Enerji 101 – Ders 5
Petrol ve Doğalgaz

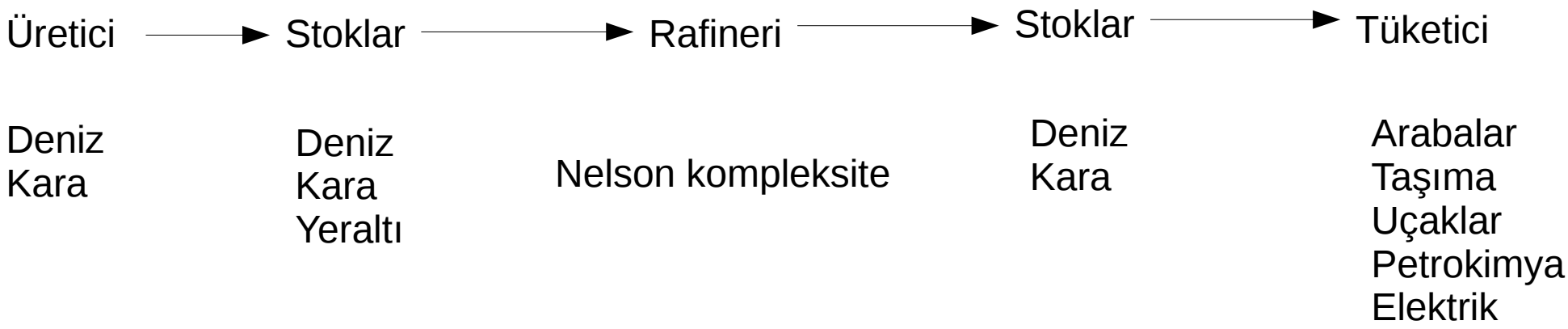
Barış Sanlı

Kaynaklar

- Oil Market Report, https://www.iea.org/oilmarketreport/omrpublic/
- Oil 101, Morgan Downey
- Gas Trading Manual: A Comprehensive Guide to the Gas Markets, Gay Wenban-Smith, Geoff Moore, David Long
- Natural Gas: Fuel for the 21st Century, Vaclav Smil
- OPEC Monthly oil report, https://momr.opec.org/
- CME, understanding the oil data report,

