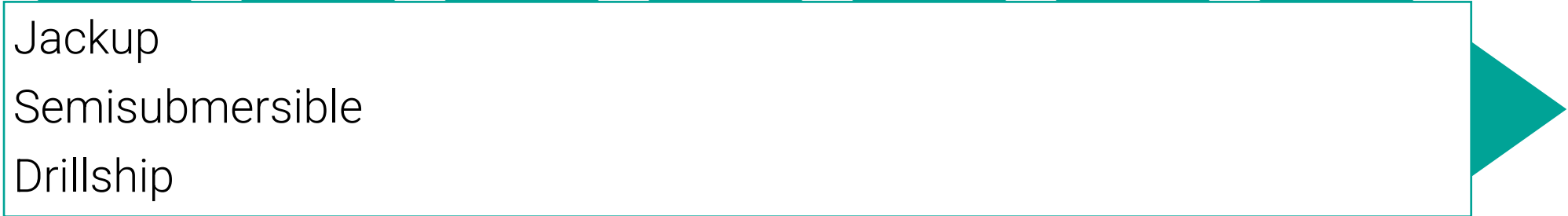
HYDROGEN	CARBON	GEO-ENERGY	GEOTHERMAL	LITHIUM / BATTERIES
 Genvia	 CCS	 Celsius Energy	 GeoFrame Energy	 New Ventures
Commercializing reversible solid oxide electrolyzer technology to produce clean hydrogen	Providing carbon capture and storage solutions to partners with concentrated emission streams	Using geo-energy sources to provide digitally controlled heating and cooling	Leveraging our subsurface and drilling expertise to develop geothermal power projects	Creating a pipeline of ventures such as developing advanced lithium extraction process technology

Land



Drilling
Workover

Offshore



Jackup
Semisubmersible
Drillship

TOP Offshore Rig Contractors

TOP 10 OFFSHORE DRILLING CONTRACTORS BY NUMBER OF RIGS MANAGED (TOTAL RIGS INCLUDES RIGS UNDER CONSTRUCTION)

Company	Total Rigs	Working	Under Construction	US GOM	Latin Am	NW Europe	W Africa	Middle East	Asia/Pacific	Rest of World
Valaris	70	35	2	13	7	15	10	9	12	4
COSL	55	45	0	0	3	3	1	3	45	0
Seadrill	51	19	3	6	5	12	5	6	16	1
Transocean	47	25	2	8	3	15	3	0	7	11
Shelf Drilling	36	29	0	0	0	0	5	16	12	3
Borr Drilling	34	15	7	0	5	5	6	3	15	0
Noble	25	18	0	5	5	5	0	6	3	1
PDVSA	23	4	0	0	23	0	0	0	0	0
Maersk Drilling	22	13	0	1	1	12	2	0	4	2
ADNOC Drilling	20	18	0	0	0	0	0	20	0	0
Top Ten Total	383	221	14	33	52	67	32	63	114	22
Entire Fleet	914	466	80	72	147	90	61	172	309	63
Top Ten % of Total	41.9%	47.4%	17.5%	45.8%	35.4%	74.4%	52.5%	36.6%	36.9%	34.9%

Notes: Rig Types: Arctic, drill barges (but not inland barges), drillships, jackups, semisubmersibles, submersibles, and tender-assists.

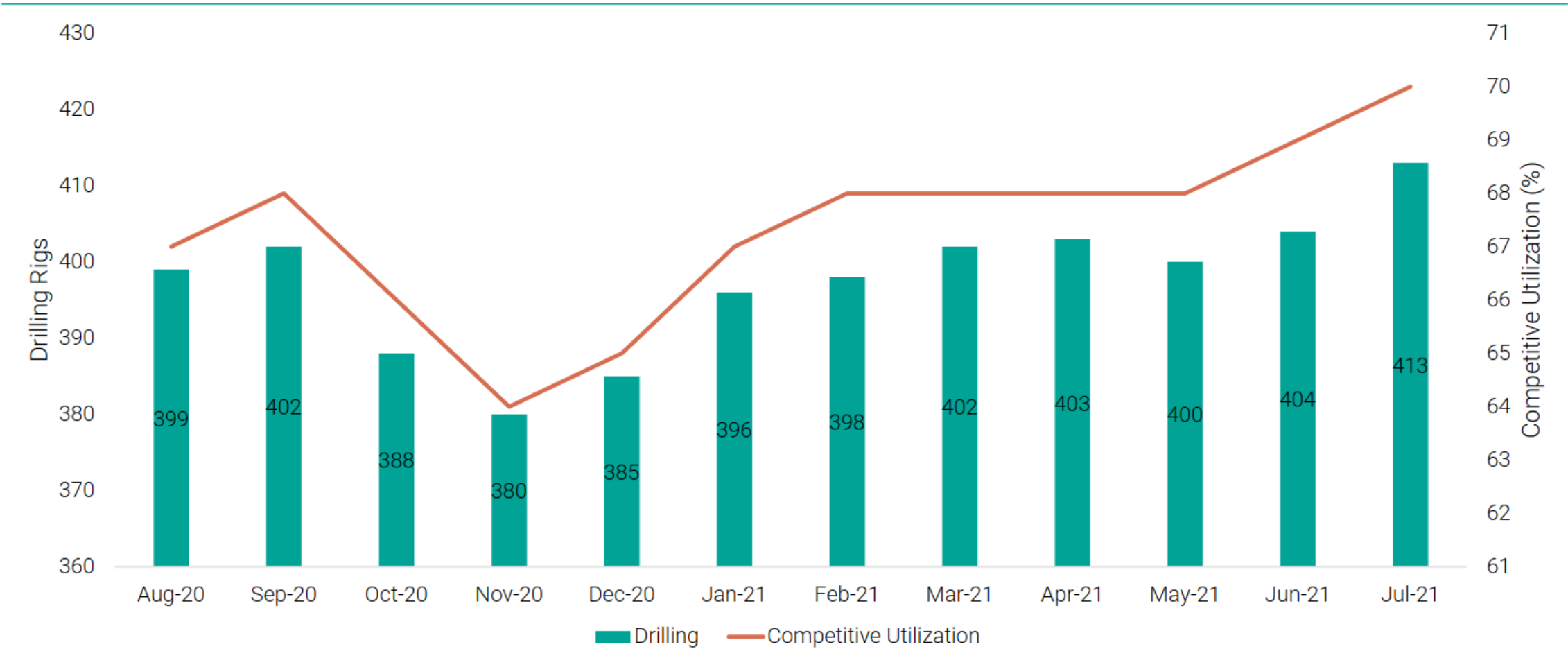
Rigs en route between regions are shown in the destination region.

Latin America includes all South America, Central America, Caribbean, and Mexico.

Seadrill numbers do not include rigs owned and managed by North Atlantic Drilling.

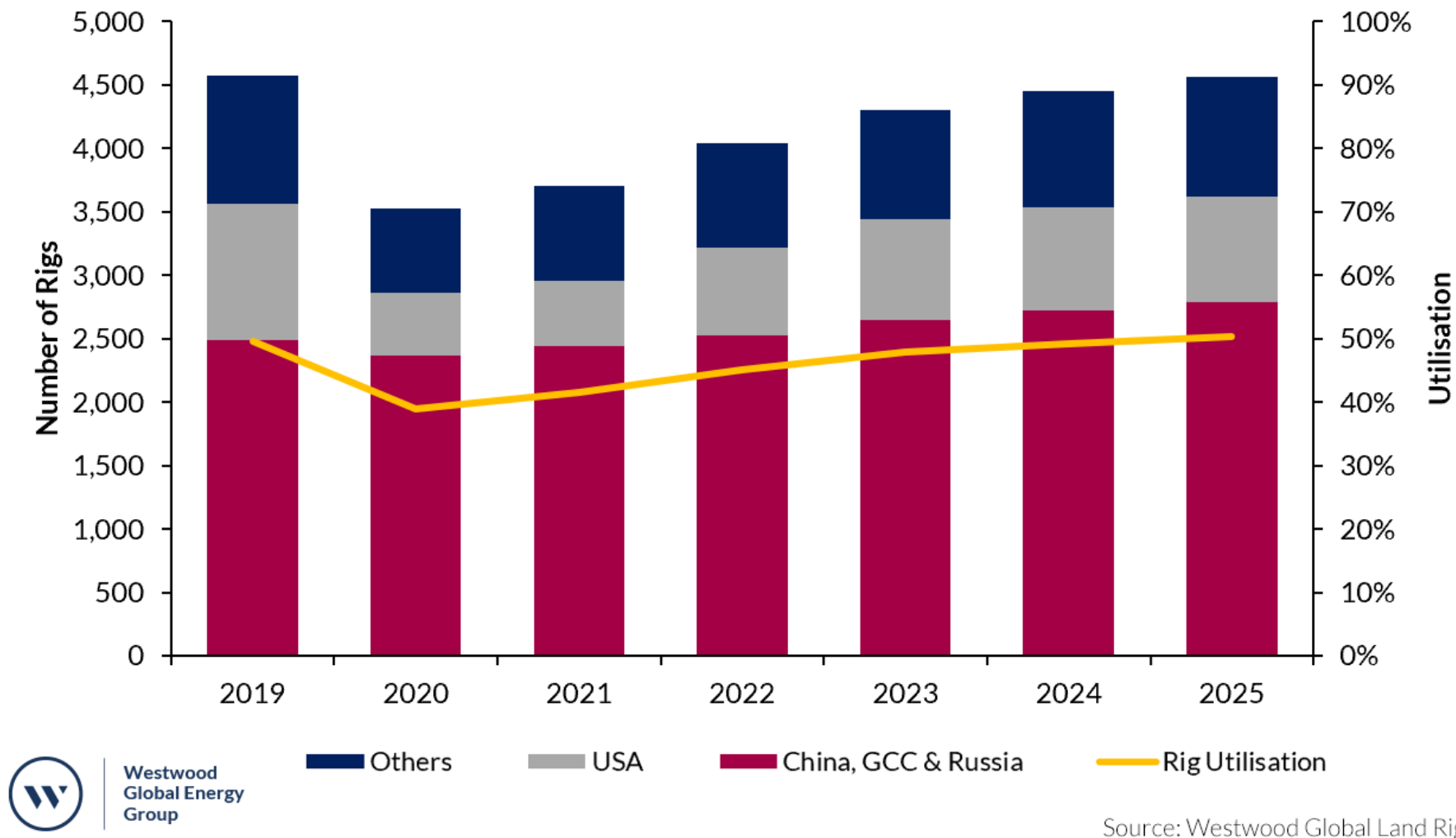
Data courtesy of IHS Markit. All data as of December 31, 2019.

