Oil Market Outlook

Focus on the trends for the next 5 years

- A lot of interesting developments for trade flows, refining, product differentials, etc



DNB oil story in pictures & graphs

April 2018 - Torbjørn Kjus

DNB

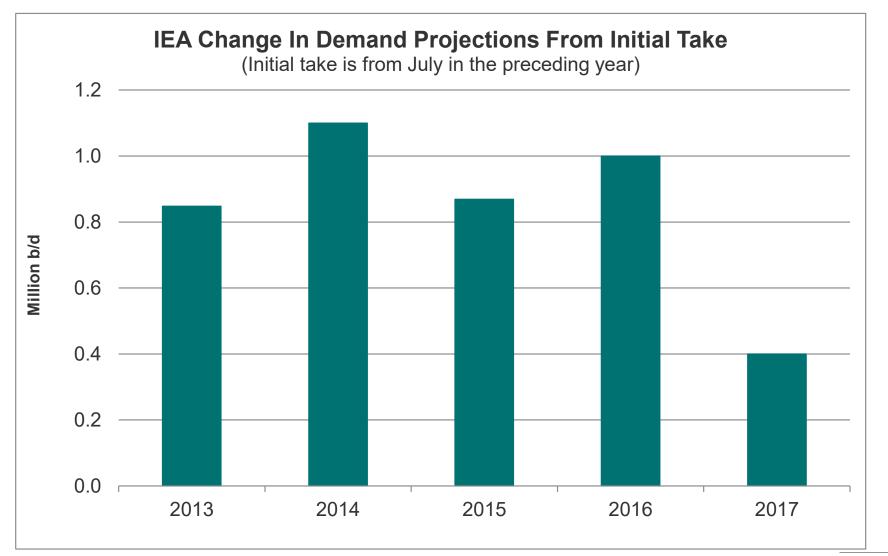
The World Is Undoubtedly Still Thirsty For Oil

- US demand growth strong at low prices – Asia less price elastic, driven by population growth and a growing middle class



IEA Has Been To Negative To Oil Demand The Past 5 Years

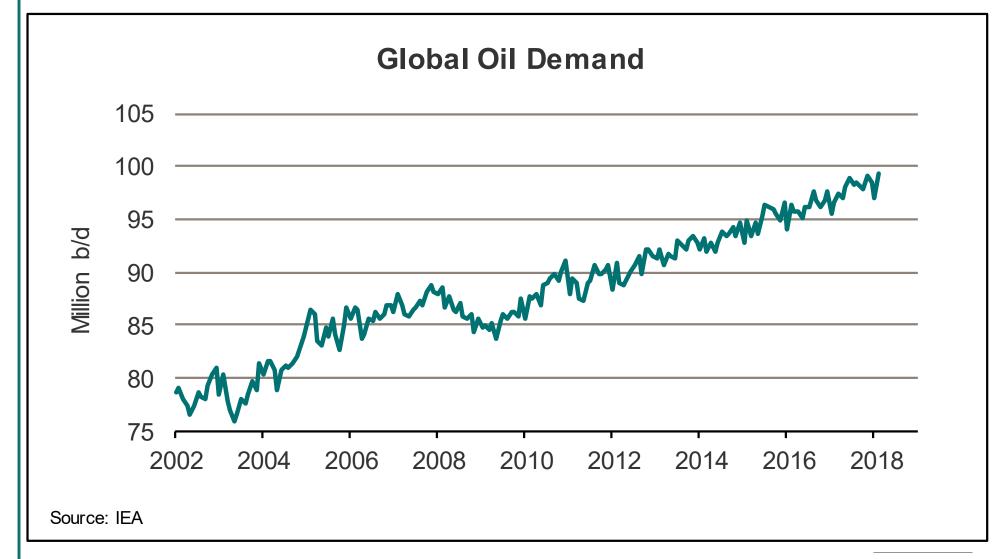
- Demand has on average come in 0.8 million b/d stronger than what IEA predicted 6 months before the year started





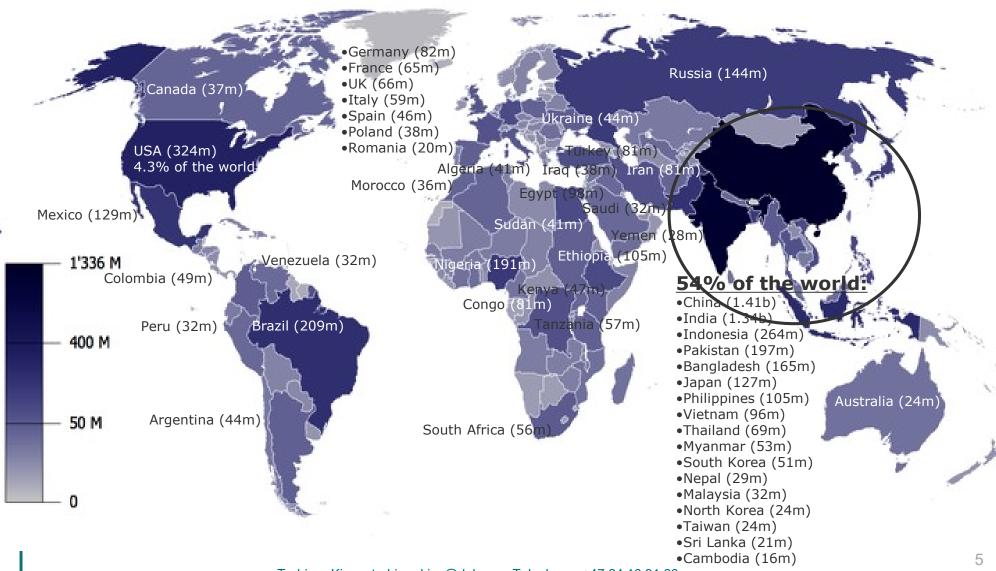
Global Oil Demand Keeps Growing

- Not easy to see any peak in oil demand for the next 5 years



World Population By Country

(Source: United Nations Population Division 2017)