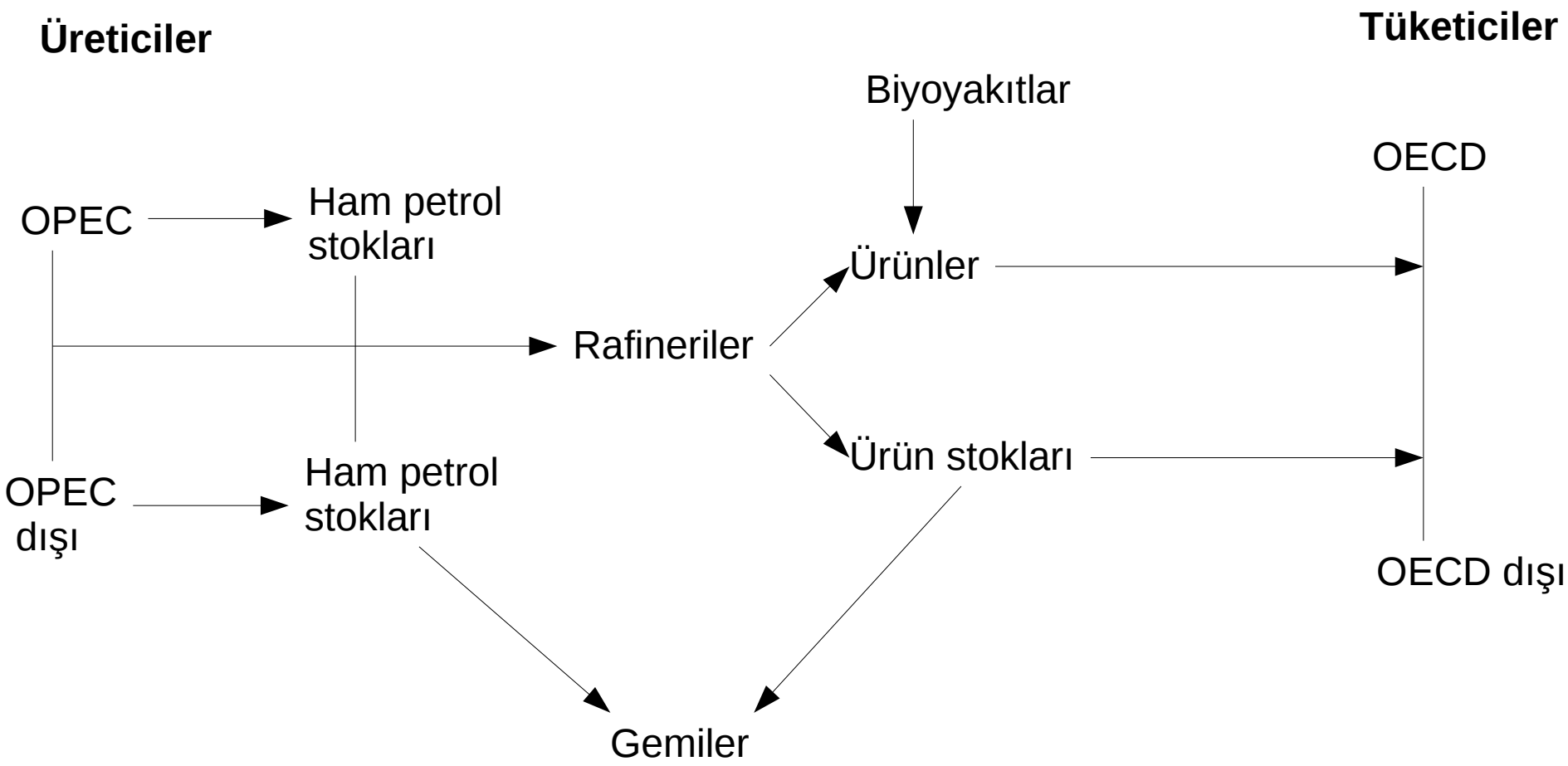
Basit denge

İyi haber petrol depolanabiliyor, kötü haber petrol depolanabiliyor...