Offshore Rig Market

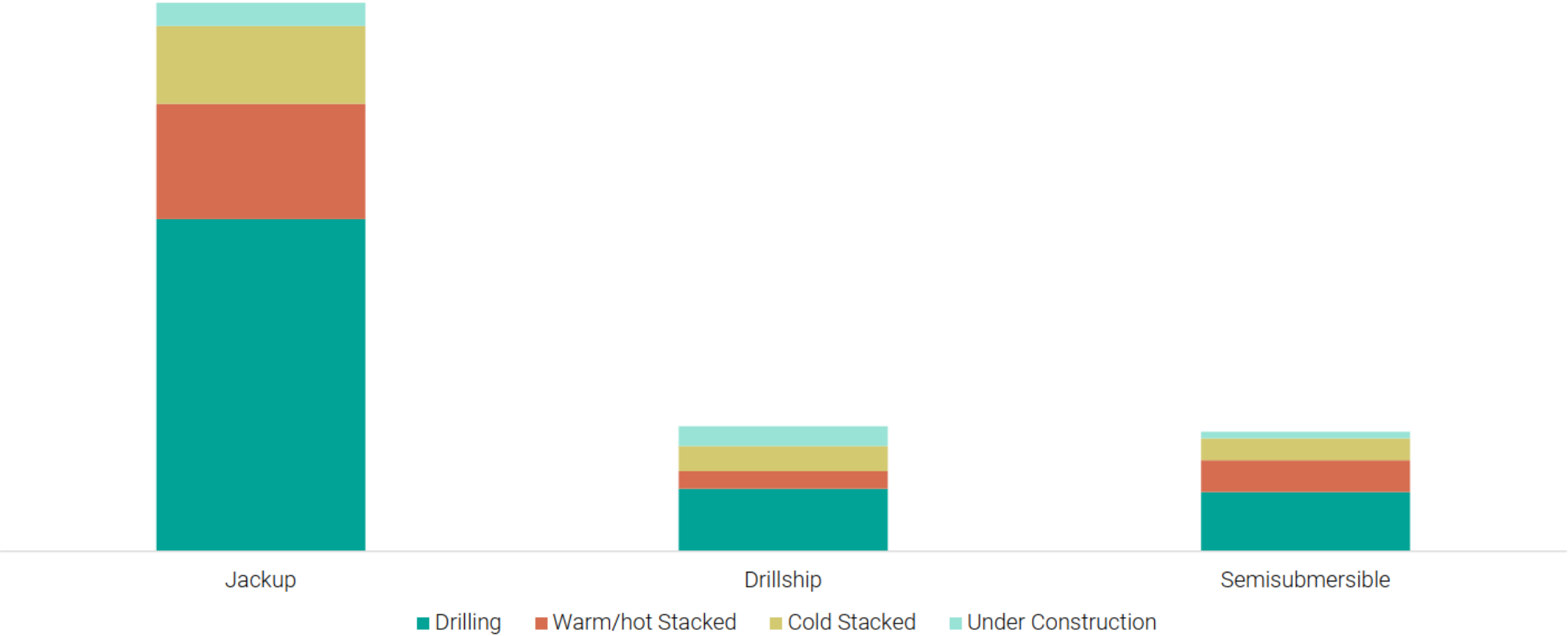


Source: Bassoe Analytics

Average Number of Rigs Operational and Global Rig Utilization

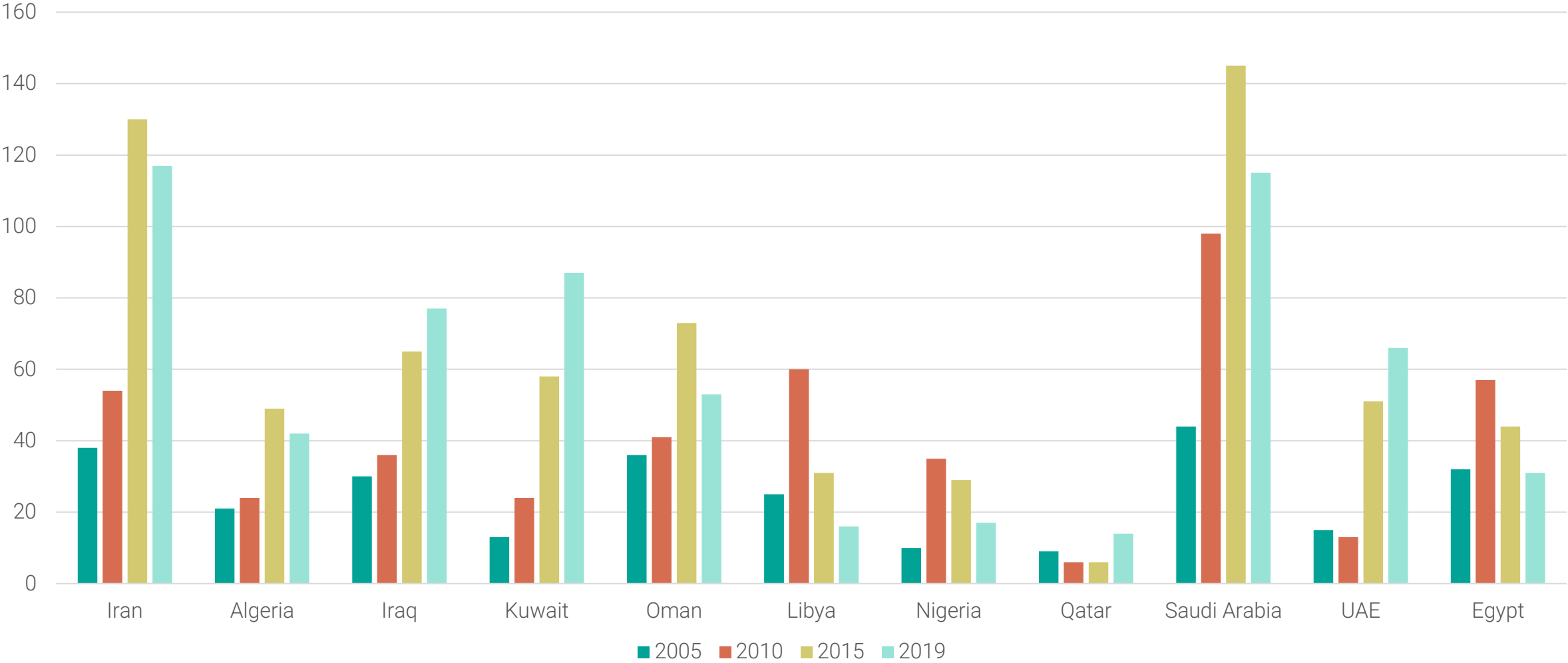


Rigs Status by Type

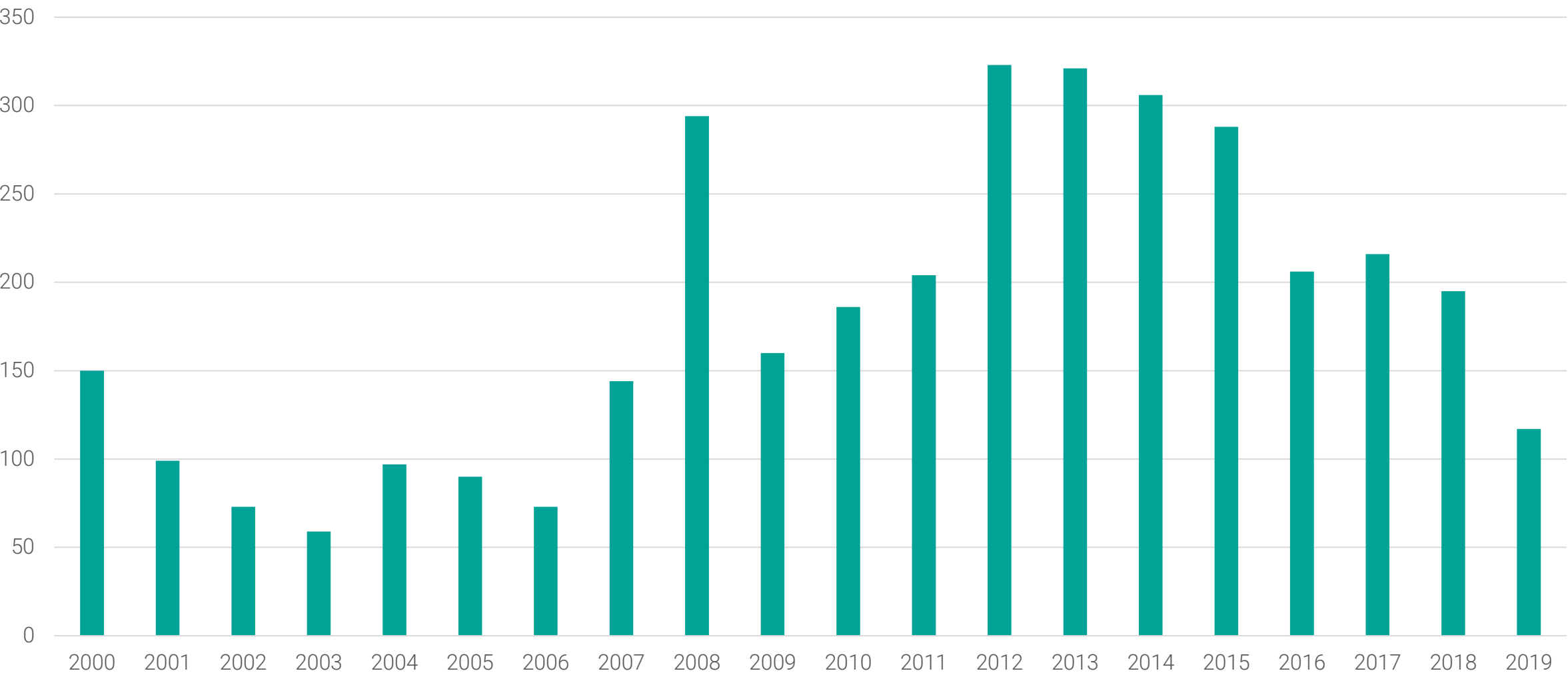


Source: Bassoe Analytics

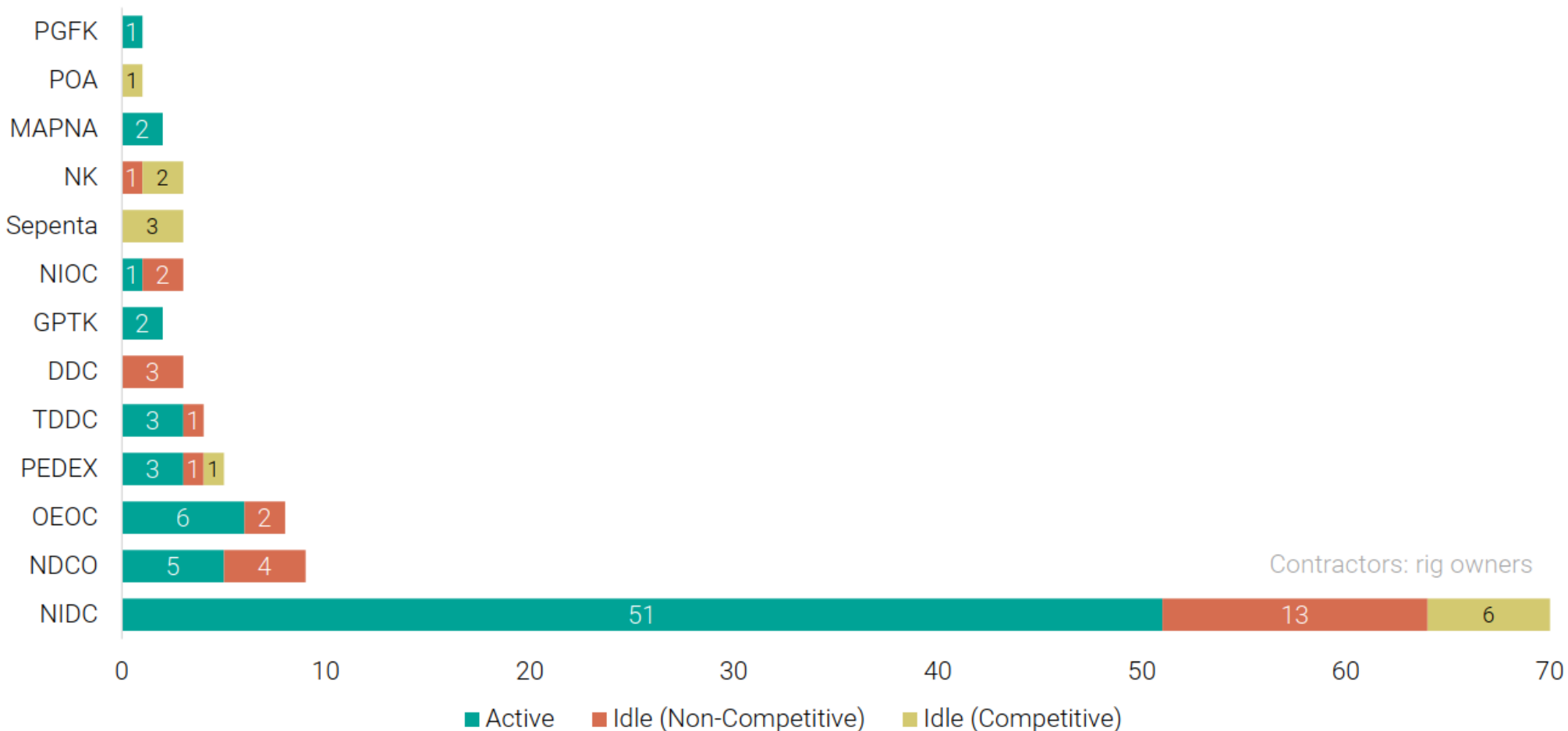
Active Rigs in MENA



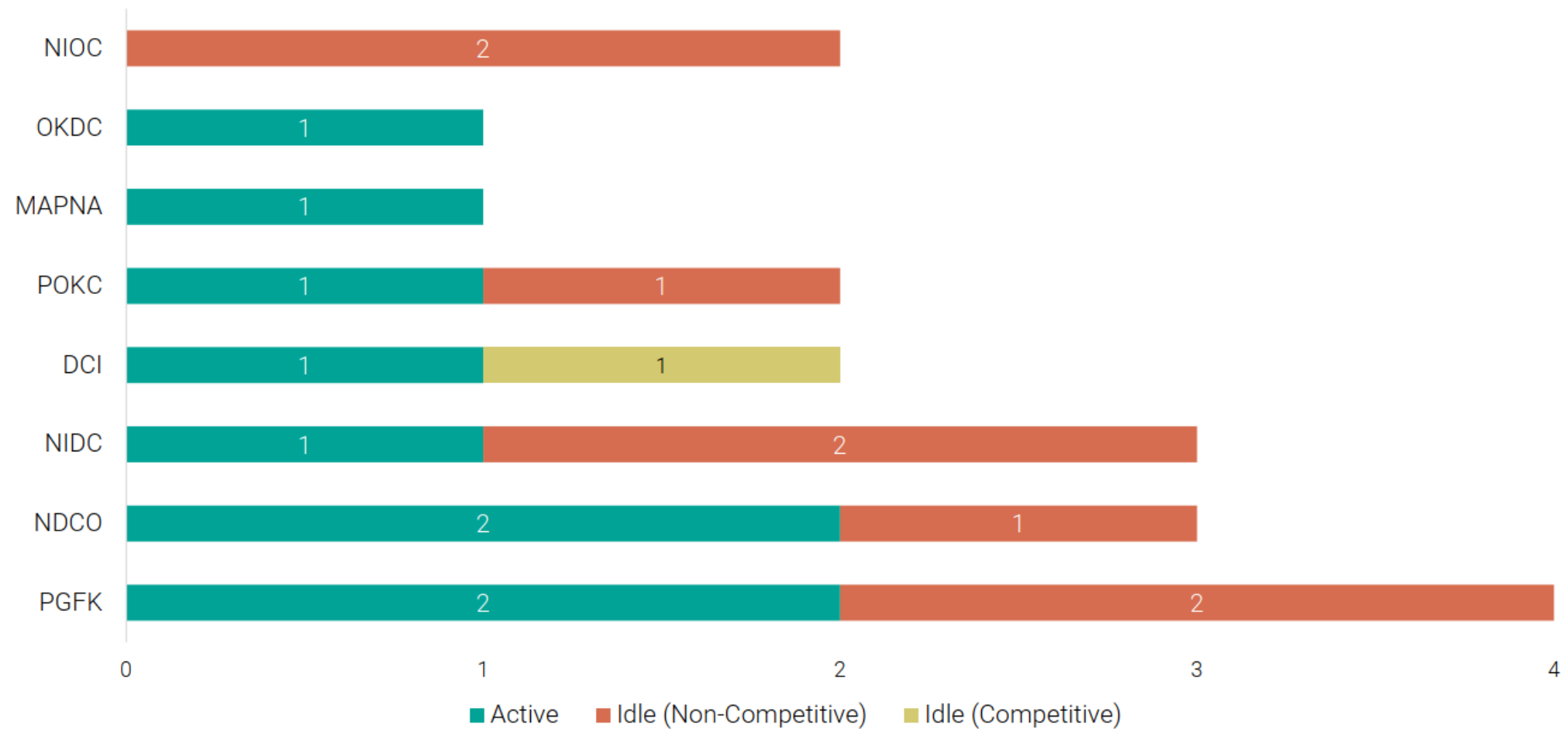
Completed Wells in Iran



Iran Drilling Players (Land)

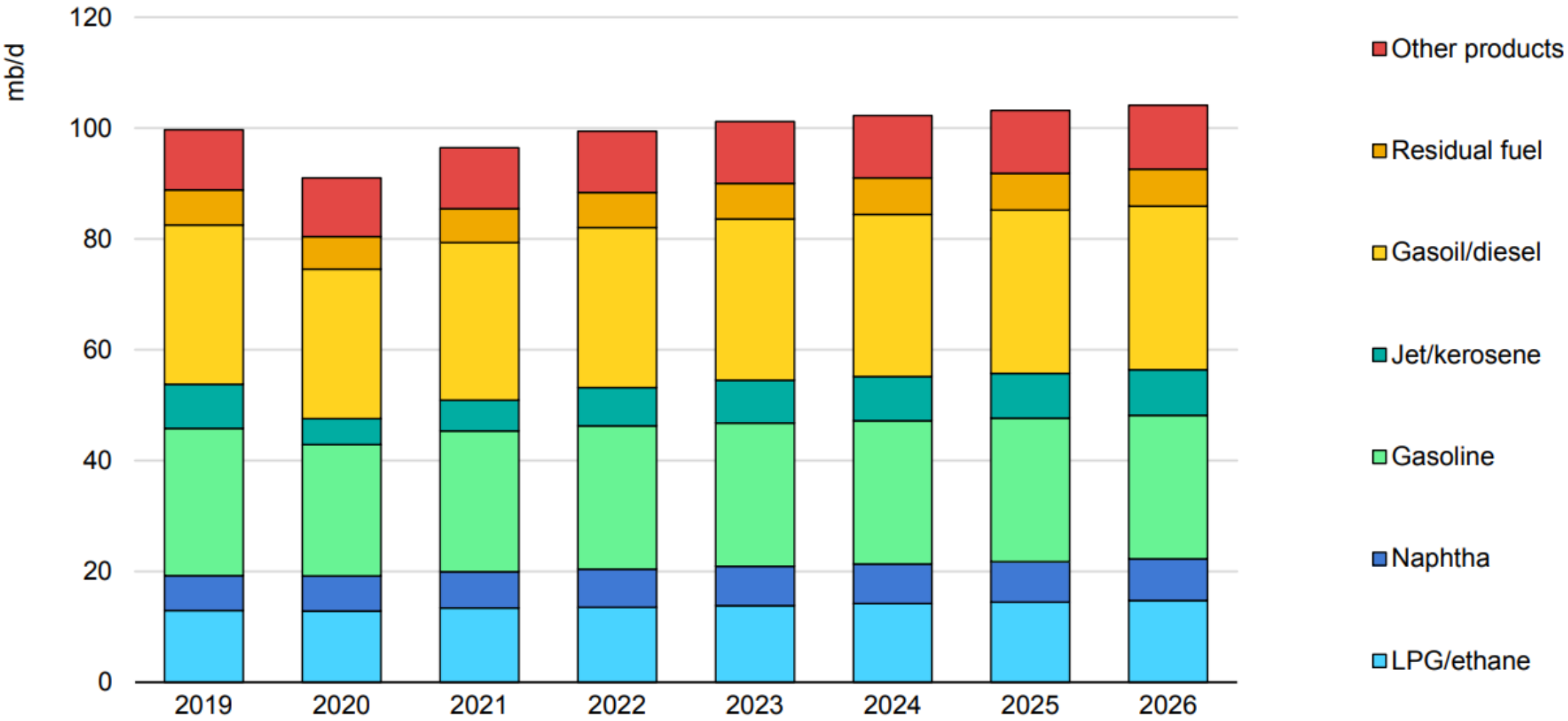


Iran Drilling Players (Offshore)