2018-23 Demand Increases in Non-OECD Decreases In OECD

- Key growth expected in the petrochemical sector but still solid growth for diesel and gasoline demand in non-OECD

World

Oil demand by product	2018	%	2023	%	2023 vs 2018	2023 vs 2018 %
LPG & Ethane	12.1	12%	13.6	13%	1.5	27%
Naphtha	6.4	6%	7.2	7%	0.8	15%
Motor Gasoline	26.2	26%	27.0	26%	0.8	15%
Jet fuel & Kerosene	7.6	8%	8.0	8%	0.4	7%
Gasoil/Diesel	28.5	29%	29.3	28%	0.8	15%
Residual Fuel Oil	7.3	7%	7.9	8%	0.6	11%
Other**	11.1	11%	11.7	11%	0.6	11%
Total	99.2	100%	104.7	100%	5.5	100%
Total refined products	80.7		83.9		3.2	(0.64 mbd per year)

Ethane, LPG and Naphtha can be produced from natural gas and do not necessarily need a refinery in the middle

Non-OECD

Oil demand by product	2018	%	2023	%	2023 vs 2018	2023 vs 2018 %
	2010	70	2023			2023 V3 2010 /0
LPG & Ethane	6.7	7%	7.7	7%	1.0	16%
Naphtha	2.8	3%	3.4	3%	0.6	11%
Motor Gasoline	11.7	12%	13.3	13%	1.7	28%
Jet fuel & Kerosene	3.2	3%	3.7	4%	0.5	7%
Gasoil/Diesel	15.0	15%	16.2	16%	1.2	20%
Residual Fuel Oil	5.2	5%	5.8	6%	0.6	9%
Other**	7.2	7%	7.7	7%	0.5	9%
Total	51.8	52%	57.9	55%	6.1	100%
Total refined products	42.3		46.8		4.5	(0.9 mbd per year)

Ethane, LPG and Naphtha can be produced from natural gas and do not necessarily need a refinery in the middle

OECD

Oil demand by product	2018	%	2023	%	2023 vs 2018 2023 vs 2018 %
LPG & Ethane	5.4	5%	6.0	6%	0.5
Naphtha	3.6	4%	3.8	4%	0.2
Motor Gasoline	14.6	15%	13.7	13%	-0.9
Jet fuel & Kerosene	4.4	4%	4.3	4%	0.0
Gasoil/Diesel	13.5	14%	13.1	12%	-0.4
Residual Fuel Oil	2.1	2%	2.1	2%	0.0
Other**	3.9	4%	4.0	4%	0.1
Total	47.4	48%	46.8	45%	-0.6
Total refined products	38.4		37.1	_	-1.3 (-0.26 mbd per year)

Ethane, LPG and Naphtha can be produced from natural gas and do not necessarily need a refinery in the middle

Asia Is The Key For Further Demand Growth

- Diesel continues to grow outside China but gasoline demand continues to grow in China
- Asia will be behind 2.7 mbd out of 3.2 mbd growth in demand for refined products (84%)

Non-OECD Asia excl. China

Oil demand by product	2018	%	2023	%	2023 vs 2018	2023 vs 2018 %
LPG & Ethane	1.7	2%	2.0	2%	0.2	12%
Naphtha	1.2	1%	1.4	1%	0.2	11%
Motor Gasoline	2.5	3%	3.0	3%	0.5	22%
Jet fuel & Kerosene	1.1	1%	1.3	1%	0.2	9%
Gasoil/Diesel	4.1	4%	4.7	5%	0.7	33%
Residual Fuel Oil	1.7	2%	1.7	2%	0.1	2%
Other**	1.7	2%	1.9	2%	0.2	10%
Total	13.8	14%	15.8	15%	2.0	100%
Total refined products	11.0		12.5		1.6	(0.32 mbd per year)

Ethane, LPG and Naphtha can be produced from natural gas and do not necessarily need a refinery in the middle