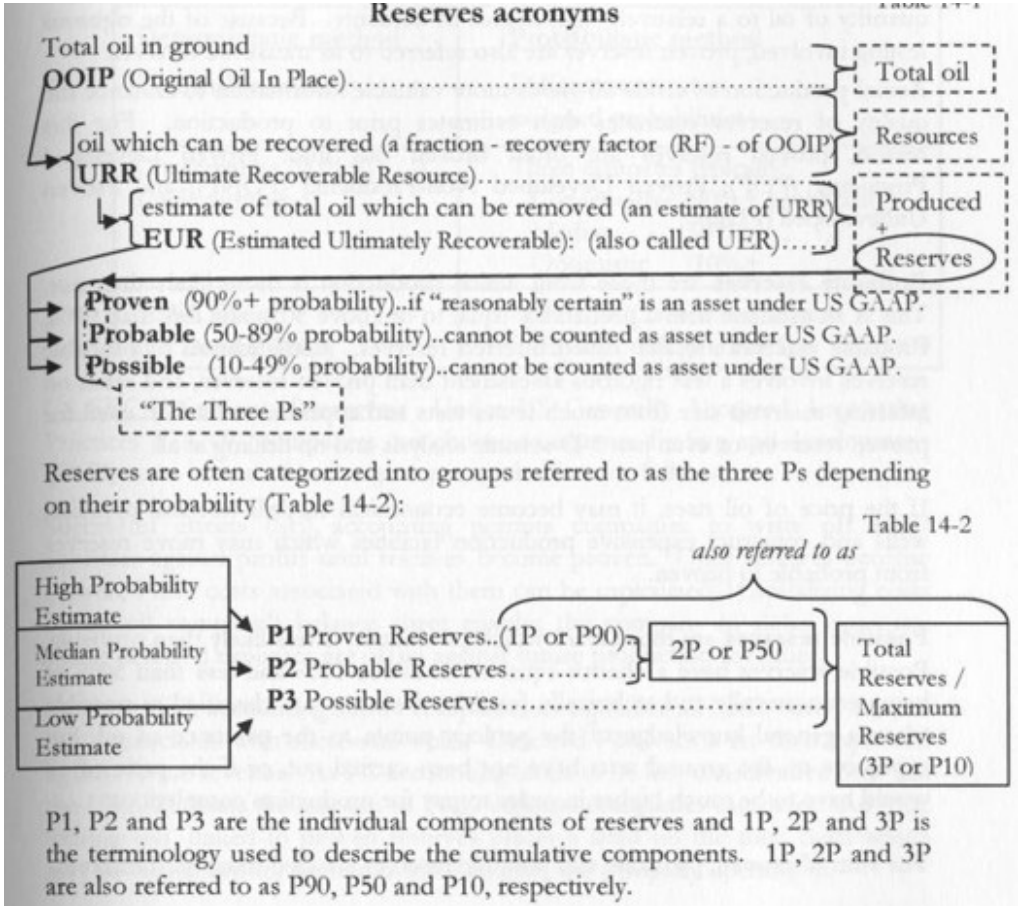


Arz talep nerede kesişiyor

Petrolde


Üreticiler
Tüketiciler
Biyoyakıtlar
OECD
OPEC
Ham petrol stokları
Ürünler
Rafineriler
Ürün stokları
OPEC dışı
Ham petrol stokları
OECD dışı
Gemiler

Bazı teknik noktalar



nber of rbon oms	Prefix	Paraffin (alkane) example	Mono-olefin (alkene) example
1	meth–	methane	-
2	eth–	ethane	ethene
3	prop–	propane	propene
4	but–	butane	butene
5	pent–	pentane	pentene
6	hex–	hexane	hexene
7	hept–	heptane	heptene
8	oct–	octane	octene
9	non–	nonane	nonene
10	dec–	decane	decene

Breakdown of crude oil — Table 4-1

Petroleum fraction	*Petroleum product*	*Number of carbon atoms in molecules*	*Physical state**	*Approx. boiling temp.*	*Primary uses*
Petroleum gases	Methane	1	Gas	-161.6° C	Heating/cooking, electrical power.
	Ethane	2	Gas	-88.6° C	Petrochemicals, plastics.
	Propane	3	Gas	-42.1° C	Propane and butane together are called LPG when pressure liquefied for consumer use.
	Butane	4	Gas	-11.7° C	
Light ends	Naphtha	5-11**	Liquid	70°-200° C	Petrochemicals, plastics, solvents, blending for gasoline.
	Gasoline	7-10**	Liquid	100°-150° C	Transportation fuel.
Middle distillates	Kerosene	11-18**	Liquid	200°-300° C	Jet fuel, lighting, cooking, heating.
	Distillate fuel oil/ Gas oil	11-18**	Liquid	200°-300° C	Diesel fuel, home heating oil.
Heavy ends	Lubricating oil	18-25**	Liquid	300°-400° C	Motor oil, transmission oil.
	Residual fuel oil	20-27**	Liquid	350°-450° C	Marine shipping fuel, electrical power, industrial fuel.
	Greases & Wax	25-30**	Solid	400°-500° C	Lubricants, candles and coating fruit.
	Bitumen	35+**	Solid	500° + C	Road paving & roofing.
	Coke	50+**	Solid	600° + C	Industrial fuel for steel production.

*at standard atmospheric pressure and room temperature; **approximate range

OPEC ve OPEC harici ülkeler

	2017	2018	2019	1Q18	2Q18	3Q18	4Q18	1Q19	Jun 18	Jul 18	Aug
OPEC											
Crude Oil											
Saudi Arabia	9.96			9.95	10.14				10.46	10.35	10.
Iran	3.81			3.83	3.84				3.83	3.78	3.
Iraq	4.47			4.45	4.47				4.54	4.56	4.
UAE	2.93			2.84	2.88				2.90	2.98	2.
Kuwait	2.71			2.70	2.71				2.72	2.80	2.
Neutral Zone	0.00			0.00	0.00				0.00	0.00	0.
Qatar	0.61			0.60	0.61				0.62	0.62	0.
Angola	1.64			1.55	1.49				1.45	1.47	1.
Nigeria	1.53			1.66	1.51				1.46	1.52	1.
Libya	0.83			1.01	0.89				0.71	0.67	0.
Algeria	1.05			1.01	1.03				1.05	1.06	1.
Congo	0.26			0.31	0.32				0.33	0.31	0.
Gabon	0.20			0.21	0.19				0.20	0.18	0.
Equatorial Guinea	0.13			0.13	0.12				0.12	0.12	0.
Ecuador	0.53			0.52	0.53				0.53	0.53	0.
Venezuela	1.97			1.54	1.36				1.30	1.26	1.
Total Crude Oil	32.62			32.32	32.08				32.22	32.21	32.
Total NGLs[1]	6.91	6.98	7.05	6.94	6.95	7.01	7.03	7.05	6.95	7.01	7.
Total OPEC[2]	**39.52**			**39.26**	**39.03**				**39.17**	**39.22**	**39.**