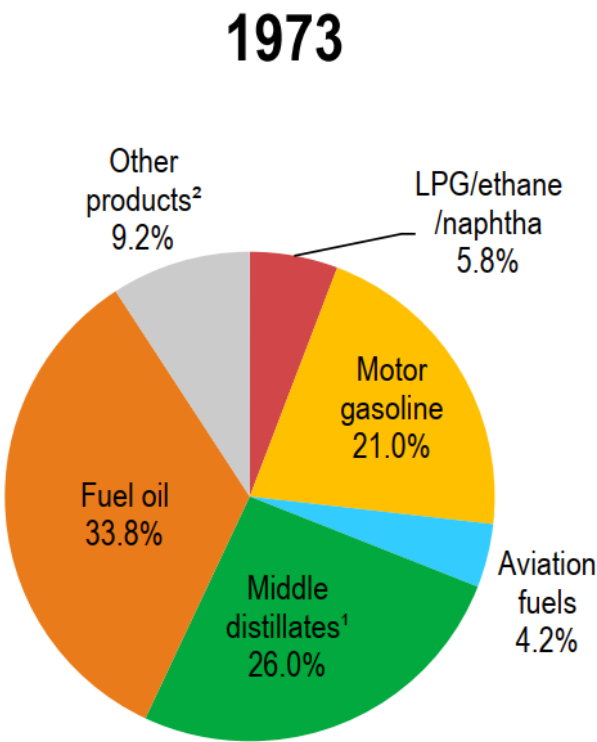


Refining & Chemicals

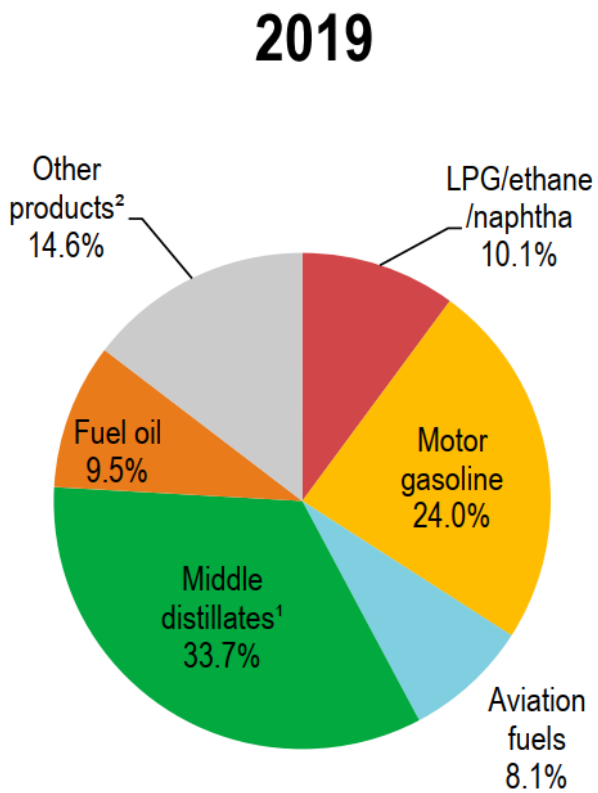
Global Oil Demand By Product



Refinery Output by Product

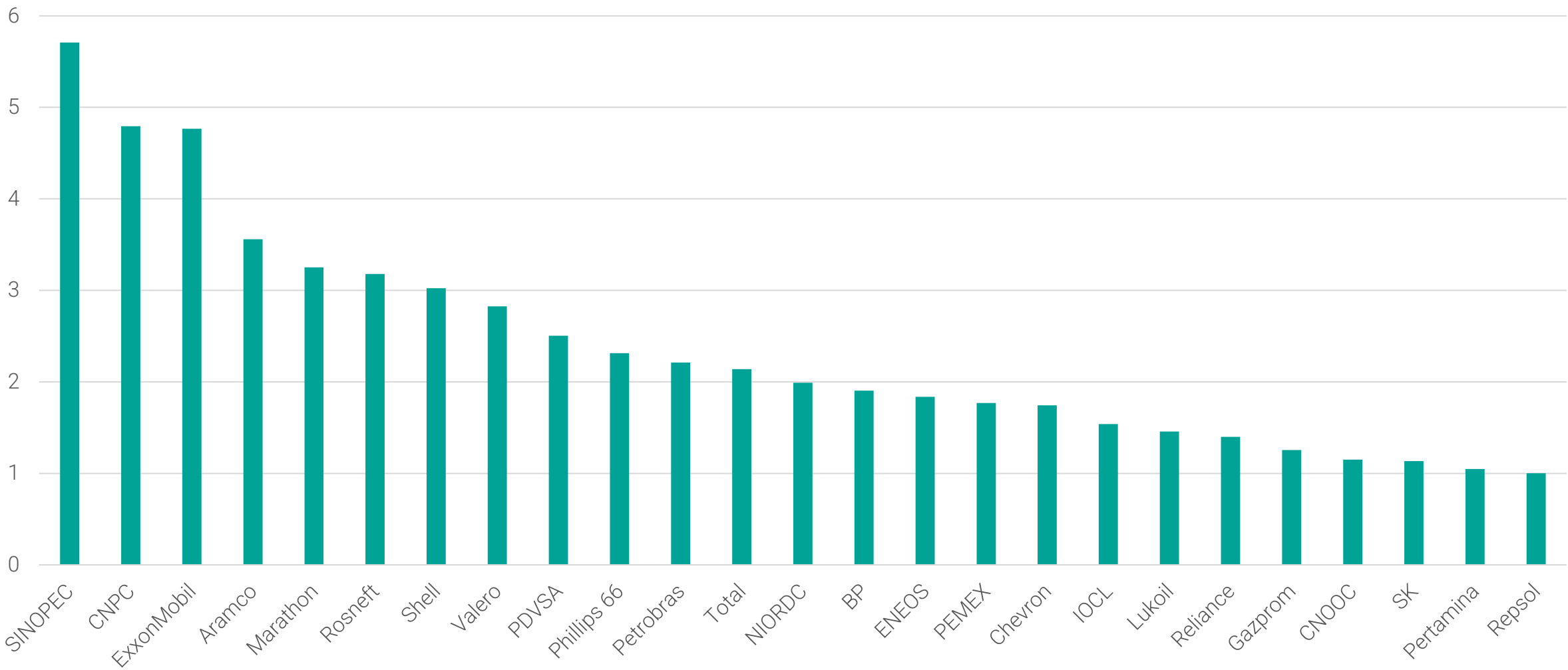


2 719 Mt

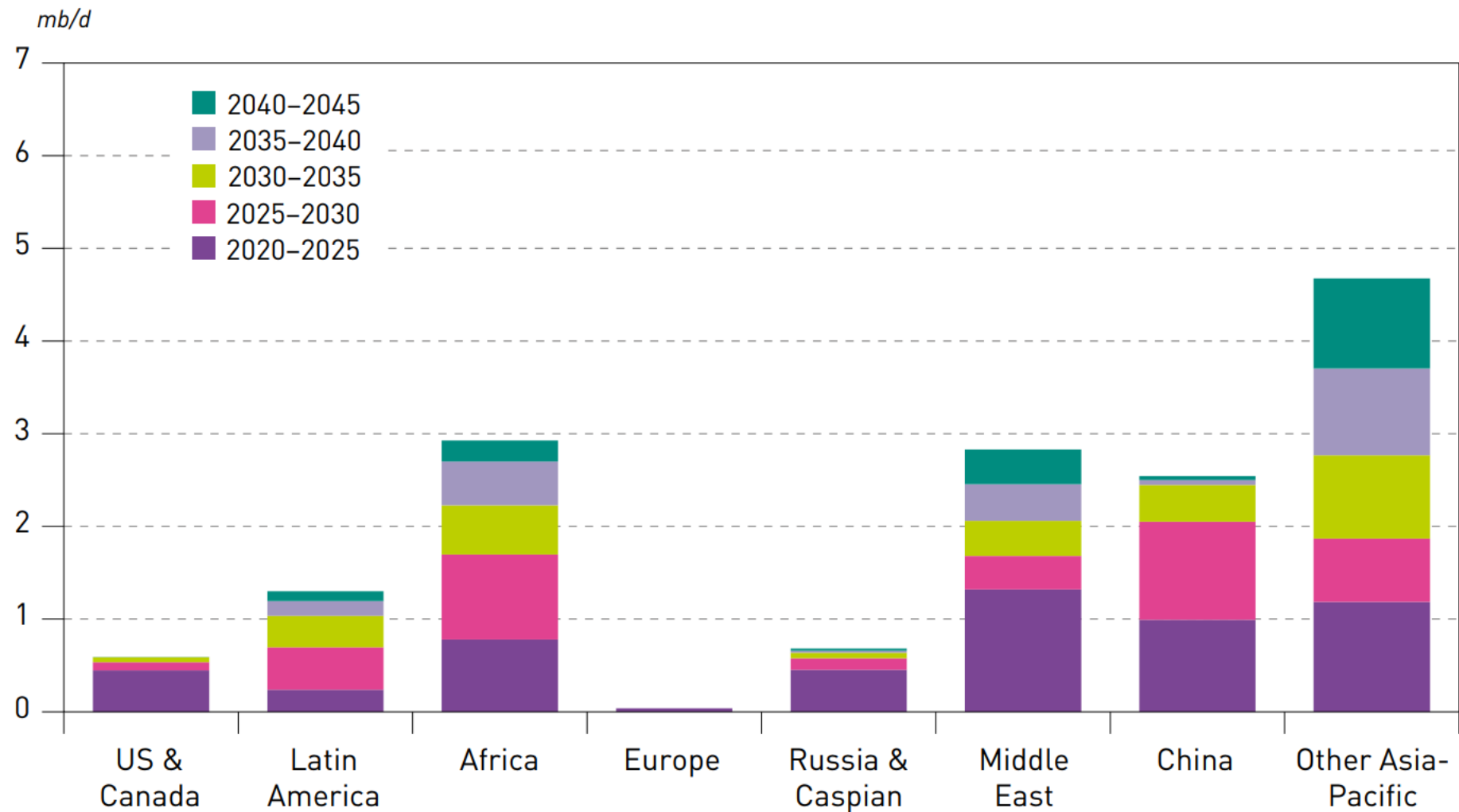


4 159 Mt

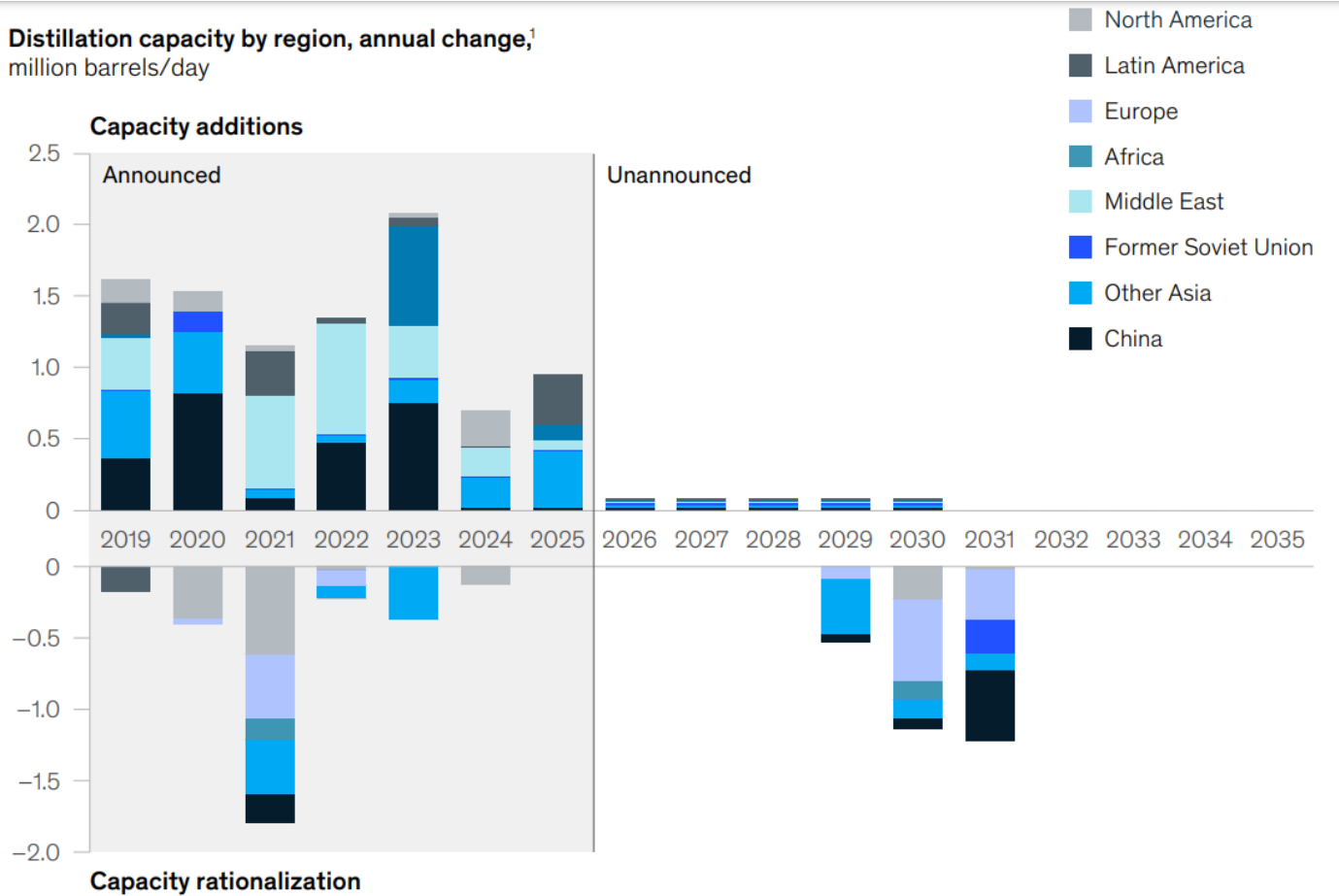
Top Refining Companies By Capacity (MBPD)



Distillation Capacity Additions, 2019–2045

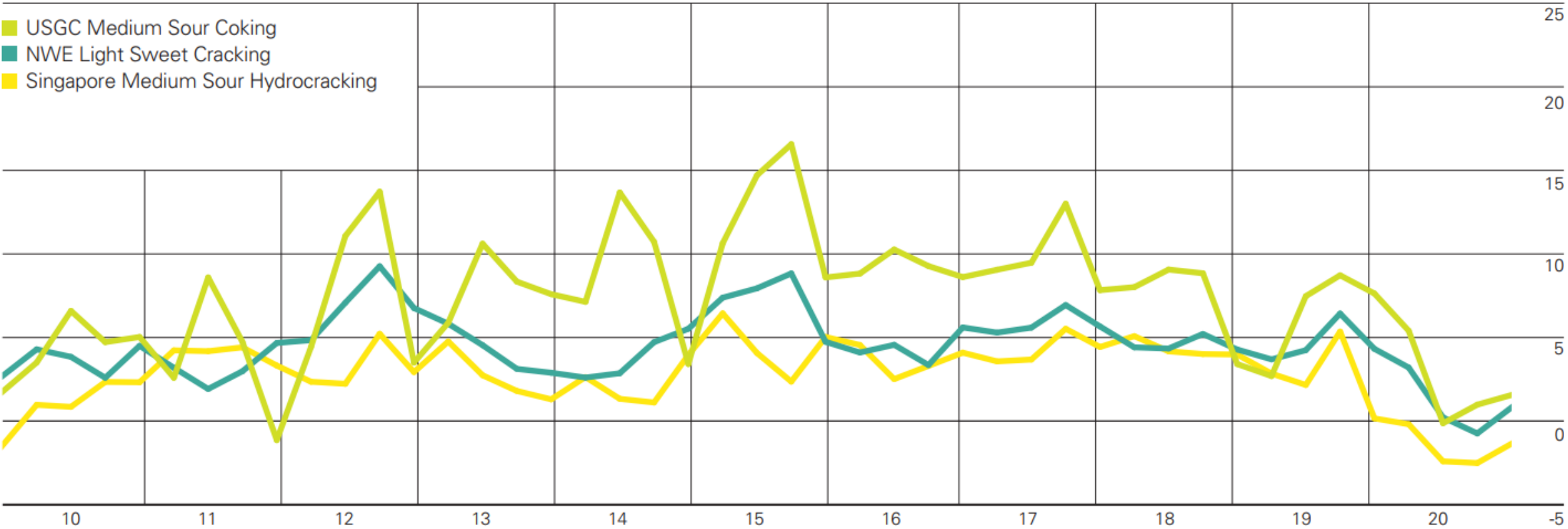


Distillation Capacity By Region, Annual Change



¹Start and closure dates defined as first full year; additions include only projects classified as firm and probable; includes 0.125% per annum creep in growing markets.
Source: McKinsey Energy Insights Global Downstream Model 2021; McKinsey Refining Capacity Database