China

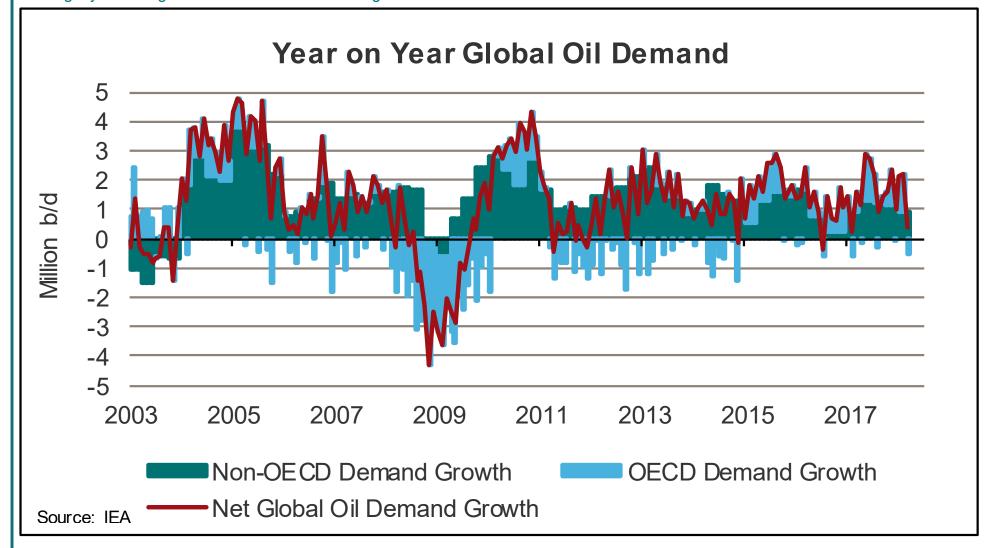
Offilia						
Oil demand by product	2018	%	2023	%	2023 vs 2018	2023 vs 2018 %
LPG & Ethane	1.7	2%	1.9	2%	0.2	11%
Naphtha	1.2	1%	1.5	1%	0.3	20%
Motor Gasoline	3.1	3%	3.8	4%	0.8	47%
Jet fuel & Kerosene	8.0	1%	0.9	1%	0.1	9%
Gasoil/Diesel	3.5	4%	3.5	3%	0.0	-3%
Residual Fuel Oil	0.4	0%	0.4	0%	0.0	2%
Other**	2.3	2%	2.5	2%	0.2	14%
Total	12.8	13%	14.4	14%	1.6	100%
Total refined products	9.9		11.0		1.1	(0.22 mbd per year)

Ethane, LPG and Naphtha can be produced from natural gas and do not necessarily need a refinery in the middle



Global Oil Demand Keeps Growing

- Slightly weaker growth in non-OECD but stronger in OECD



DNR

The FID-slump From 2014-16 Will Hit The 2020-23 Market

- The lack of FIDs are even more important than the lack of CAPEX, because we will soon run out of large startups

A big jump in new sanctions....but for a different type of project

Under a third of the 32 major projects sanctioned in 2017 could be considered 'greenfield'

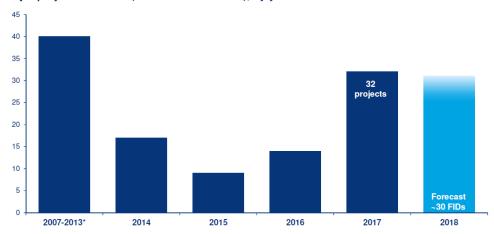
Sanctioned major* projects in 2017 by country, theme and operator



Confidence has returned to the conventional sector, evidenced by the rise in new sanctions

We are expecting ~30 FIDs in 2018, with the focus remaining on smaller, leaner projects

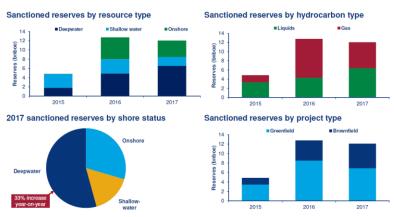
Major project sanctions (50+ mmboe reserves), by year



Source: Wood Mackenzie's Pre-FID Upstream Project Tracker *Projects with commercial reserves greater than 50 mmboe

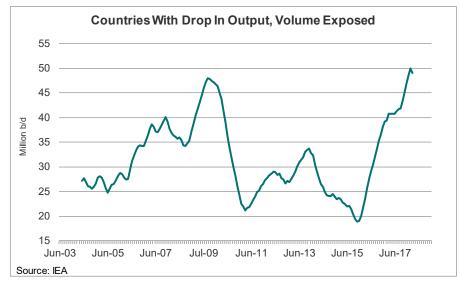
2017 in a nutshell: more oil, more brownfield and more deepwater

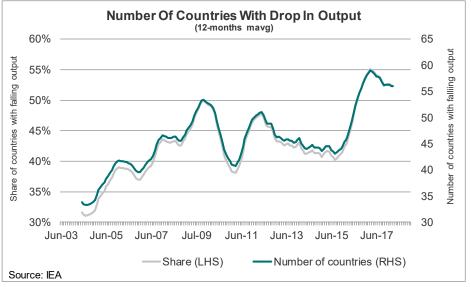
But also more smaller projects - over 50% have reserves under 200 mmboe

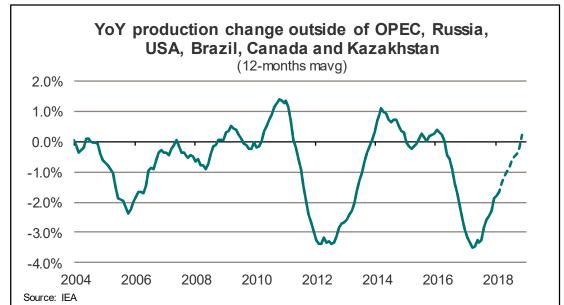


Accelerating Number Of Countries In Decline

- And also accelerating volume exposed, will gradually be more visible as legacy startups of projects dry out. Already visible in the 25% of the oil market that is outside OPEC, USA, Russia, Brazil, Canada, Kazakhstan