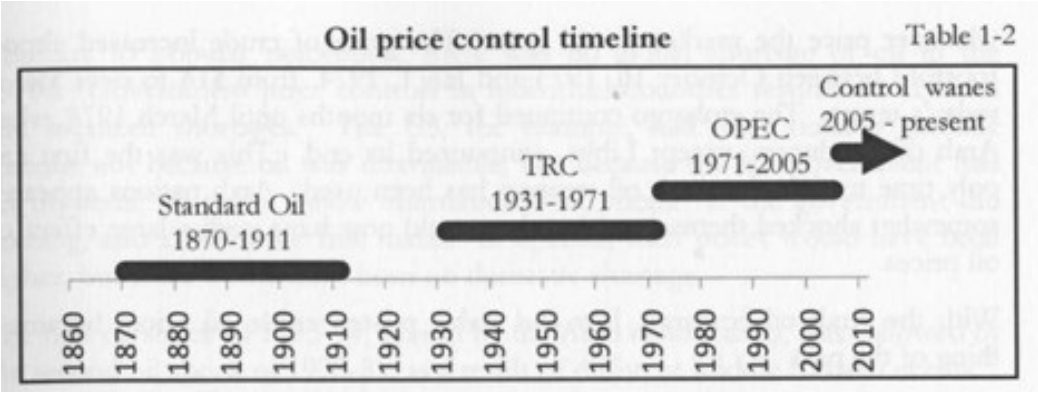
WORLD OIL PRODUCTION

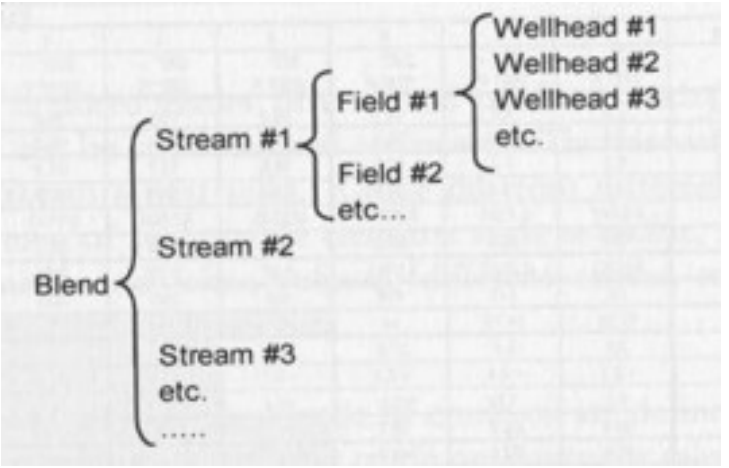
(million barrels per day)