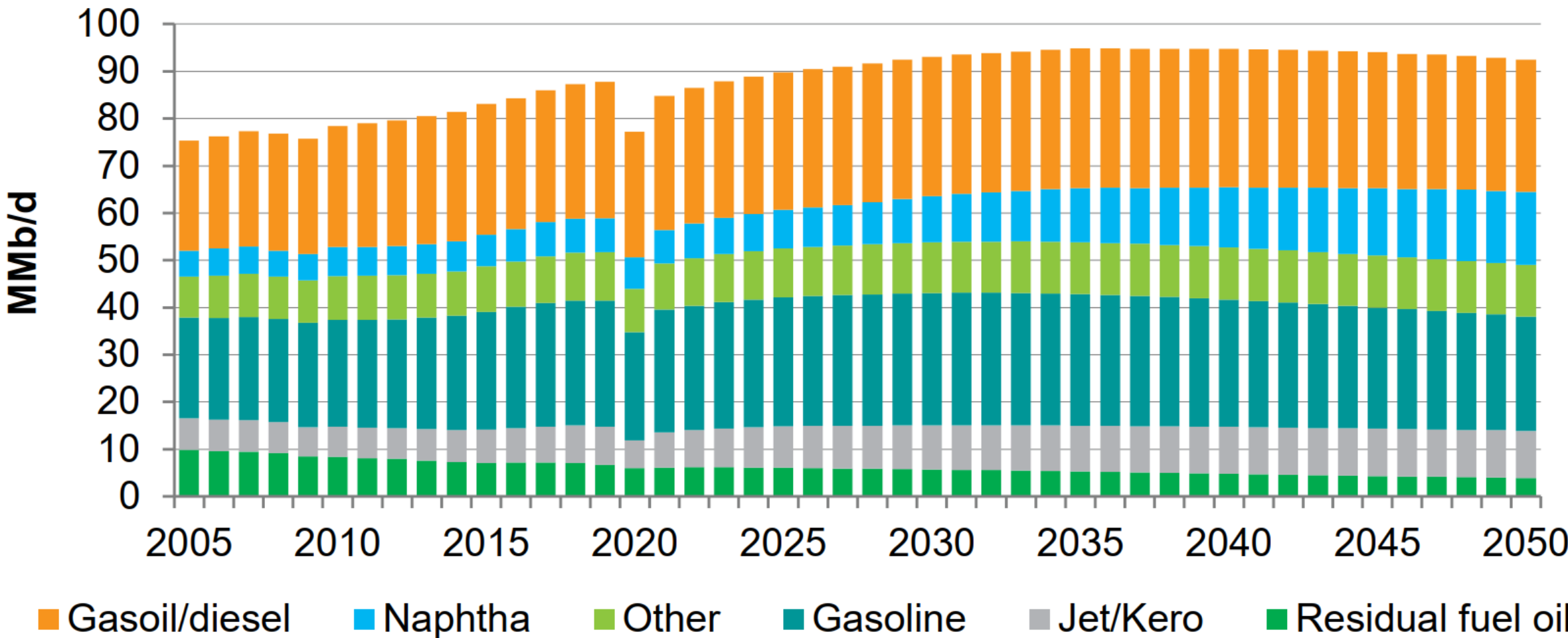
Refining Margins



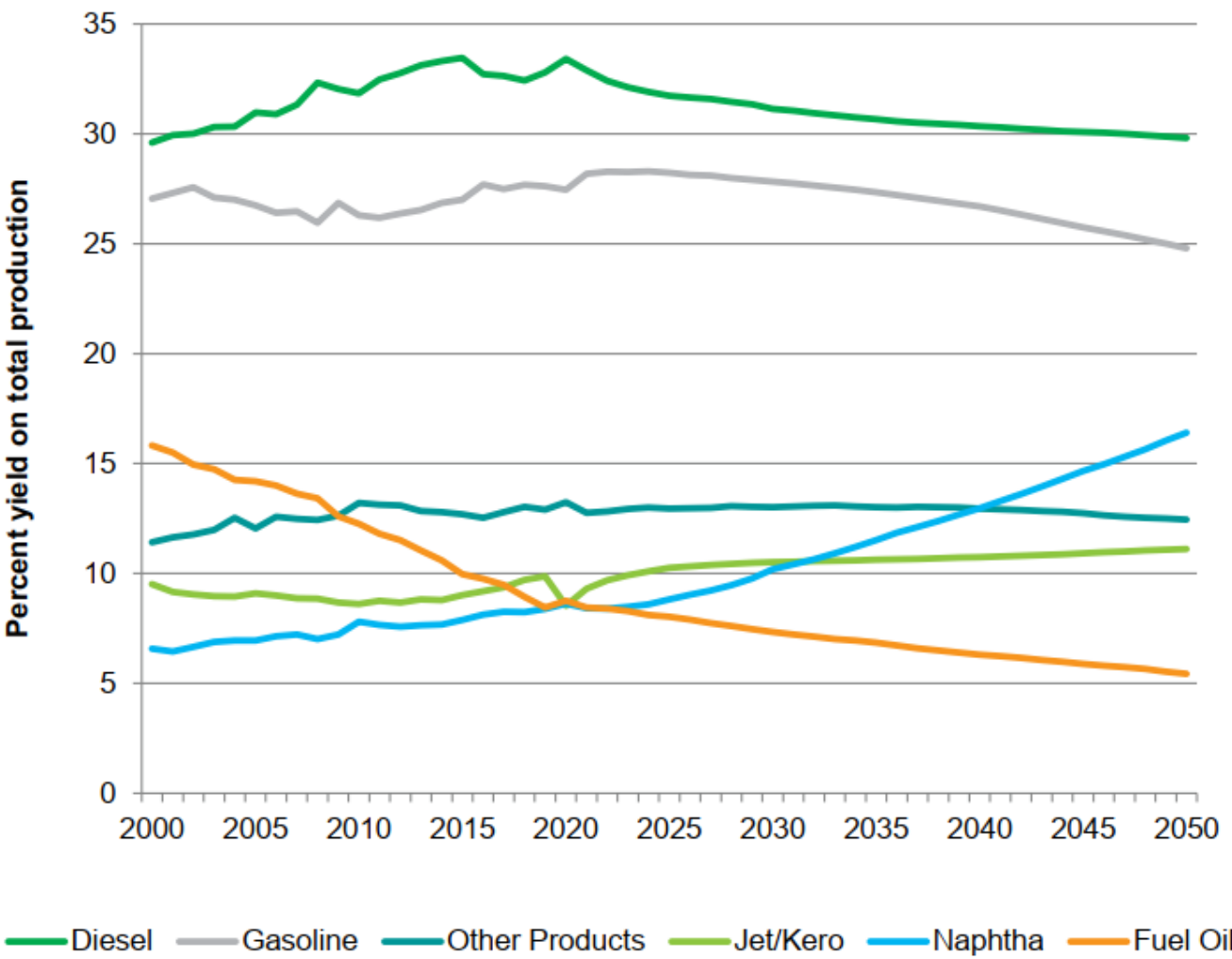
Note: The refining margins presented are benchmark margins for three major global refining centres. US Gulf Coast (USGC), North West Europe (NWE – Rotterdam) and Singapore. In each case they are based on a single crude oil appropriate for that region and have optimized product yields based on a generic refinery configuration (cracking, hydrocracking or coking), again appropriate for that region. The margins are on a semi-variable basis, i.e. the margin after all variable costs and fixed energy costs.



World Refined Product Demand



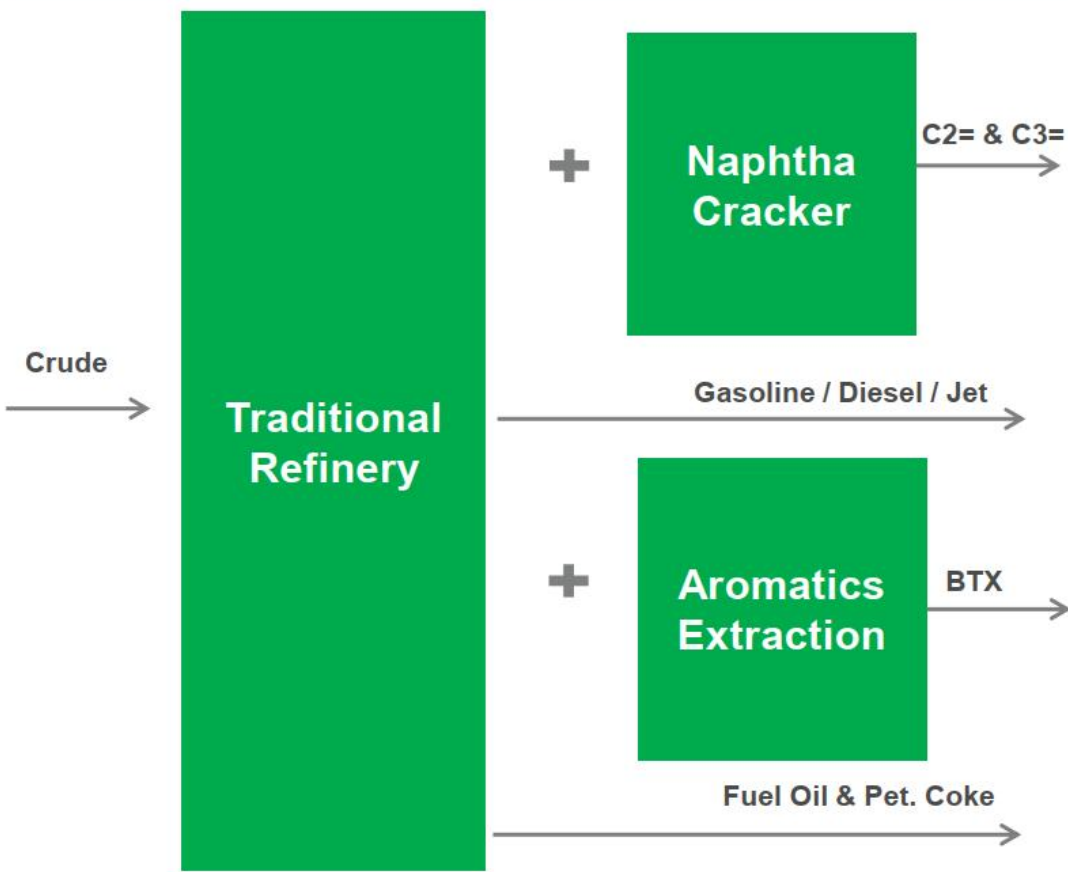
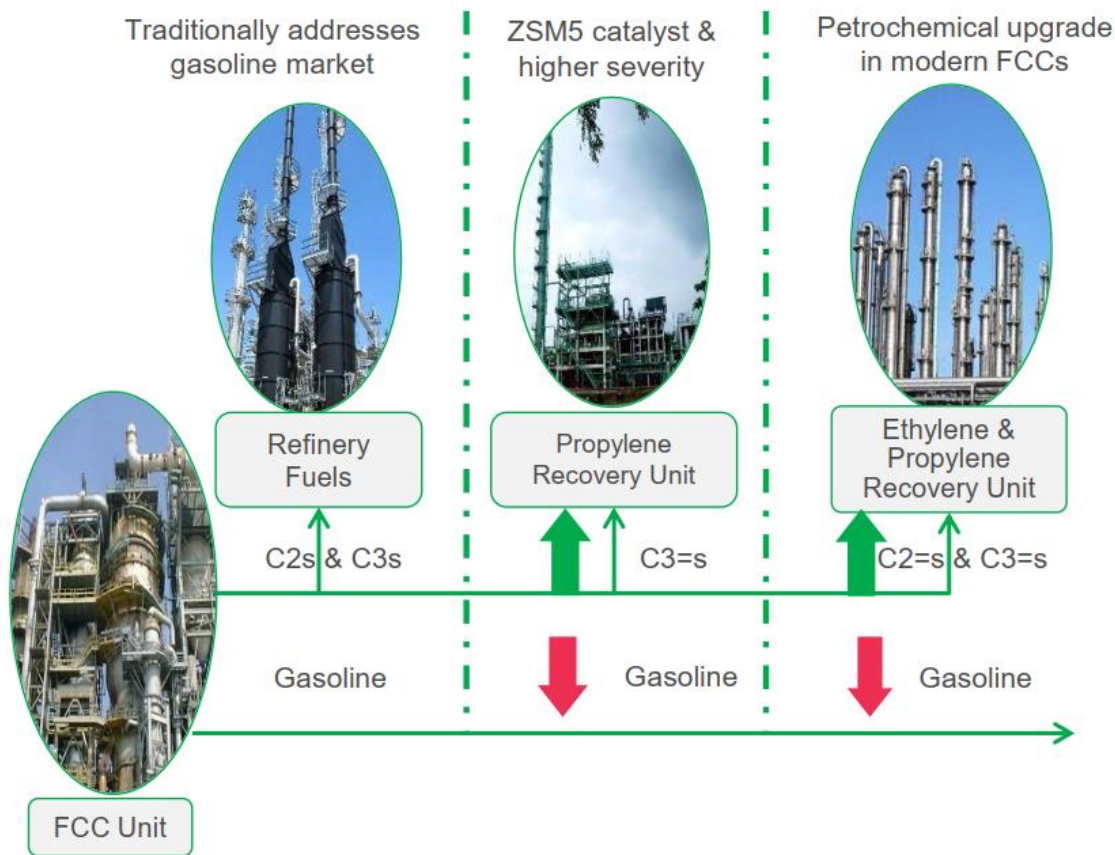
World Refinery Yields