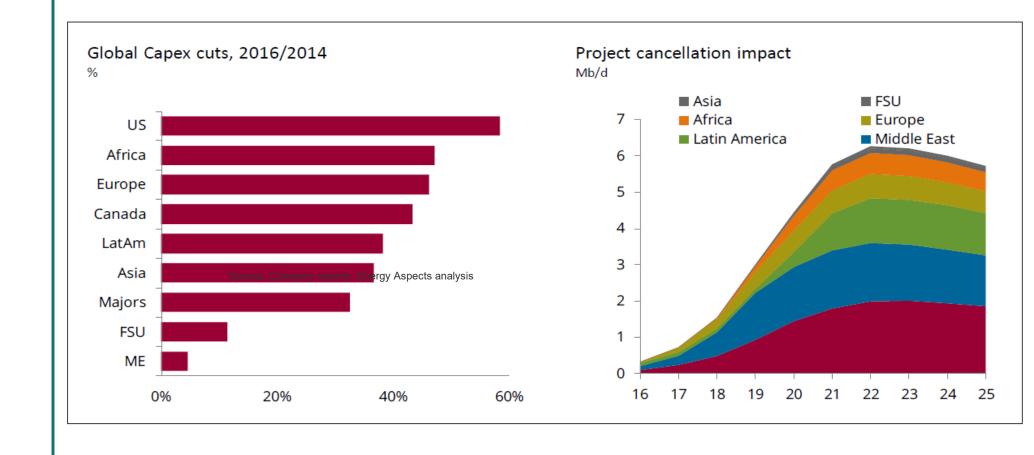






The CAPEX Cuts From 2014-2016 Will Hit Future Production

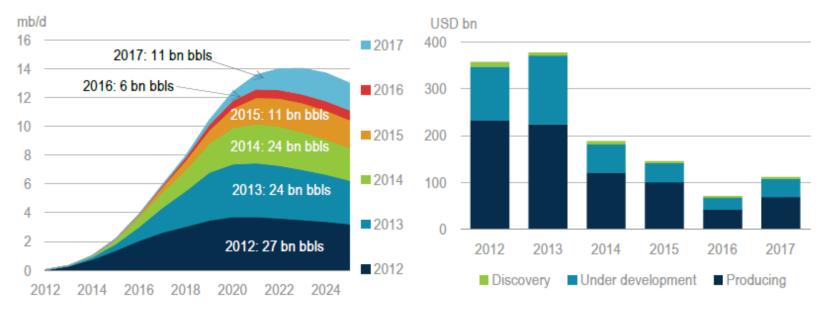
- This means that OPEC has achieved to push long lead time expensive resources out of the market for a while
- Source for the data below is Energy Aspects



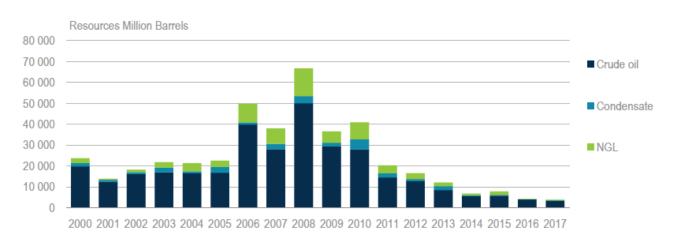
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Global Resource Discoveries Record Low Recently

- And the ramp-up from the 2012-2015 FIDs will be done by 2020

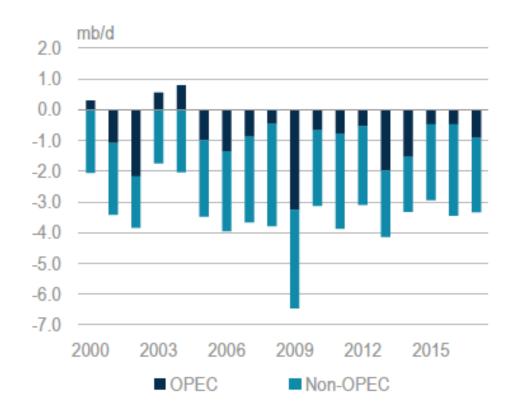


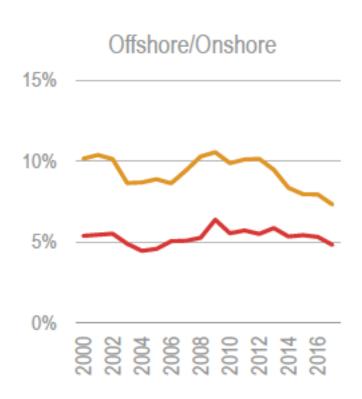
Source: IEA analysis of Rystad data. Note: Includes oil sands, excludes LTO