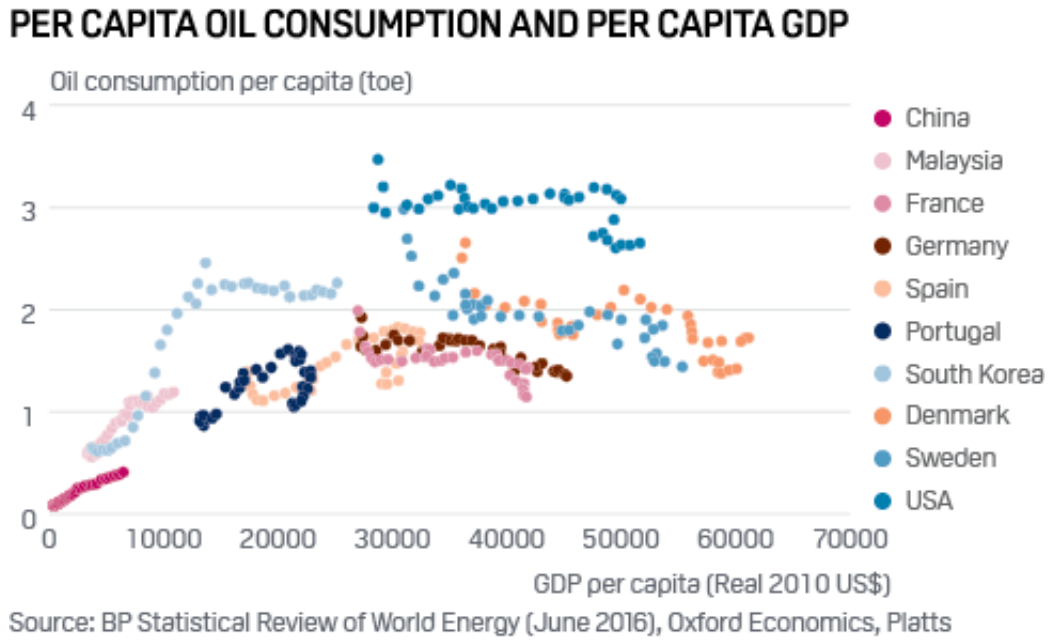
	2017	2018	2019	1Q18	2Q18	3Q18	4Q18	1Q19	Jun 18	Jul 18	Aug 18
NON-OPEC[2,3]											
OECD											
Americas	20.32	22.19	23.57	21.74	22.14	22.26	22.61	23.21	22.25	22.42	22.35
United States	13.27	14.99	16.23	14.38	15.05	15.18	15.34	15.73	15.22	15.28	15.22
Mexico	2.23	2.10	2.04	2.15	2.12	2.08	2.06	2.04	2.09	2.09	2.09
Canada	4.82	5.08	5.29	5.19	4.95	4.99	5.20	5.43	4.93	5.03	5.03
Chile	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Europe	3.49	3.44	3.39	3.55	3.34	3.37	3.49	3.47	3.29	3.47	3.32
UK	1.01	1.07	1.10	1.08	1.04	1.04	1.13	1.12	0.95	1.04	1.01
Norway	1.97	1.85	1.76	1.96	1.79	1.81	1.84	1.83	1.85	1.91	1.81
Others	0.51	0.51	0.52	0.51	0.51	0.51	0.51	0.52	0.50	0.52	0.51
Asia Oceania	0.39	0.39	0.47	0.40	0.39	0.38	0.40	0.43	0.40	0.38	0.38
Australia	0.31	0.32	0.40	0.33	0.31	0.31	0.33	0.36	0.33	0.31	0.31
Others	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Total OECD	**24.20**	**26.02**	**27.43**	**25.69**	**25.86**	**26.01**	**26.50**	**27.11**	**25.94**	**26.27**	**26.05**
NON-OECD											
Former USSR	14.34	14.54	14.78	14.43	14.47	14.58	14.67	14.79	14.52	14.67	14.51
Russia	11.36	11.49	11.71	11.34	11.38	11.59	11.64	11.67	11.45	11.60	11.59
Others	2.98	3.05	3.06	3.09	3.09	2.99	3.03	3.12	3.08	3.08	2.92
Asia[2]	7.34	7.14	6.92	7.24	7.20	7.10	7.03	6.97	7.28	7.12	7.10
China	3.87	3.80	3.70	3.82	3.86	3.78	3.75	3.72	3.92	3.80	3.77
Malaysia	0.72	0.72	0.70	0.74	0.72	0.72	0.71	0.70	0.73	0.72	0.72
India	0.86	0.84	0.80	0.85	0.85	0.83	0.82	0.81	0.85	0.83	0.83
Indonesia	0.84	0.80	0.77	0.81	0.81	0.80	0.79	0.78	0.80	0.80	0.80
Others	1.05	0.98	0.94	1.02	0.97	0.98	0.97	0.96	0.98	0.98	0.98
Europe	0.13	0.12	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Americas[2]	4.54	4.56	4.87	4.50	4.53	4.55	4.67	4.73	4.52	4.48	4.58
Brazil	2.74	2.77	3.12	2.71	2.72	2.75	2.89	2.96	2.71	2.69	2.78
Argentina	0.57	0.57	0.57	0.57	0.58	0.57	0.57	0.57	0.58	0.58	0.57
Colombia	0.86	0.86	0.84	0.86	0.87	0.87	0.86	0.85	0.87	0.87	0.87
Others	0.37	0.35	0.34	0.36	0.37	0.35	0.35	0.34	0.36	0.34	0.35
Middle East[2,4]	1.25	1.25	1.25	1.21	1.26	1.27	1.27	1.26	1.27	1.27	1.27
Oman	0.98	0.98	0.96	0.97	0.98	0.98	0.98	0.97	0.98	0.98	0.98
Syria	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Yemen	0.03	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Others	0.21	0.21	0.22	0.18	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Africa	1.41	1.45	1.44	1.44	1.48	1.46	1.43	1.45	1.51	1.47	1.46
Egypt	0.64	0.64	0.61	0.65	0.65	0.64	0.63	0.62	0.65	0.64	0.64
Others	0.77	0.81	0.83	0.80	0.82	0.82	0.80	0.83	0.86	0.82	0.82
Total Non-OECD	**28.99**	**29.07**	**29.37**	**28.96**	**29.06**	**29.08**	**29.20**	**29.32**	**29.22**	**29.14**	**29.03**
Processing gains[5]	2.29	2.32	2.35	2.32	2.32	2.32	2.32	2.35	2.32	2.32	2.32
Global Biofuels	2.47	2.56	2.66	2.09	2.71	2.97	2.47	2.19	3.01	3.03	3.01
TOTAL NON-OPEC	**57.96**	**59.97**	**61.81**	**59.06**	**59.95**	**60.38**	**60.48**	**60.96**	**60.49**	**60.75**	**60.41**