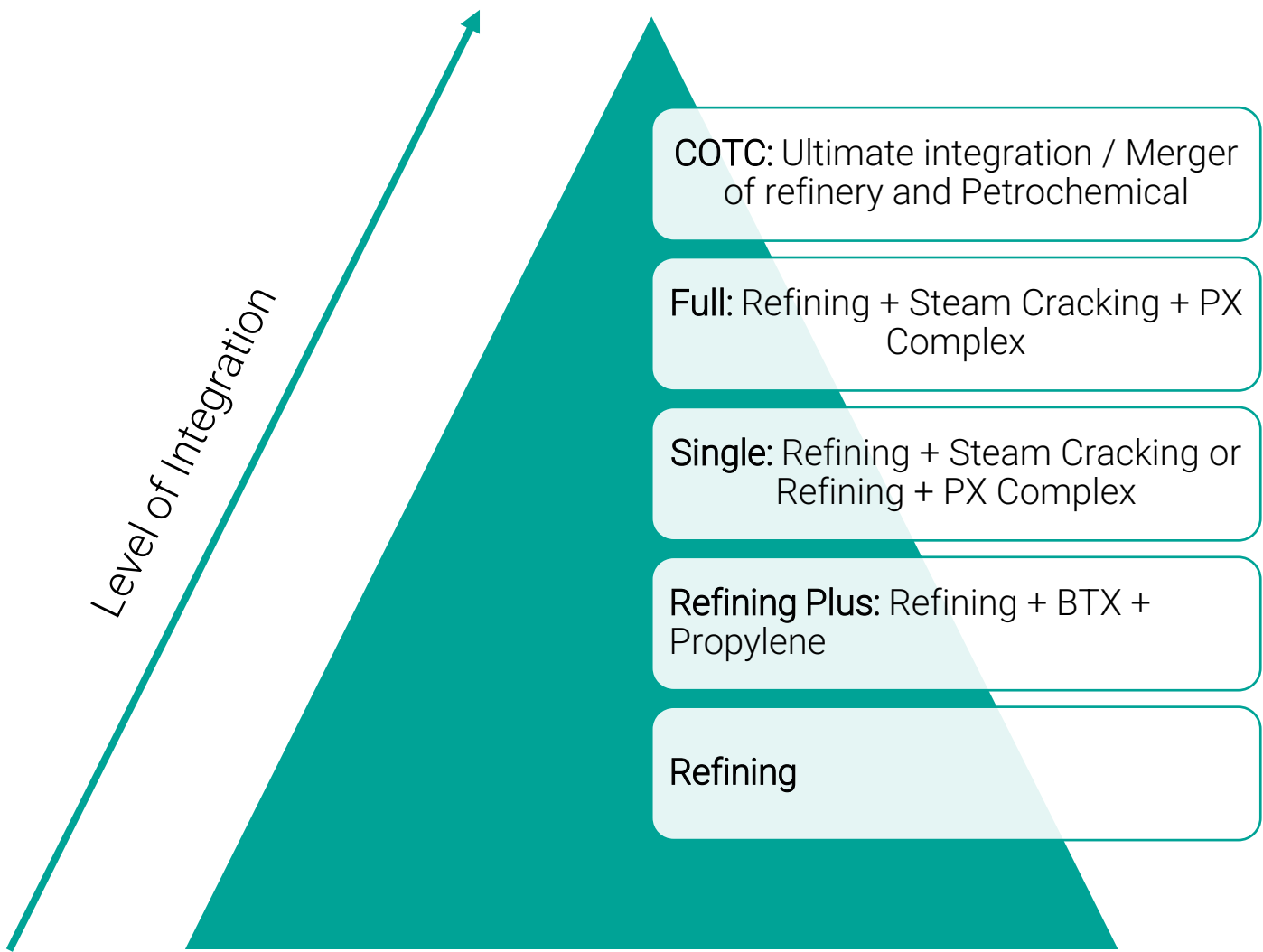
Refining Petrochemical Integration

“Re-inventing” the FCC can potentially be the first move

Long term plan to “bolt-on” petrochemical production



COTC Configures A Refinery To Produce Maximum Chemicals



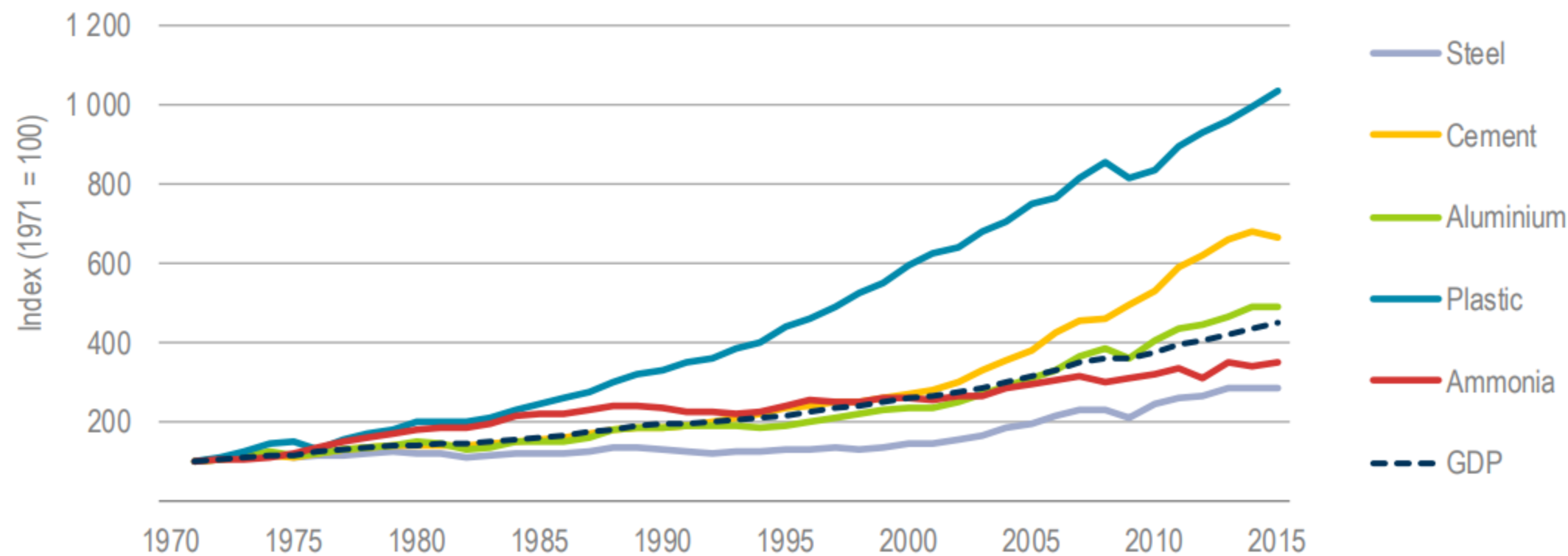
COTC Projects Update

Project	Refinery Capacity (MMTPA)	P-Xylene Capacity (MMTPA)	Olefin Capacity (MMTPA)	Est. Chemical conversion/ bbl of oil (%)	Investment (\$bn)	Start Trial Operation
Hengli Petrochemical	20	4.3	1.5	42	11.4	Dec 2018
Zhejiang Petroleum and Chemical (ZPC) Phase 1	20	4.0	1.4	45	12	Est. Q2 2019
Hengyi (Brunei) PMB Refinery-Petrochem	8	1.5	0.5	>40	3.45	Est. 2019
Zhejiang Petroleum and Chemical (ZPC) Phase 2	20	4.8*	1.2	50*	12	Est. 2021
Shenghong refinery and Integrated Petrochem	16	2.8	1.1	60**	11.0	H2** 2021
Aramco/SABIC JV	20	--	3.0	45	20	2025

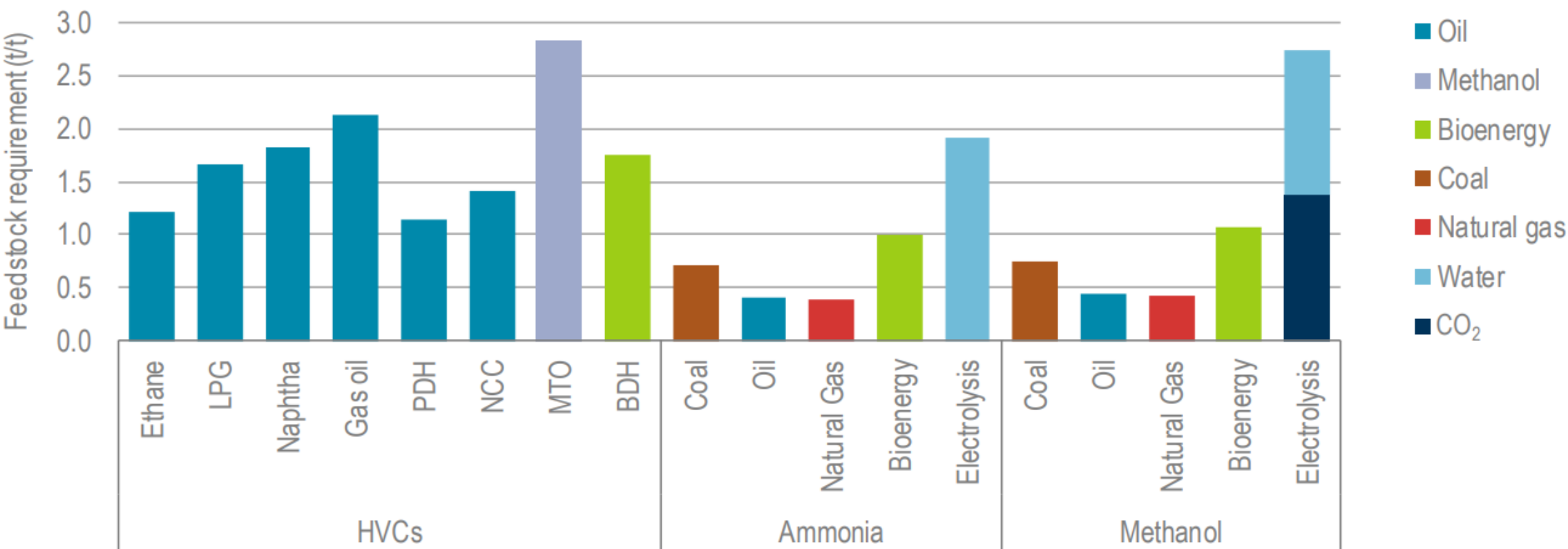
Oil Demand in the Petrochemical Sector

	2019	2020	2025	2030	2035	2040	2045	Growth 2019–2045
OECD Americas	3.5	3.2	3.8	4.1	3.9	3.7	3.5	0.1
OECD Europe	1.9	1.7	1.8	1.8	1.7	1.6	1.5	–0.4
OECD Asia Oceania	2.1	1.9	2.0	2.0	2.0	2.0	2.0	–0.1
OECD	7.4	6.9	7.6	8.0	7.7	7.4	7.0	–0.4
Latin America	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.1
Middle East & Africa	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
India	0.4	0.4	0.5	0.7	0.9	1.0	1.1	0.7
China	1.9	1.8	2.1	2.2	2.4	2.6	2.7	0.8
Other Asia	1.3	1.3	1.5	1.7	1.9	2.0	2.1	0.8
OPEC	1.2	1.2	1.4	1.7	2.2	2.5	2.7	1.5
Russia	0.9	0.9	1.1	1.1	1.1	1.1	1.1	0.1
Other Eurasia	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0
Non-OECD	6.2	6.0	7.1	8.0	9.0	9.7	10.3	4.1
World	13.7	12.9	14.7	15.9	16.7	17.0	17.3	3.7

Production Growth For Selected Bulk Materials And GDP

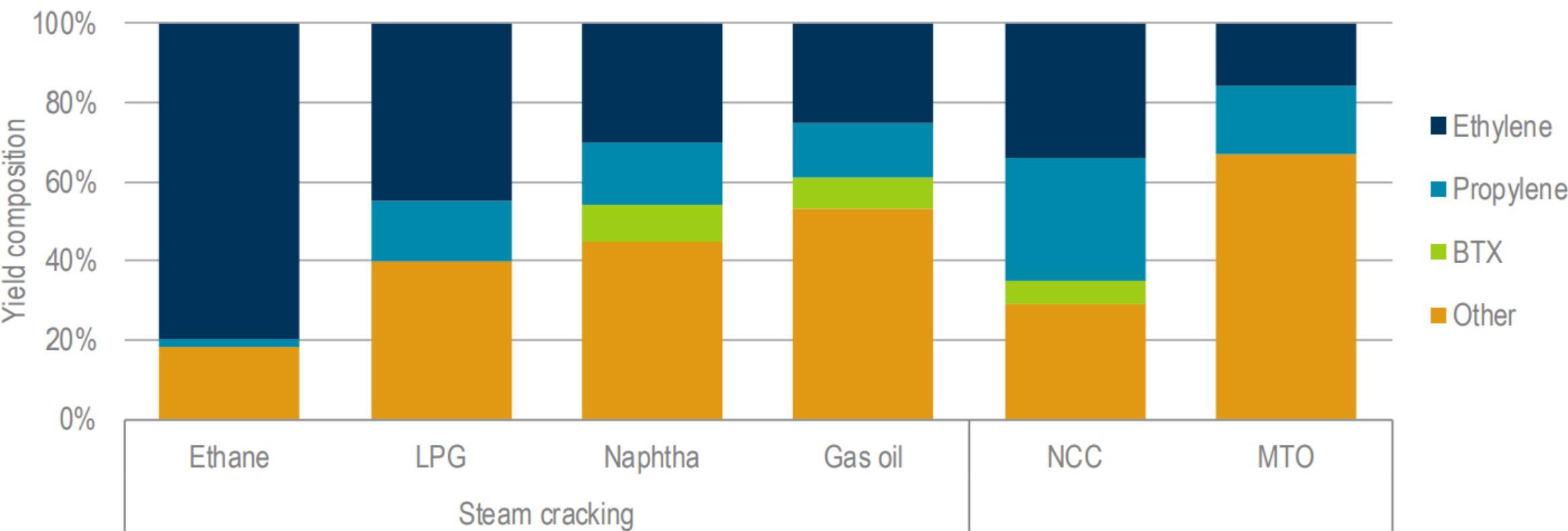


Feedstock Options By Chemical Product

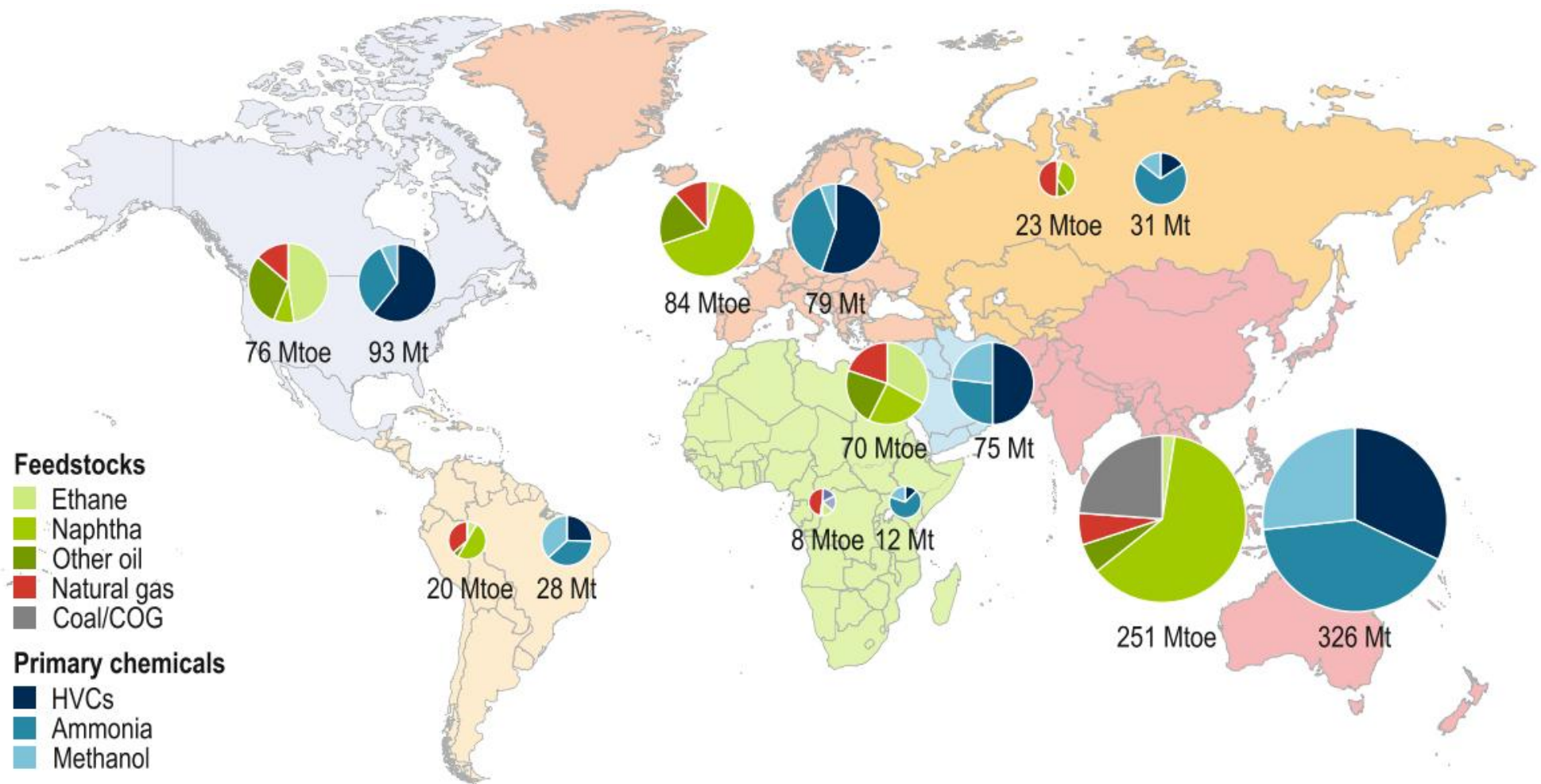


Notes: BDH = bioethanol dehydration; LPG = liquefied petroleum gas; NCC = naphtha catalytic cracking. The quantity pertaining to BDH is in terms of bioethanol.