Annual Supply Loss From Post-Peak Conventional Crude Fields

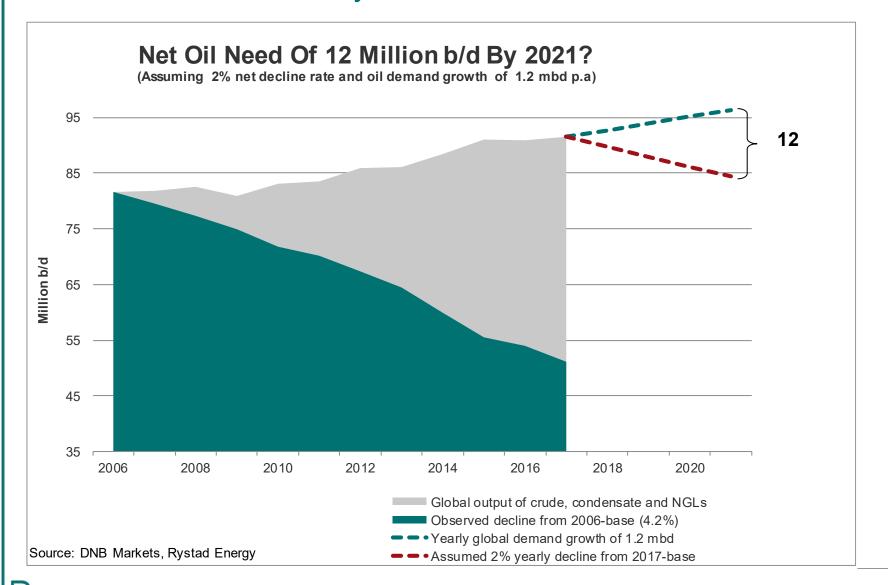
- Source: IEA Oil Market Report 2018





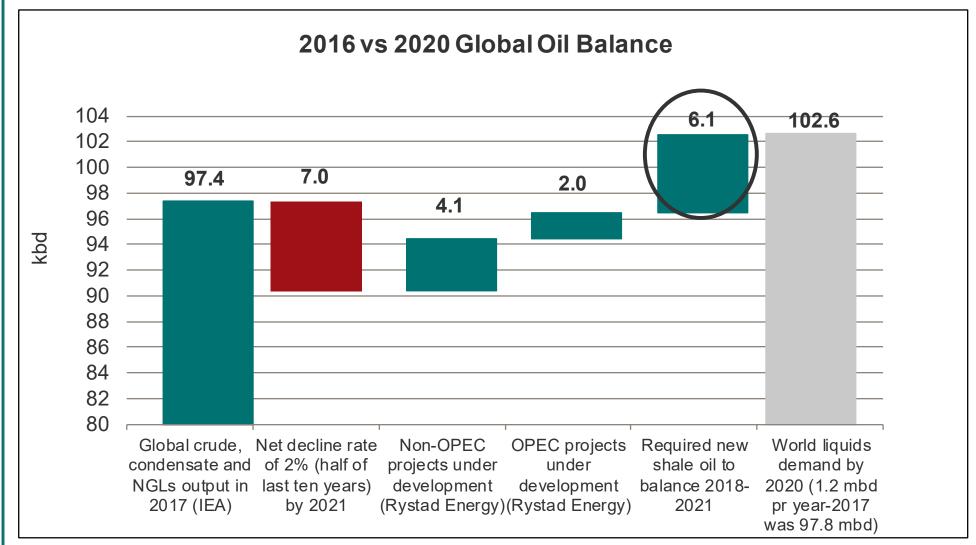
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Net Need Of 12 Mbd By 2021 – Translates To 3 mbd Per Year



Net Need For Shale Of 6.1 mbd From 2018-2021

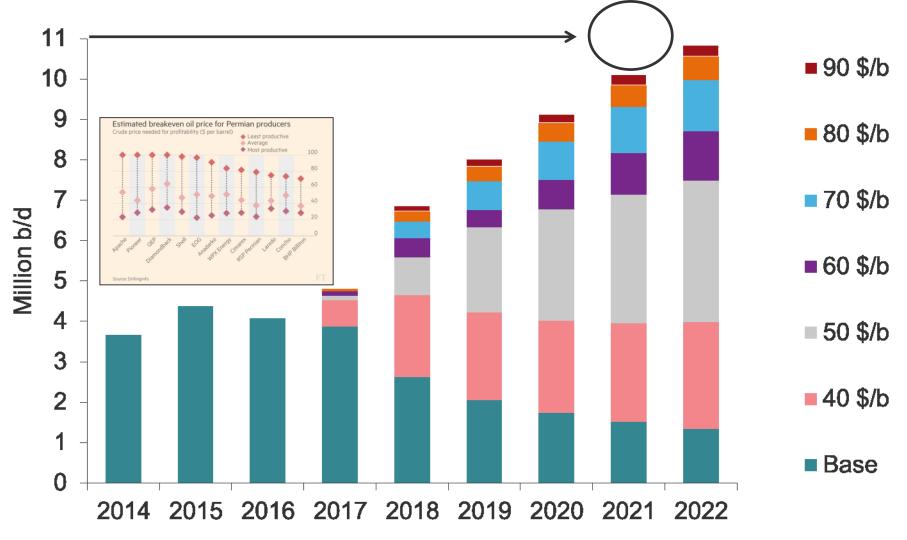
- Average growth of 1.5 mbd per year required by 2021 - US shale must grow from 4.3 mbd to 9.4 mbd



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What Kind Of Brent Price Is Required For Economic Barrels?

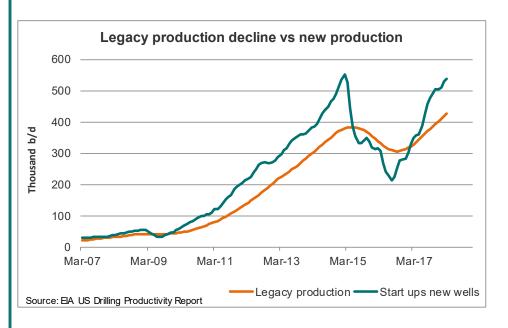
- Our "call on US shale" in 2021 is 11 million b/d. The Brent price must then be higher than the 50-60 range.