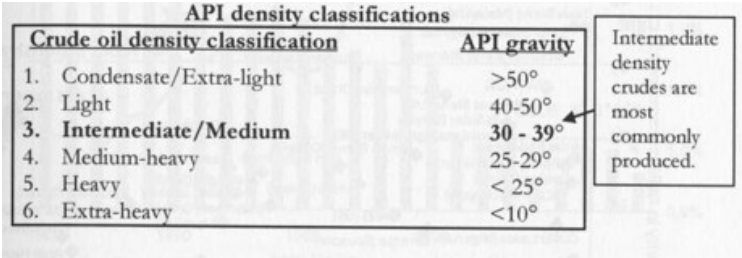
https://www.iea.org/oilmarketreport/omrpublic/currentreport/

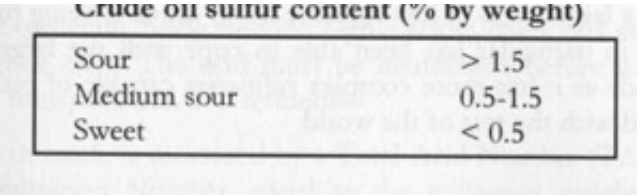
Petrol fiyatları







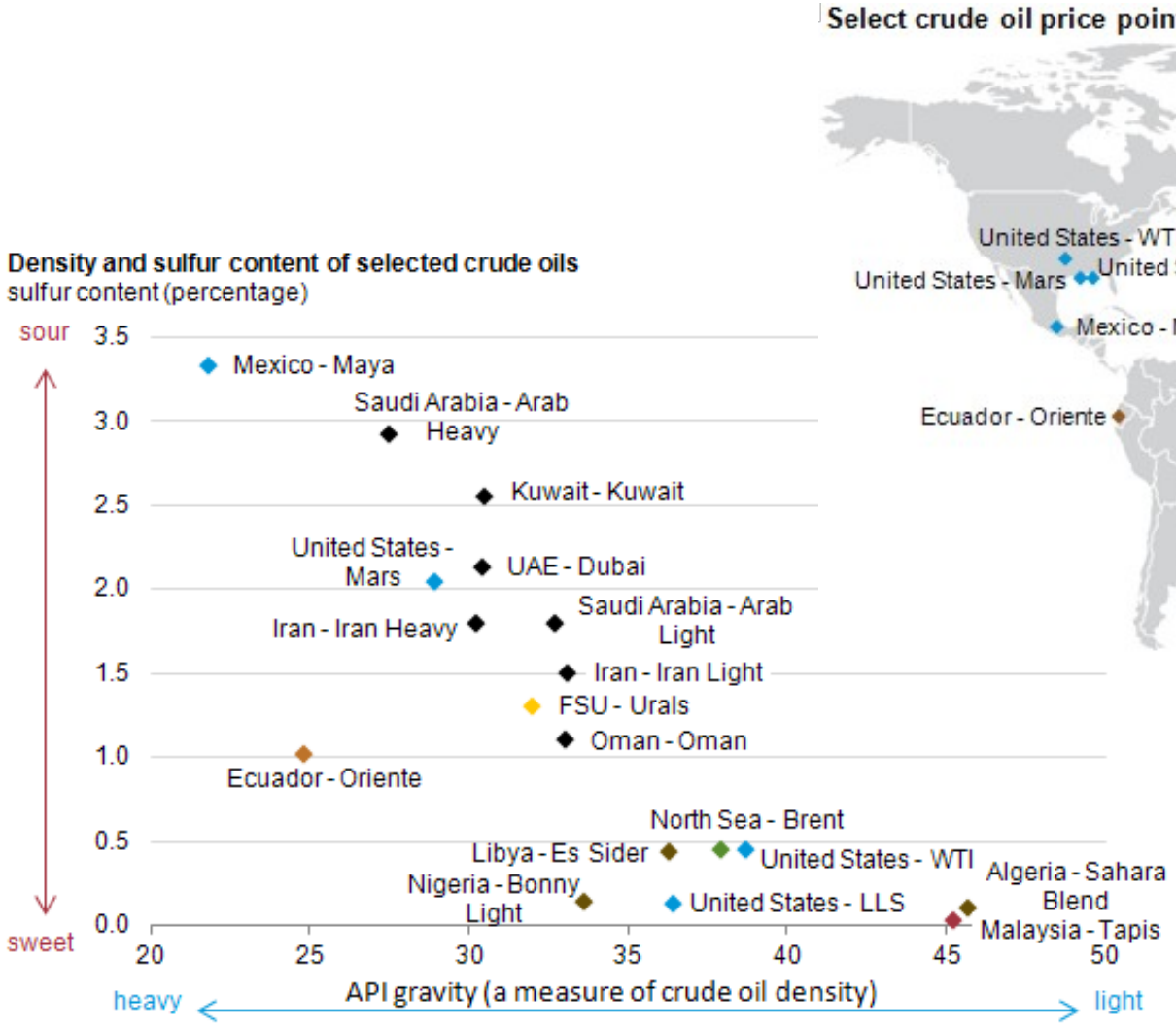


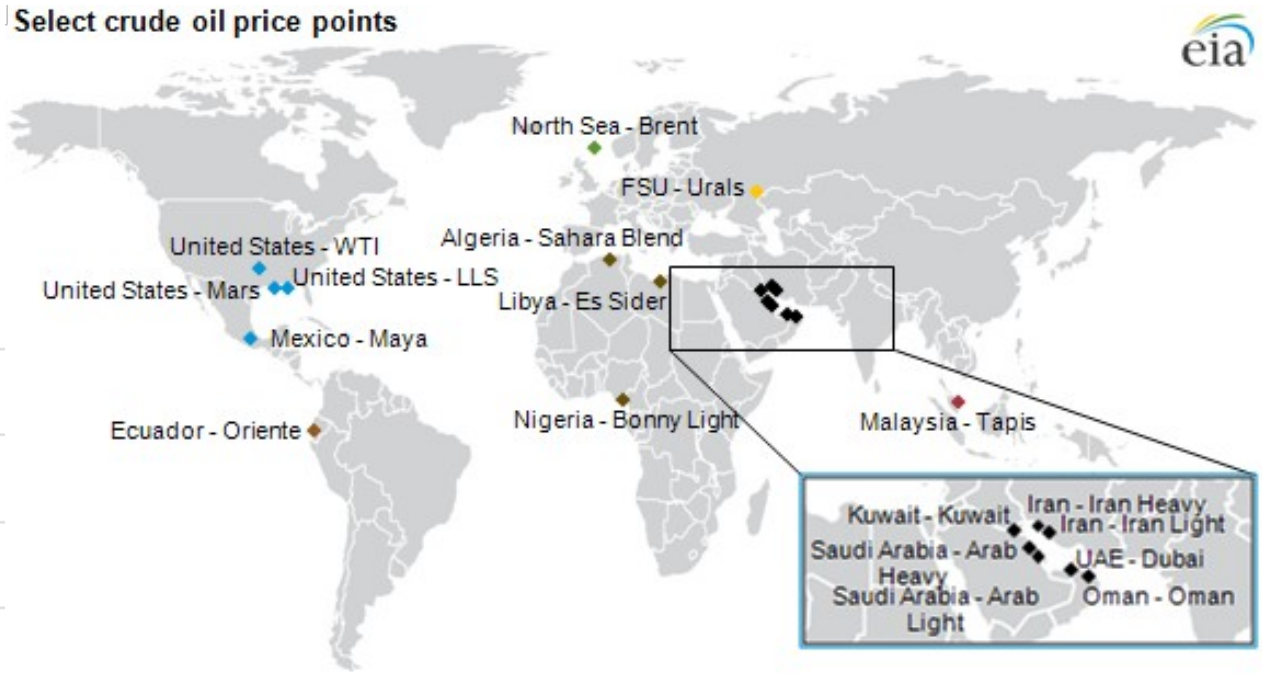


http://blogs.platts.com/2017/06/28/sustainable-china-future-energy-demand/

Oil 101, Morgan Downey

Bir çok ürün ve nokta





https://www.eia.gov/todayinenergy/detail.php?id=7110

Petrol talebi

SUMMARY OF GLOBAL OIL DEMAND

	2016	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	1Q19	2Q19	3Q19	4Q19	2019
Demand (mb/d)																
Americas	24.88	24.61	25.12	25.15	25.34	25.06	25.26	25.37	25.42	25.51	25.39	25.24	25.62	25.71	25.82	25.60
Europe	13.99	13.82	14.25	14.70	14.40	14.30	14.05	14.16	14.53	14.27	14.25	13.92	14.39	14.72	14.35	14.35