Yield Of Individual HVCs In Multi-product Processes



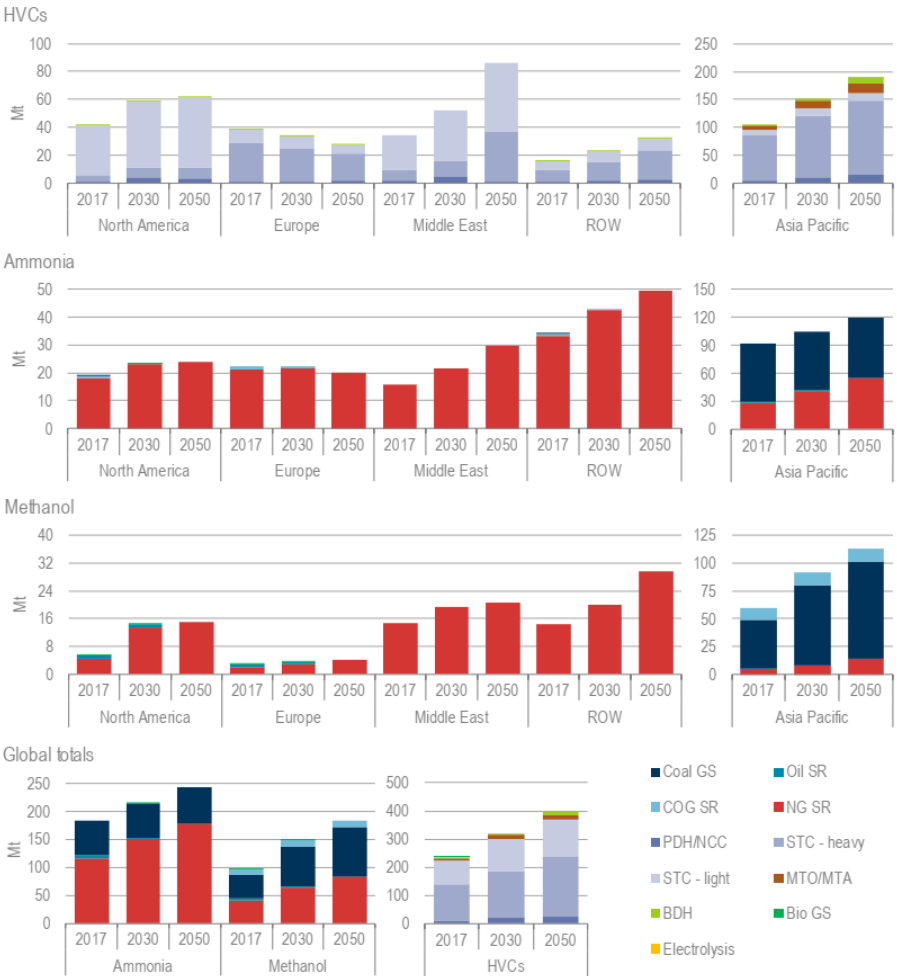
Primary Feedstock Use And Chemical Production By Region



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

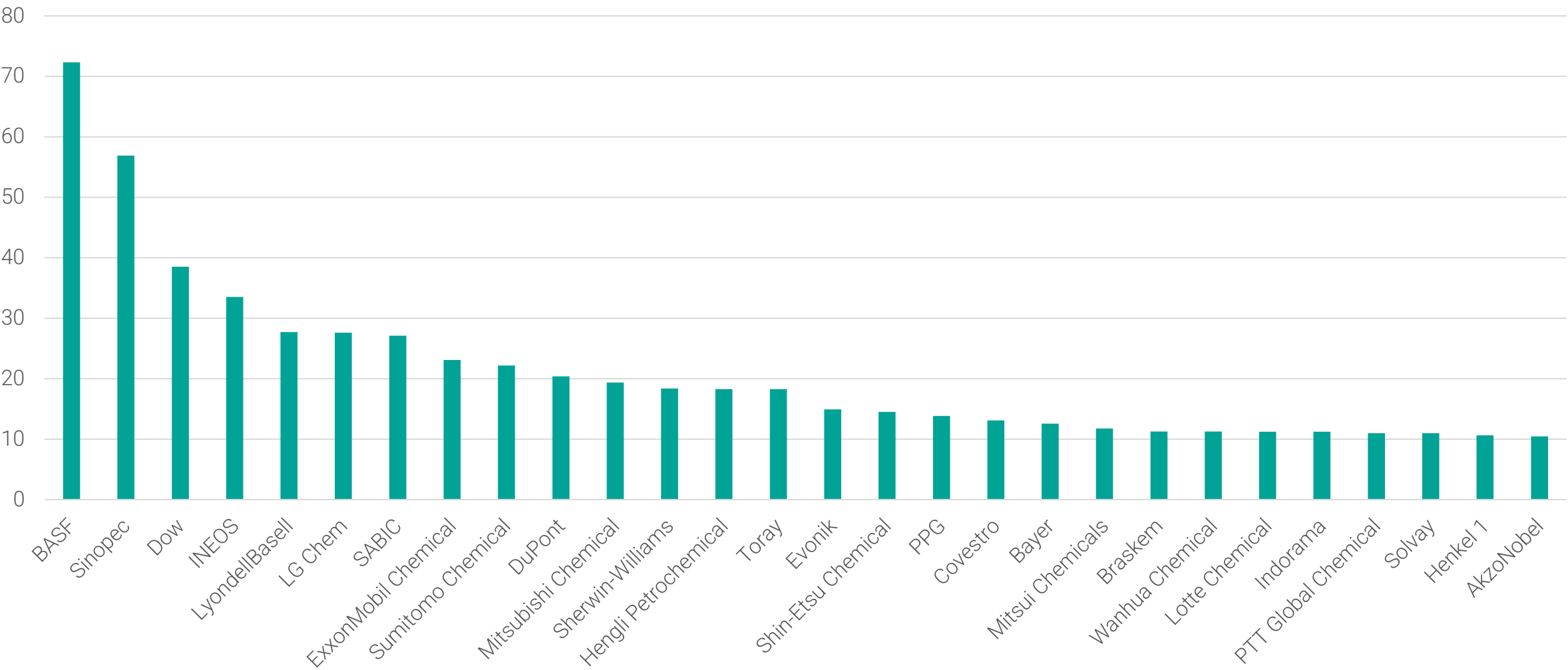
Production Routes For Primary Chemicals In The RTS

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Notes: Tabulated results are provided in the online annex. Bio = bioenergy; GS = gasification; SR = steam reforming; STC - heavy = naphtha and gas oil steam cracking; STC - light = ethane and liquid petroleum gas steam cracking.

The ICIS Top 100 Chemical Companies 2020 (\$B)

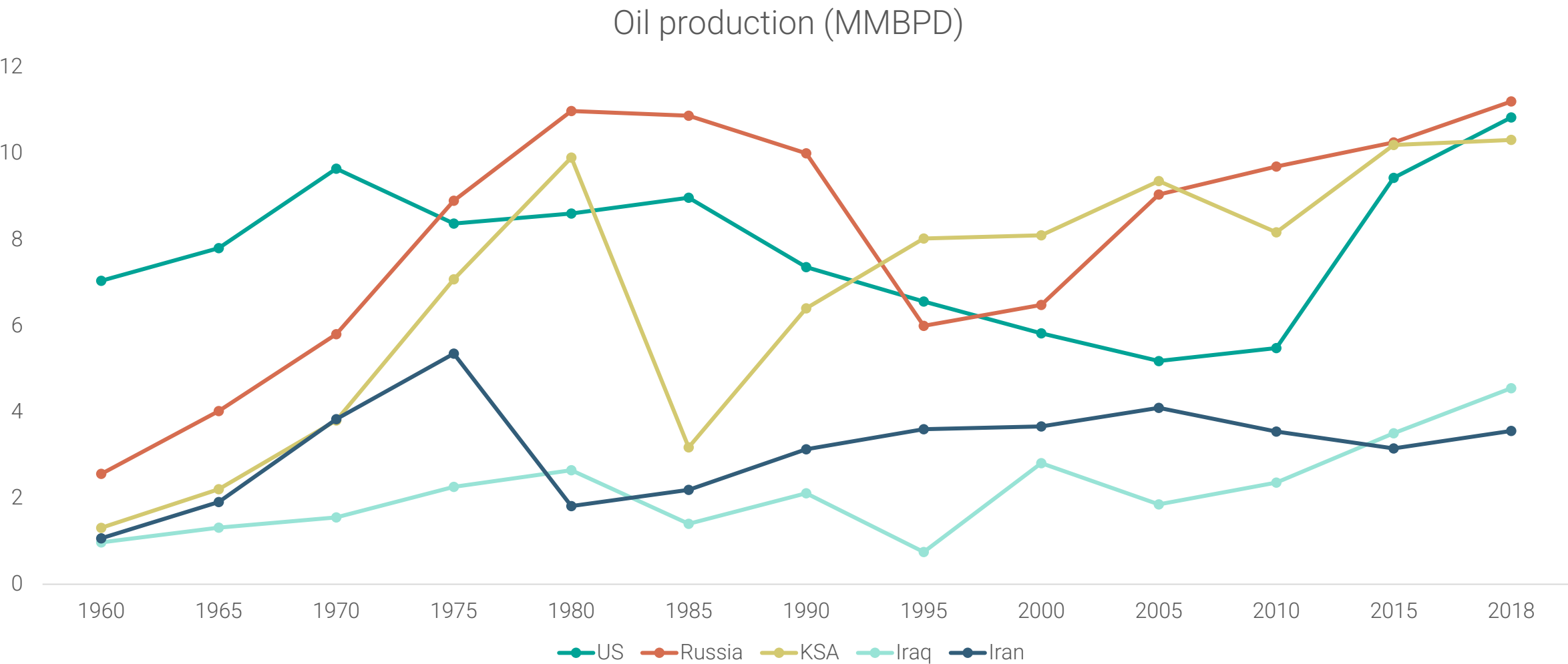


The ICIS Top 100 Chemical Companies 2020

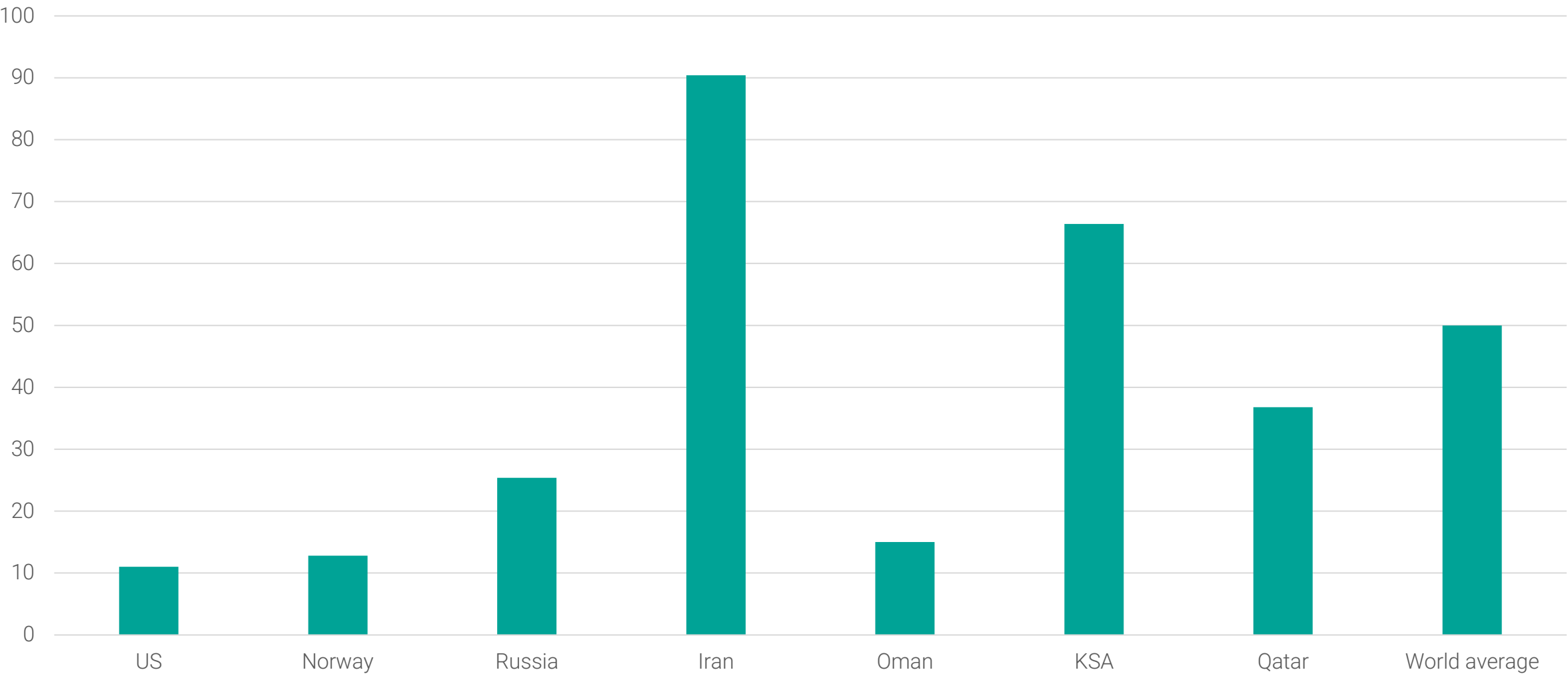
Rank 2019	Company	Sales 2019% change		Operating profit 2019% change		Net income 2019% change		Total Assets 2019% change		R&D 2019% change		Capex 2019% change		Employees 2019% change	
\$m, change in reporting currencies															
1	BASF	66,594	-1.5	4,549	-32.2	9,454	78.9	97,619	0.5	2,423	8.2	4,310	6.2	132,061	-3.9
2	Sinopec ²	63,244	-6.9	2,463	-36.5	-	-	-	-	-	-	-	-	-	-
3	Dow ¹	42,951	-13.4	-395	-	-1,272	-	60,524	-27.7	765	-4.4	1,961	-6.2	36,500	-32.4
4	LyondellBasell	34,727	-11.0	4,116	-21.3	3,397	-27.6	30,435	7.6	111	-3.5	2,694	28.0	19,100	-1.8
5	SABIC ²	32,488	-19.0	3,680	-59.1	-	-	74,933	-3.2	-	-	-	-	-	-
6	INEOS ²	32,103	-8.6	2,485	-39.0	-	-	-	-	-	-	-	-	23,015	13.9
7	ExxonMobil ²	27,416	-15.5	-	-	592	-82.3	-	-	-	-	1,933	29.4	-	-
8	LG Chem	24,793	1.6	776	-60.1	326	-75.2	29,470	17.6	949	8.7	1,793	1.4	-	-
9	DuPont ¹	21,512	-4.8	194	-70.4	498	-87.0	69,396	-63.1	955	-10.7	1,492	19.9	35,000	-
10	Sumitomo Chemical ³	20,480	-4.0	1,265	-24.8	501	-64.3	33,588	15.1	-	-	1,108	-31.1	-	-