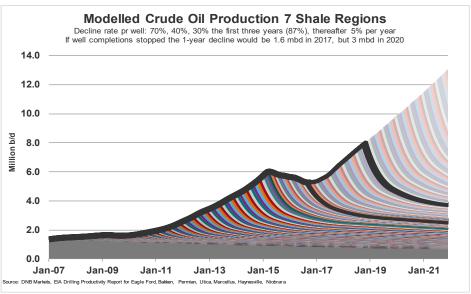


Source for break even calculations: PIRA Energy - July 2017 (calculation using 10% cost of capital and is showing Brent equivalent prices, not wellhead prices)

Legacy Decline Rising Quickly As New Wells Are Completed

- Since legacy production now increases again there would be a need to complete a larger number of wells each month to stay flat

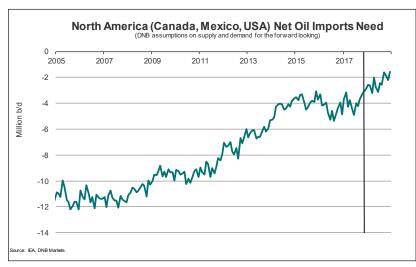


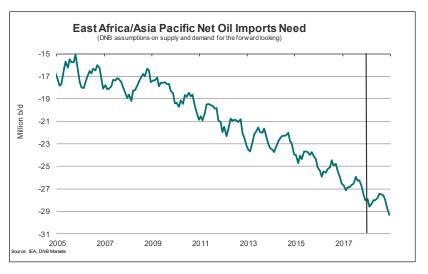


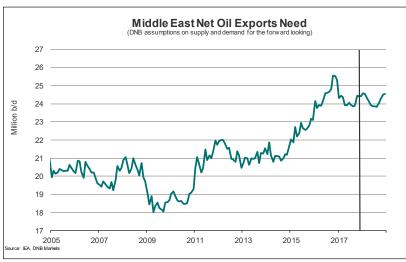
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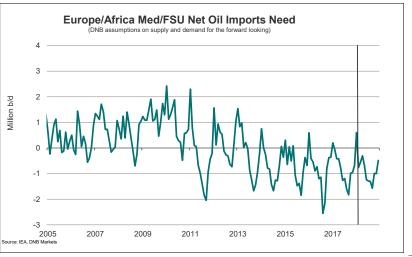
North America Soon Net Long – Growing Net Short In Asia

- Europe and the Med turned to a small net short; Middle East and North America will have to cover the short in Asia/Europe