Asia Oceania	8.11	8.48	7.65	7.80	8.33	8.06	8.51	7.60	7.75	8.25	8.03	8.44	7.60	7.66	8.23	7.98
Total OECD	46.97	46.91	47.02	47.66	48.06	47.42	47.82	47.13	47.70	48.03	47.67	47.60	47.62	48.09	48.40	47.93
Asia	24.97	25.57	26.24	25.59	26.30	25.93	26.50	27.04	26.77	27.58	26.98	27.39	27.83	27.62	28.43	27.82
Middle East	8.49	8.24	8.67	8.87	8.22	8.50	8.10	8.43	8.95	8.39	8.47	8.22	8.65	9.07	8.45	8.60
Americas	6.44	6.34	6.46	6.57	6.45	6.46	6.34	6.37	6.51	6.48	6.42	6.33	6.45	6.56	6.54	6.47
FSU	4.51	4.30	4.53	4.77	4.65	4.57	4.51	4.69	4.87	4.69	4.69	4.54	4.76	4.95	4.83	4.77
Africa	4.25	4.36	4.30	4.19	4.26	4.28	4.34	4.30	4.20	4.34	4.30	4.45	4.40	4.29	4.43	4.39
Europe	0.72	0.72	0.75	0.76	0.76	0.75	0.73	0.75	0.78	0.78	0.76	0.75	0.77	0.79	0.79	0.77
Total Non-OECD	49.39	49.53	50.95	50.76	50.65	50.48	50.53	51.58	52.07	52.26	51.62	51.67	52.86	53.27	53.46	52.83