8 MBPD Agenda

Iran Oil Production vs. Competitors



Reserve to Production Ratio



Iran Upstream Asset Lifecycle Issues

Exploration and Appraisal

- New Exploration Opportunities
- Shale Exploration
- Appraisal of Opportunities

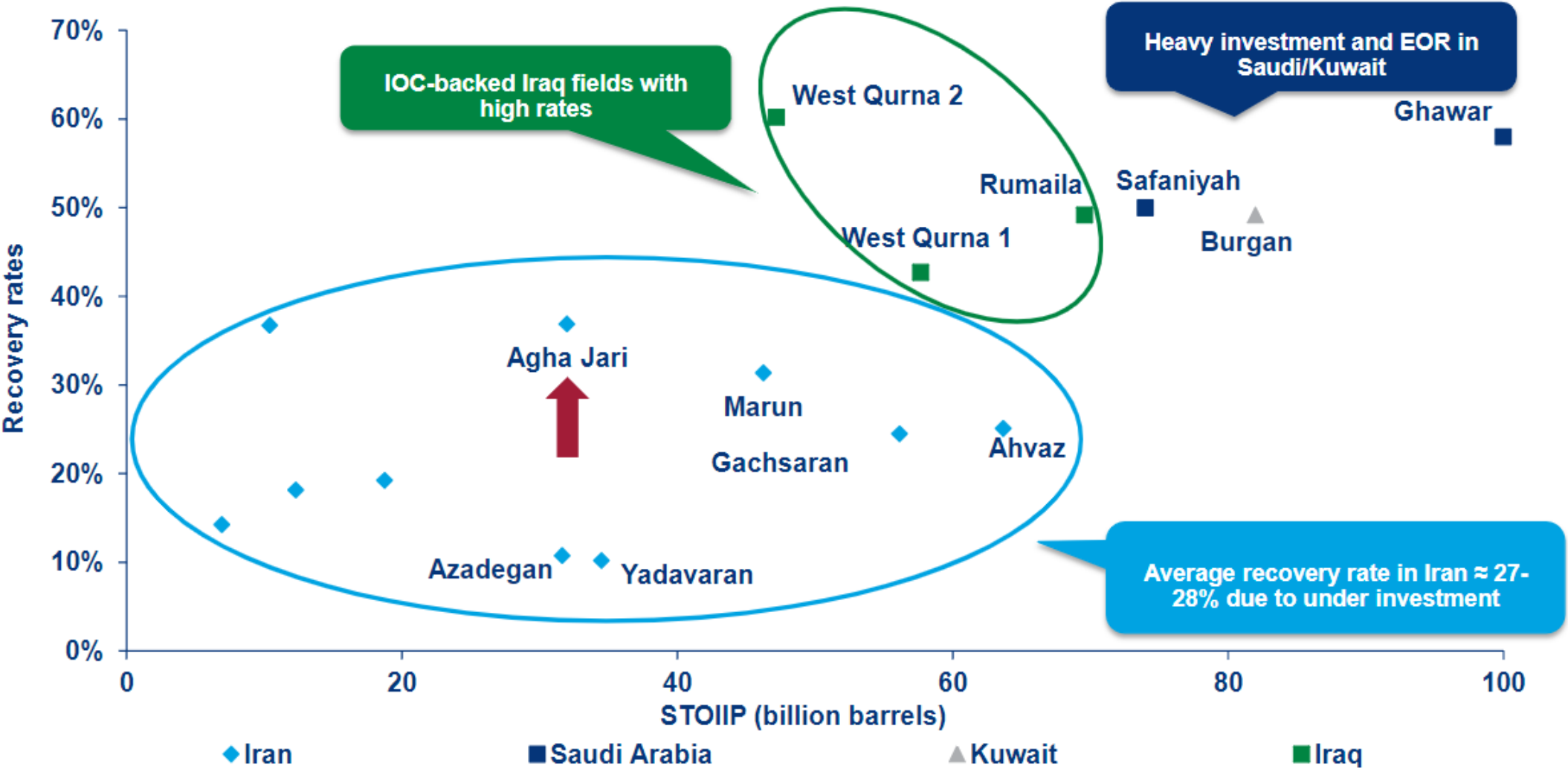
Development and Production

- 200+ Undeveloped Assets
- Limited Production
- Low OPEX in Brownfields

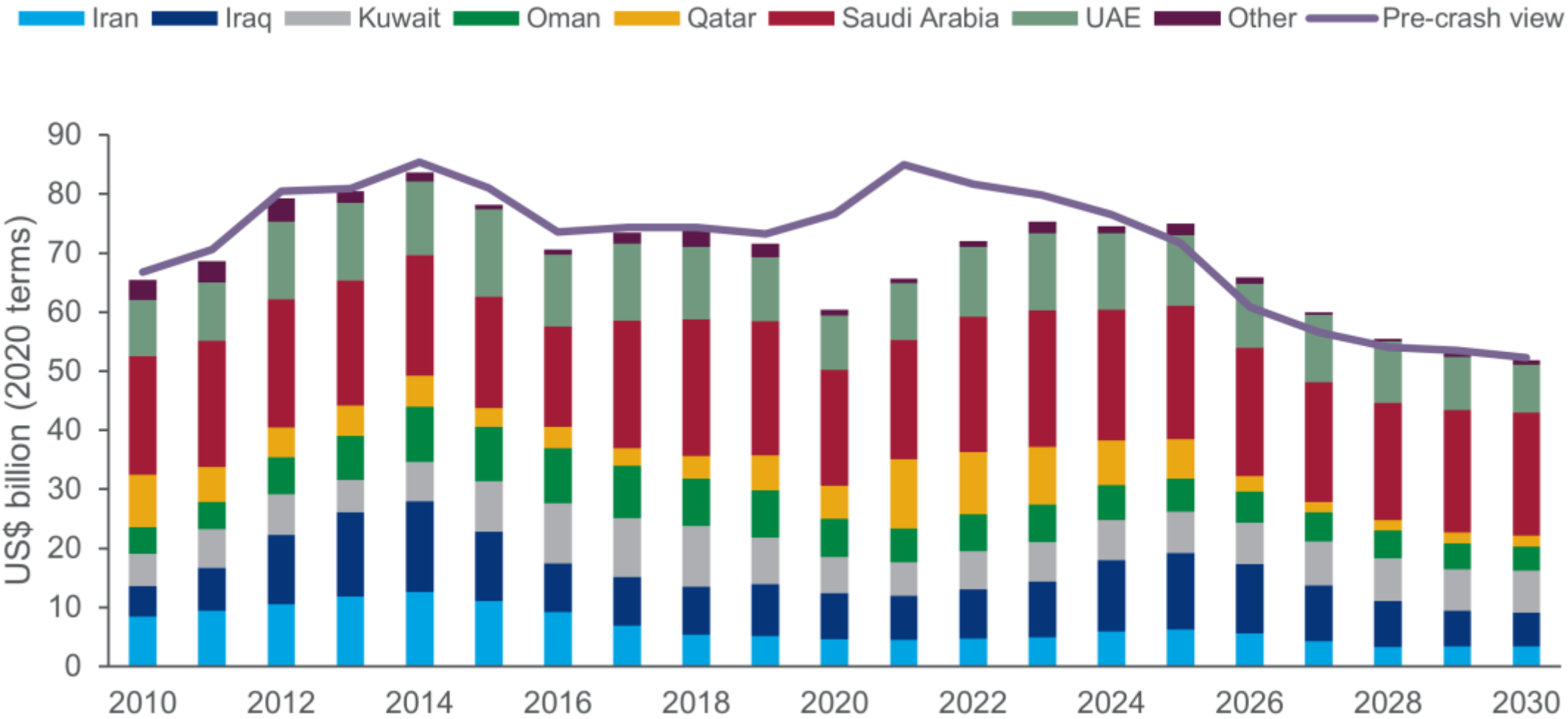
IOR / EOR

- Recovery Factor Around 25%
- Focus on IOR/EOR
- Limited access to Technology

Recovery Factor



Middle East Upstream Investment



Case Study: Total

History

1924
Establishment
year

Top 5
One of majors

€108B
Market
Capitalization

100,000+
Number of
Employees

\$ 140 B
Total Sales

\$ -7.36 B
Net Income



1954



1960



1970



1982



2003



2021

2016 Transformation

Integrating climate into strategy and Cost reduction

1. Creation of the Gas, Renewables & Power Segment

- The new Gas, Renewables & Power segment will spearhead Total's ambitions in the electricity value chain by expanding in downstream gas, renewable energies and energy efficiency.

2. Creation of a new Total Global Services segment

- This new segment is being created to sustainably improve efficiency across all businesses by globally pooling support services (Accounting, Purchasing, Information Systems, Training, Human Resources Administration and Facilities Management).

3. Corporate headquarters refocused on strategic functions

- People & Social Responsibility
- Strategy & Innovation

ONE Total

Total Global Services generating results



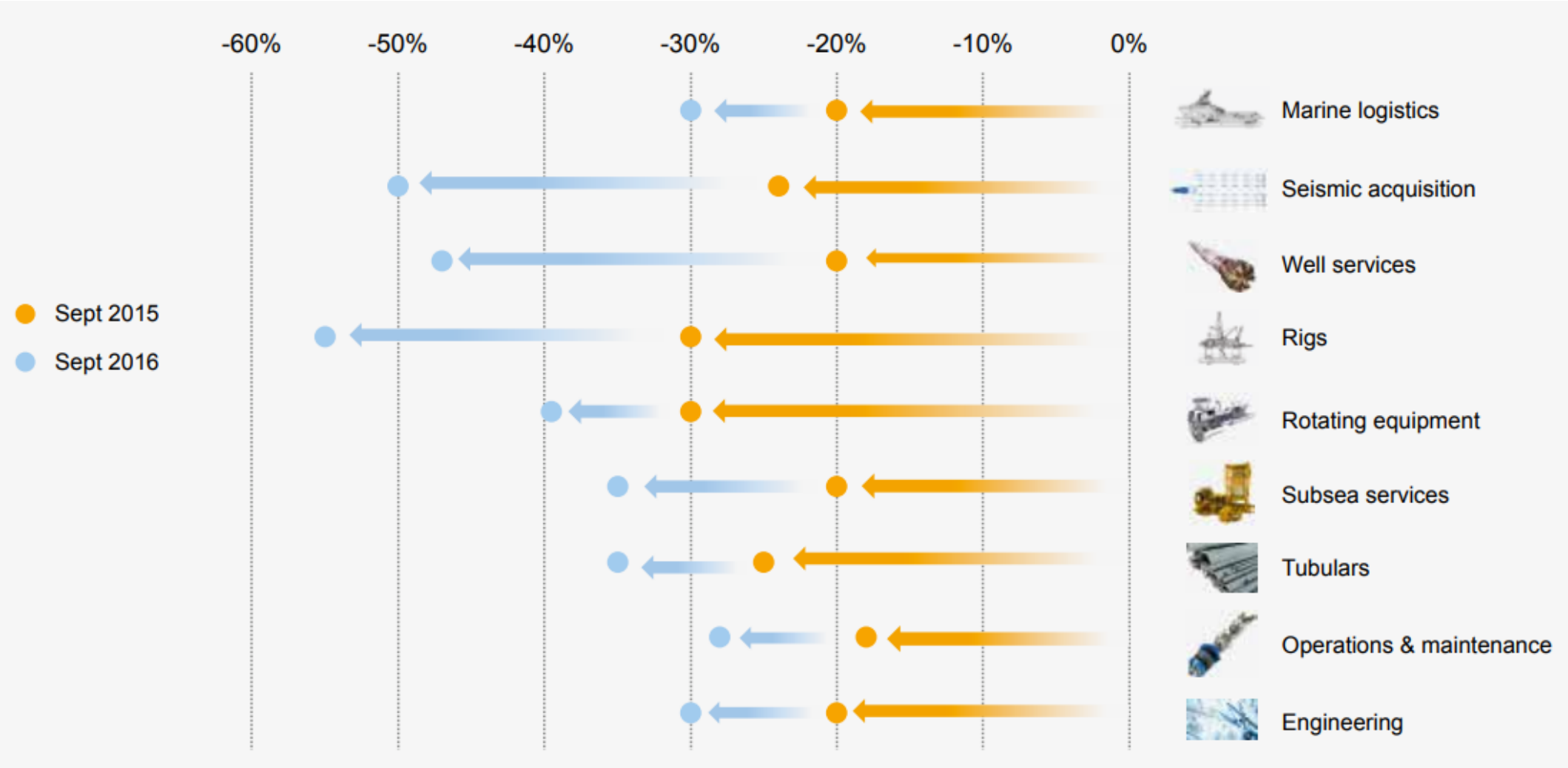
- **~400 M\$ savings in 2017** (Opex + Capex), targeting **1 B\$ by 2020**
- **40% of procurement negotiated globally**
- **Bundling contracts** with major vendors to create economies of scale

ONE TOTAL

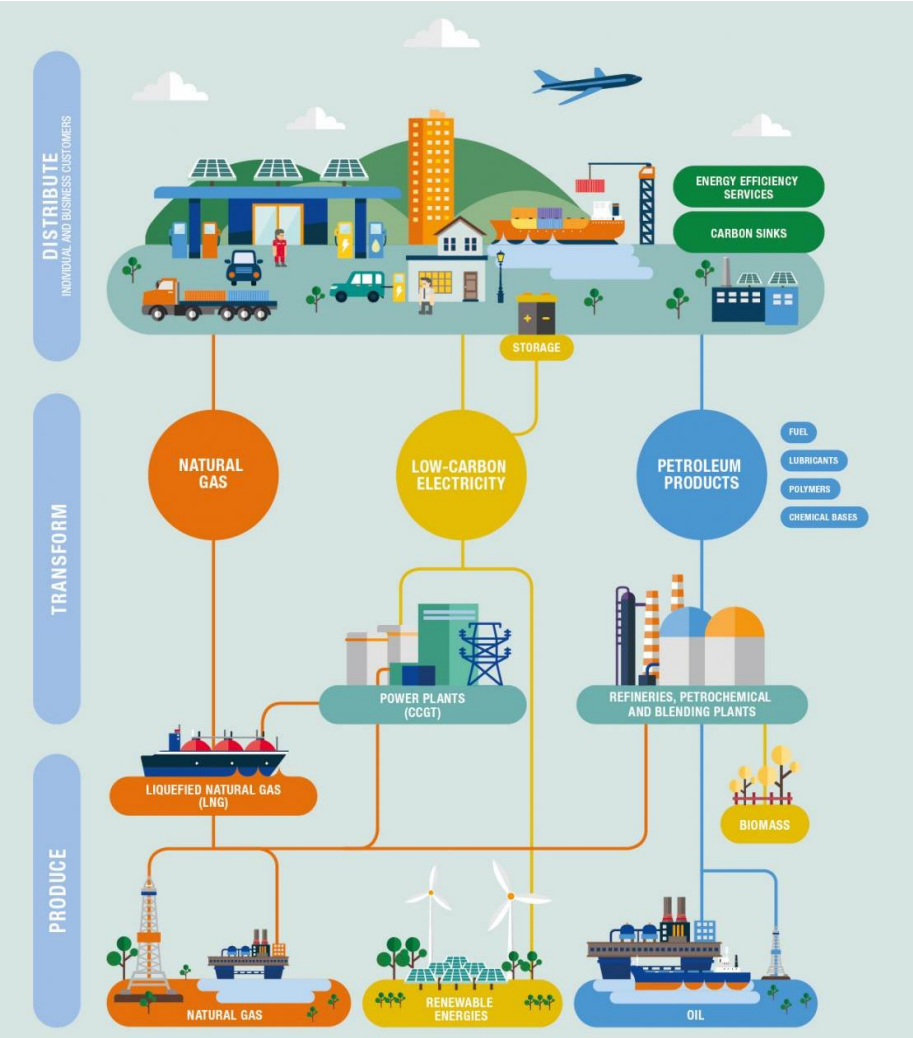


- **One Total Chair** per country
- **Cross-segment** support functions
- Group-wide **simplification program**

Cost Reduction



Integrated Business Model



Sustainable Energy Challenge

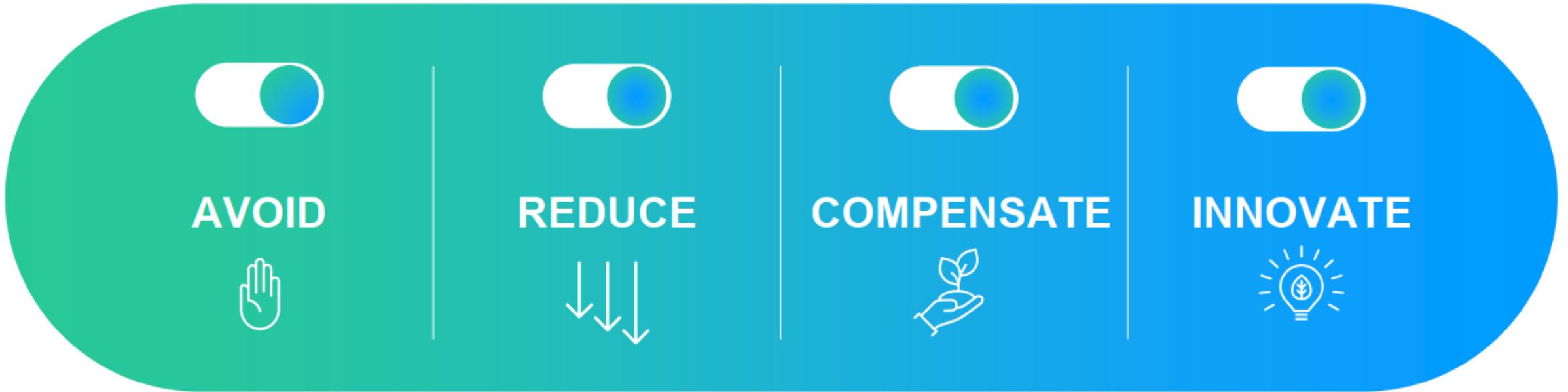
1

**Ensuring a reliable,
affordable, accessible
energy supply for a
growing world
population**

2

**Protecting the planet and
its inhabitants from the
adverse effect of greenhouse
gas emissions and their impact
on climate change**