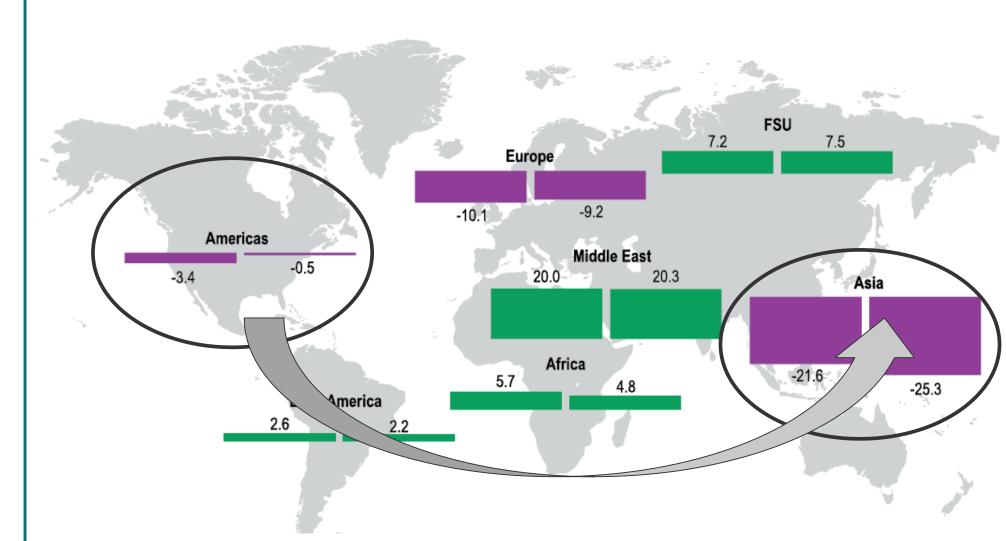






Regional Crude Oil Balances 2017-2023

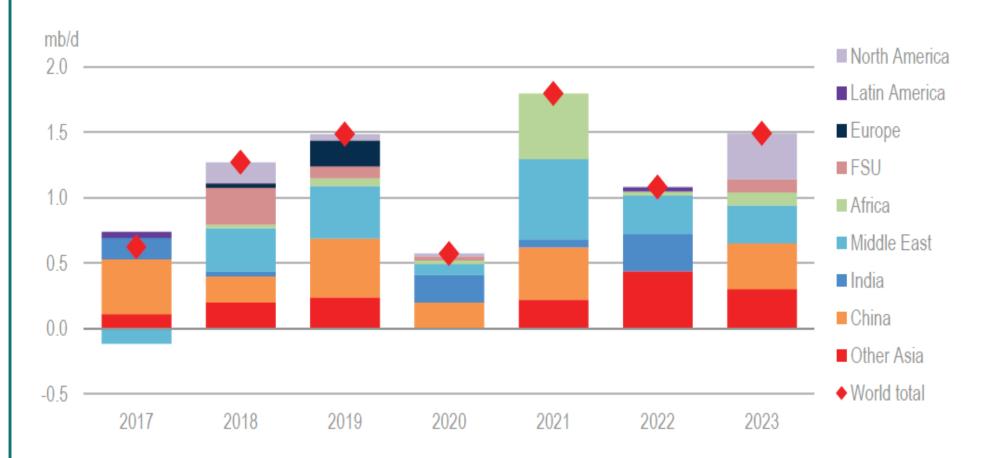
- Source: IEA Oil Market Report 2018



Global Refinery Capacity Additions

- Source: IEA Oil Market Report 2018

Most of the capacity additions are set to take place in Asia/Middle East



DNB

"Call on OPEC" Seen Up 1.8 million b/d 2018-2023

- But this capacity growth assumes more political stability and access to capital in Iraq, Iran and Libya...

Table 1 WORLD OIL SUPPLY AND DEMAND

(million barrels per day)

	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	2019	2020	2021	2022	2023
OECD DEMAND															
Americas	24.7	24.6	25.1	25.1	24.9	24.8	24.7	25.2	25.2	25.0	25.1	25.1	25.0	24.9	24.9
Europe	14.1	14.3	14.7	14.3	14.3	14.1	14.4	14.7	14.3	14.4	14.4	14.3	14.2	14.2	14.1
Asia Oceania	8.7	7.7	7.9	8.4	8.2	8.5	7.5	7.7	8.3	8.0	8.0	8.0	7.9	7.9	7.9
Total OECD	47.4	46.6	47.6	47.8	47.4	47.5	46.6	47.7	47.9	47.4	47.6	47.4	47.2	47.0	46.8
NON-OECD DEMAND															
FSU	4.5	4.7	5.0	4.9	4.8	4.6	4.8	5.1	5.0	4.9	4.9	5.1	5.2	5.3	5.3
Europe	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	8.0	0.8	0.8	0.8
China	12.1	12.4	12.4	12.8	12.5	12.5	12.8	12.8	13.2	12.8	13.2	13.5	13.8	14.1	14.4
Other Asia	13.4	13.4	13.0	13.5	13.3	13.9	13.9	13.5	14.0	13.8	14.2	14.6	15.0	15.4	15.8
Latin America	6.4	6.5	6.7	6.7	6.6	6.4	6.6	6.8	6.8	6.7	6.7	6.8	6.9	7.0	7.1
Middle East	7.8	8.3	8.7	8.2	8.3	8.1	8.5	9.0	8.4	8.5	8.6	8.8	9.0	9.2	9.4
Africa	4.4	4.3	4.2	4.3	4.3	4.5	4.4	4.3	4.4	4.4	4.5	4.6	4.7	4.8	5.0
Total Non-OECD	49.3	50.4	50.8	51.2	50.4	50.6	51.7	52.1	52.6	51.8	52.9	54.1	55.4	56.7	57.9
Total Demand ¹	96.7	97.0	98.4	99.0	97.8	98.1	98.4	99.8	100.4	99.2	100.4	101.5	102.6	103.7	104.7
OECD SUPPLY															
Americas	19.9	19.8	20.2	21.1	20.2	21.3	21.6	22.0	22.6	21.9	23.0	23.5	23.9	24.3	24.4
Europe	3.7	3.5	3.3	3.4	3.5	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.7	3.8	3.8
Asia Oceania	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.6	0.6	0.5	0.5
Total OECD	24.0	23.6	23.9	24.9	24.1	25.3	25.5	25.8	26.6	25.8	26.9	27.6	28.2	28.6	28.8
NON-OECD SUPPLY															
FSU	14.4	14.3	14.3	14.4	14.4	14.4	14.4	14.4	14.5	14.4	14.6	14.7	14.8	14.7	14.7
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.9	3.9	3.8	3.8	3.9	3.8	3.8	3.8	3.7	3.8	3.7	3.6	3.6	3.6	3.6
Other Asia	3.5	3.4	3.4	3.4	3.5	3.4	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.0	2.9
Latin America	4.6	4.5	4.5	4.5	4.5	4.6	4.7	4.6	4.8	4.7	5.0	5.1	5.1	5.3	5.4
Middle East	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1
Africa	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.5
Total Non-OECD	29.5	29.3	29.2	29.3	29.3	29.3	29.3	29.2	29.4	29.3	29.7	29.6	29.5	29.4	28.6
Processing Gains ²	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5
Global Biofuels	1.9	2.4	2.8	2.4	2.4	2.0	2.5	2.8	2.5	2.5	2.6	2.7	2.7	2.8	2.8
Total Non-OPEC ³	57.7	57.7	58.2	58.9	58.1	58.9	59.7	60.2	60.8	59.9	61.5	62.4	62.8	63.2	63.3
OPEC															
Crude ³	32.1	32.3	32.7	32.3	32.3										
OPEC NGLs	6.8	6.9	6.9	6.9	6.9	6.9	6.9	7.0	7.0	7.0	7.1	7.1	7.2	7.3	7.3
Total OPEC ³	38.9	39.2	39.6	39.2	39.2										

32.2 32.4 33.3 33.2 32.8

2018-2023:

Total Demand growth: 5.5 mbd
Total Non-OPEC growth: 3.4 mbd
OPEC NGLs: 0.3 mbd
Call on OPEC: 1.8 mbd

MARKETS

32.3 31.8 32.6 32.6 32.3

OPEC Capacity Seen Up 0.85 million b/d 2018-2023

- But this capacity growth assumes more political stability and access to capital in Iraq, Iran and Libya...