Decarbonization levers

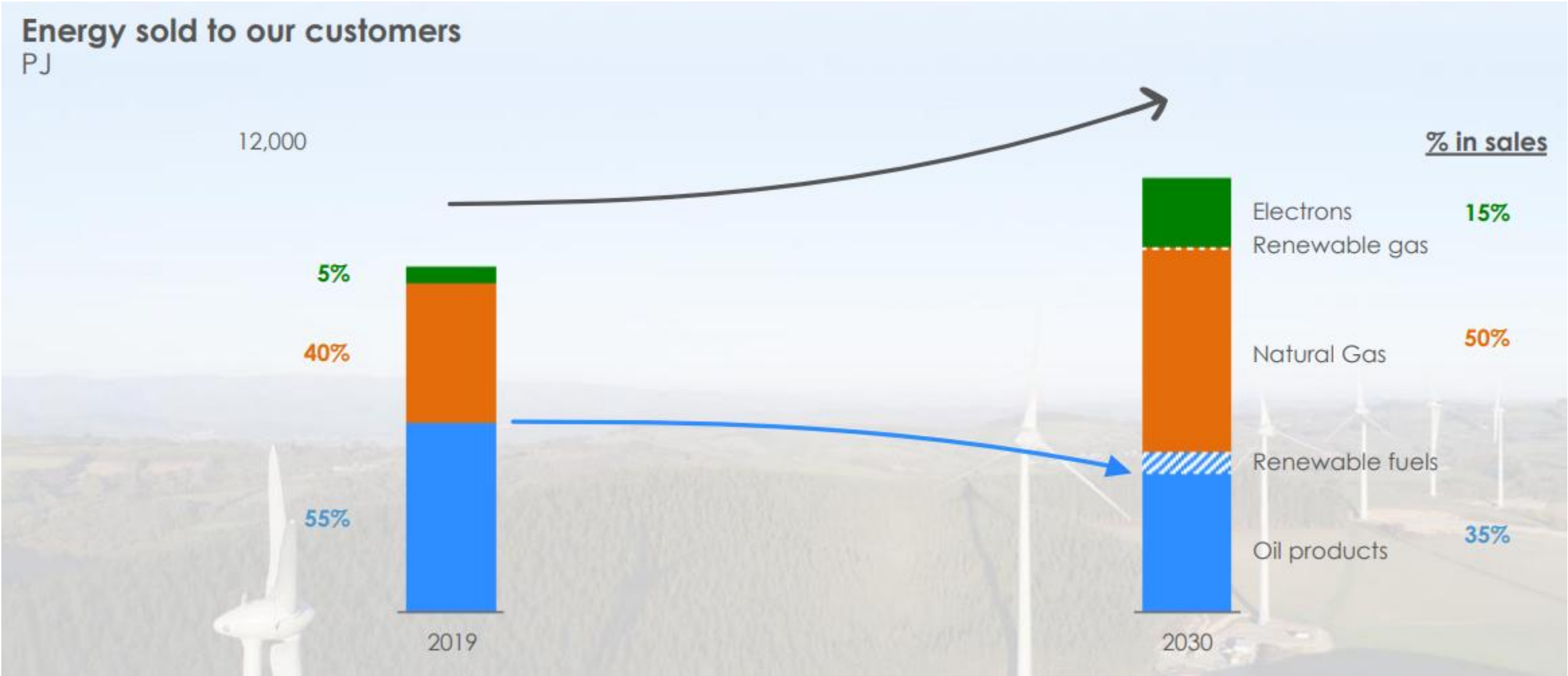


Transforming Total Into A Broad Energy Company

	Gases • Grow LNG (#2 player) and develop renewable gas (biogas / clean H₂) • Promote natural gas for power and mobility
	Renewables & Electricity • Accelerate investments in low carbon electricity primarily from renewables • Integrate along the electricity chain (production, storage, trading, supply)
	Liquids • Focus investments on low cost oil and renewable fuels (biofuels, SAF...) • Adapt refining capacity and sales to demand in Europe
	Carbon Sinks • Invest in carbon sinks (NBS and CCUS)

Total will become TotalEnergies
creating long-term value for shareholders

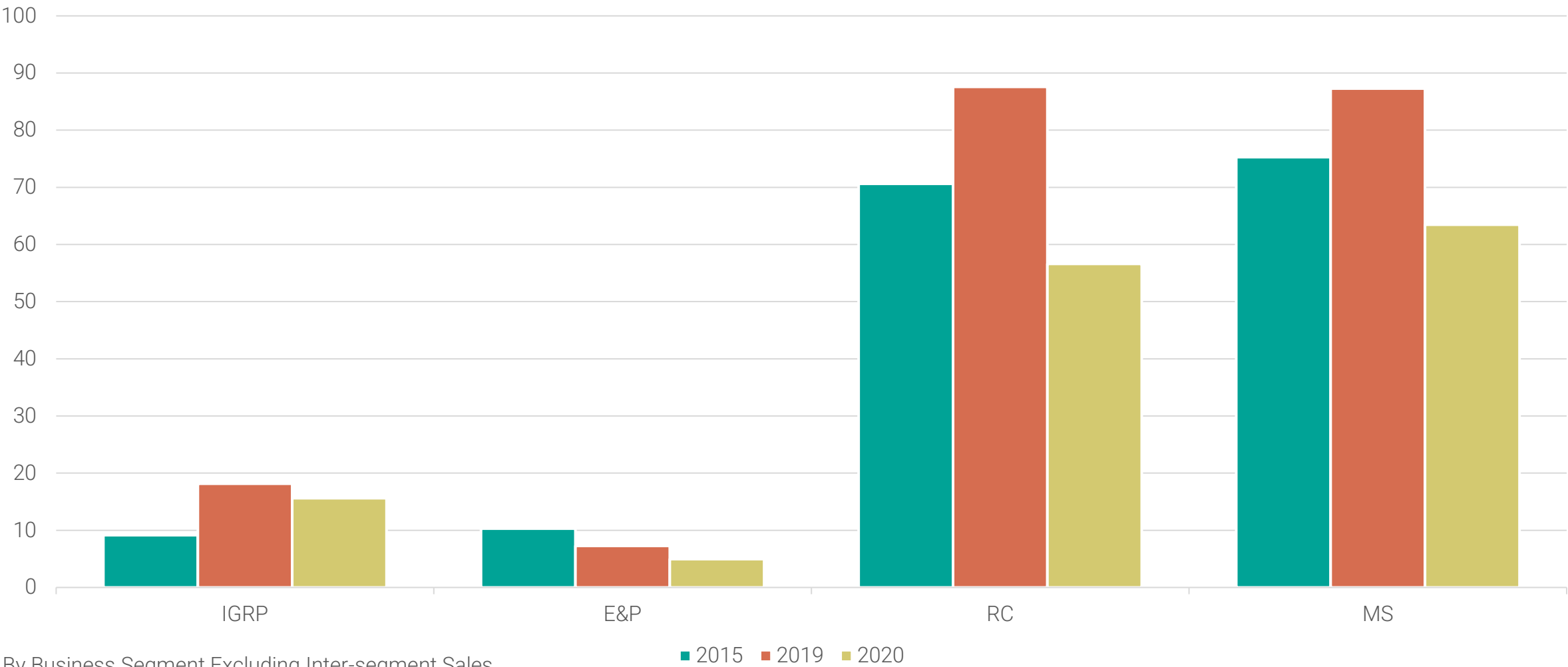
Growing Sales While Adapting To Demand



ESG Ambitions

ENVIRONMENT	SOCIAL	GOVERNANCE
		
Climate ambition to Net Zero Biodiversity new commitments Advocacy consistent with our climate ambition	Responsible employer: no lay-offs despite crisis 2025 new diversity ambition 30% women in all management bodies	Environmental and social challenges integrated in all Board decisions CEO compensation: • reduced during crisis • linked to ESG factors (25% of variable part and LTI)

Sales (\$ B)



By Business Segment Excluding Inter-segment Sales

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Net Operating Income (\$ B)



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Strategic View

Changes to Follow

Resource abundance and importance of customer preference



More competitive and productive landscape for the industry



Major changes in global economy shape and living standards



Lower for longer prices and peak demand for liquid fuels



Digitalization of the world economy with effects on the industry

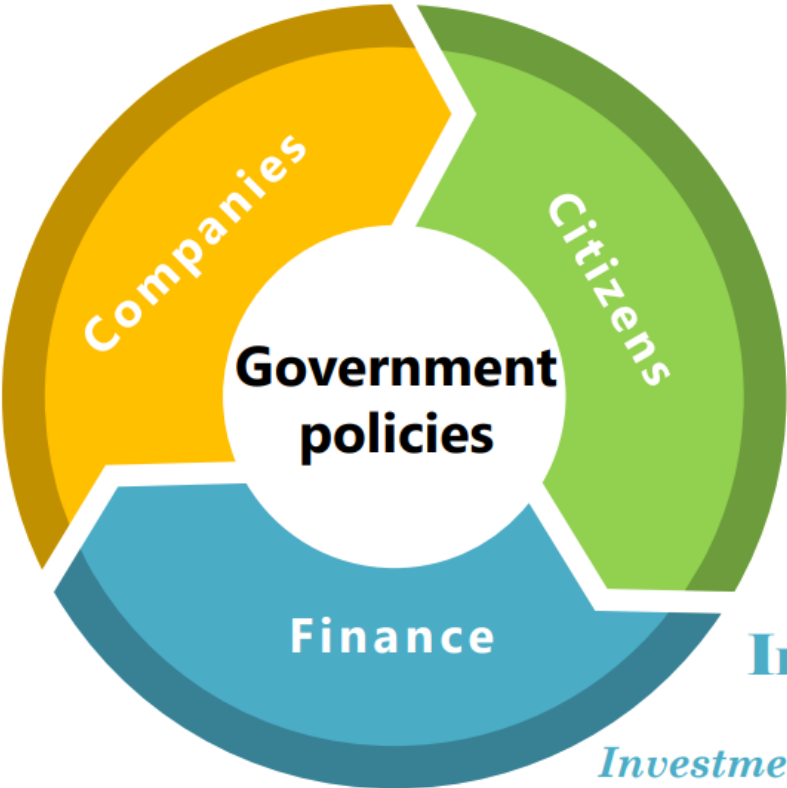


Increasing pressure from regulators and society to lower emissions



Net-zero by 2050 Demands Unprecedented Efforts

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Portfolio Management Components

E&P
corporate
strategy

Portfolio
management
model

Portfolio
strategy

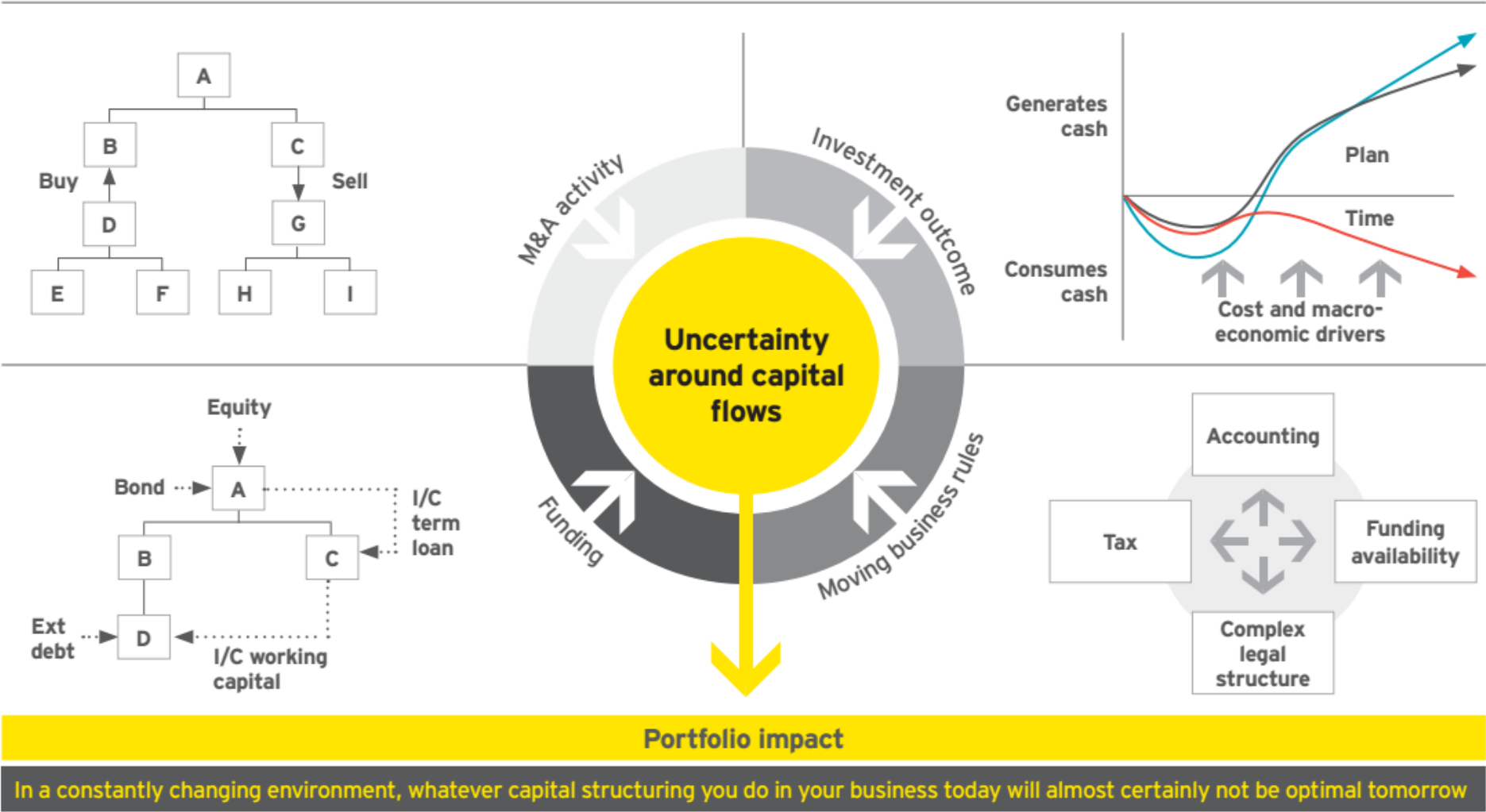
Portfolio
optimization

Performance
management

Optionality

- A company has optionality if it can quickly, effectively & efficiently shift its focus from underperforming businesses, assets & projects to better-performing ones that fit with its current strategy and enhance the overall value of the portfolio.
- A company will best leverage its optionality if it can:
 1. Proactively identify potential changes in its operating environment and review the impact of these changes on its project and portfolio
 2. Rapidly decide on a suitable course of action that would at the very least preserve, but ideally enhance, the value of its portfolio
 3. Act in a timely, cost-efficient and effective manner

Optionality at the corporate level



Shifts in Business Strategy

Company	Enhancing traditional oil and gas operations			Deploying CCUS		Supplying liquids and gases for energy transitions		Transitioning from fuel to “energy companies”			
	Reducing methane emissions	Reducing CO ₂ emissions	Sourcing renewable power	For centralised emissions	For EOR	Low-carbon gases	Advanced biofuels	Solar PV and wind generation	Other power generation	Electricity distribution/retail	Electrified services / efficiency
BP	●	●	◐	◐	◐	●	◐	●	◐	◐	●
Chevron	●	◐	●	●	◐	◐	◐	◐	○	○	◐
Eni	●	◐	●	◐	◐	◐	●	●	●	●	◐
ExxonMobil	●	◐	●	●	◐	◐	◐	○	○	○	○
Shell	●	●	●	●	◐	●	◐	●	●	●	●
Total	●	●	●	◐	◐	●	●	●	●	●	●
CNPC	◐	○	◐	◐	●	◐	◐	●	○	○	○
Equinor	●	●	●	●	◐	◐	◐	●	○	◐	◐
Petrobras	◐	◐	●	●	●	●	◐	◐	●	◐	○
Repsol	●	●	◐	◐	◐	◐	◐	●	●	●	◐

Notes: PV = photovoltaic. **Full circle** = growth area supported by observed strategic investments (e.g. M&A) and/or capital/operational expenditures in commercial-scale activities; **half circle** = announced strategy and/or minor investments, venture capital and/or research and development (R&D) spending; **empty circle** = limited evidence of investment activity. **For methane and CO₂ emissions**, which are not based on project and spending data, assessments reflect the presence and strength of methane reduction and emissions intensity targets, as well as evidence of their implementation, the emissions intensity trend of new investment, transparent reporting of absolute emissions and sources, and linking of executive and staff compensation to achieving goals. Power generation and efficiency investments in the Transitioning category pertain to projects destined for commercial sales (not own use). Electrified services include battery storage and EV charging. Low-carbon gases include low-carbon hydrogen and biomethane.

Strategic Decisions

Focus on Core Competencies

Deploying key internal capabilities and divesting non-core assets through bold M&A action (DNO, BP, Perenco)

Diversification and Internationalization

Developing into other geographies and investment in new opportunities (QP)

Low-carbon Investment

Investment in gas and renewables with a focus on carbon capture and hydrogen (BP)

Integration and Consolidation

Mergers of several assets and building integrated companies (Aramco, OQ, ADNOC)

Partnership

Leveraging technical and financial capabilities and securing supply chain from sourcing to sales (ADNOC)

“THE Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil.”

Sheikh Zaki Yamani