	2017	2018	2019	2020	2021	2022	2023	2017-23
Algeria	1.10	1.08	1.07	1.05	1.03	1.02	1.00	-0.10
Angola	1.65	1.65	1.60	1.56	1.47	1.39	1.29	-0.37
Ecuador	0.54	0.54	0.55	0.55	0.55	0.56	0.56	0.02
Equatorial Guinea	0.13	0.12	0.12	0.12	0.11	0.11	0.11	-0.02
Gabon	0.21	0.21	0.20	0.20	0.20	0.20	0.20	-0.01
Iran	3.80	3.85 -	3.90	3.96	4.01	4.07	→ 4.13	0.33
Iraq	4.77	4.86	4.96	5.07	5.17	5.26	→ 5.36	0.59
Kuwait	2.94	2.95	3.07	3.10	3.11	3.11	3.11	0.17
Libya	1.00	1.02 -	1.04	1.00	1.14	1.10	→ 1.24	0.24
Nigeria	1.70	1.79	1.82	1.83	1.80	1.78	1.75	0.05
Qatar	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.00
Saudi Arabia	12.16	12.14	12.31	12.28	12.31	12.30	12.30	0.14
UAE	3.17	3.23	3.29	3.35	3.41	3.48	3.53	0.36
Venezuela	1.75	1.38	1.17	1.06	1.05	1.07	1.10	-0.65
Total OPEC	35.56	35.46 -	35.76	35.84	36.00	36.17	> 36.31	0.75

Note: Capacity levels can be reached within 90 days and sustained for an extended period. Assumes restart to Neutral Zone by end 2019.

Total OPEC capacity increase 2018-23: **0.85 mbd**

of which

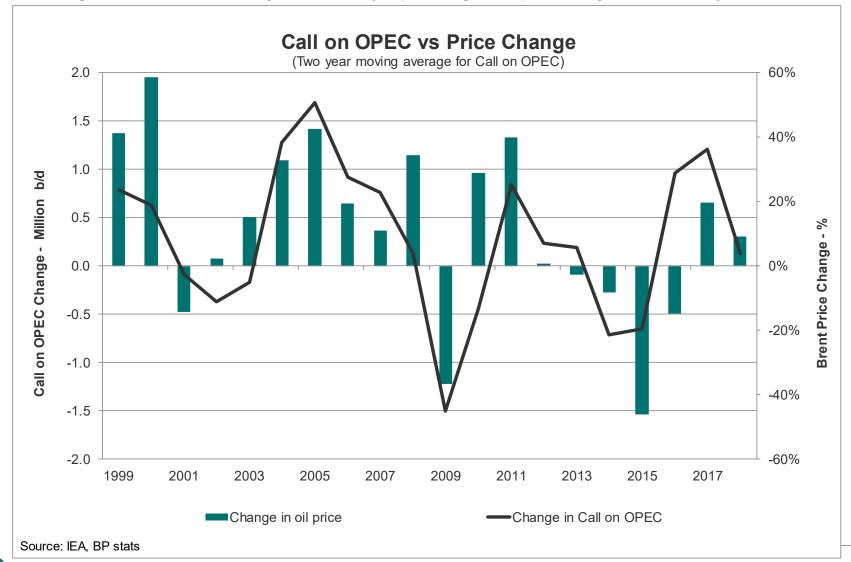
Iran: +0.3 mbd Iraq: +0.5 mbd Libya:+ 0.2 mbd

MARKETS

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Once Again The Change In "Call on OPEC" Lead The Way

- The change in call on OPEC once again led the way in predicting the oil price changes between the years



DNB Markets Commodities



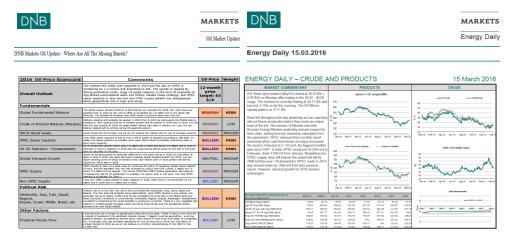
DNB Markets Commodities in brief

- DNB Markets Commodities serves corporate clients of DNB Bank ASA globally with advisory, market analysis, hedging, and origination within commodities.
- Cost-efficient and flexible trading in risk management instruments with tailormade collateral solutions. Transacting derivatives on credit lines thereby reducing capital constraints.
- Experienced dealers, traders and analysts with industry background offering 24/7 markets coverage with wide market access.
- Daily market reports and in-depth commodity market analysis.
- Global reach with dedicated Commodity teams in Oslo, Stockholm, London, New York, Singapore and Shanghai.

Sector commodity offering



Oil & Gas - Research and reports



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Oslo, Sales & Trading Nils Fredrik Hvatum Kenneth Tveter Sebastian Malmstein

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