World	**96.36**	**96.44**	**97.98**	**98.41**	**98.71**	**97.90**	**98.36**	**98.71**	**99.77**	**100.29**	**99.29**	**99.27**	**100.48**	**101.37**	**101.87**	**100.76**
of which: US50	19.69	19.54	20.07	20.01	20.21	19.96	20.24	20.33	20.38	20.40	20.34	20.21	20.60	20.62	20.70	20.53
Europe 5*	8.15	8.16	8.28	8.44	8.24	8.28	8.18	8.17	8.28	8.20	8.21	8.12	8.29	8.40	8.23	8.26
China	11.99	12.39	12.80	12.36	12.70	12.56	12.83	13.18	13.26	13.54	13.20	13.29	13.57	13.72	13.97	13.64
Japan	4.01	4.30	3.58	3.63	4.06	3.89	4.27	3.43	3.57	3.91	3.79	4.14	3.38	3.43	3.85	3.70
India	4.44	4.46	4.67	4.42	4.72	4.57	4.82	4.88	4.65	5.00	4.84	5.02	5.10	4.83	5.20	5.04
Russia	3.33	3.15	3.33	3.54	3.39	3.35	3.32	3.44	3.60	3.41	3.44	3.33	3.50	3.66	3.48	3.49
Brazil	2.98	2.92	2.96	3.08	3.04	3.00	2.95	2.91	3.06	3.08	3.00	2.92	2.97	3.08	3.08	3.01
Saudi Arabia	3.30	2.93	3.41	3.62	3.13	3.27	2.93	3.19	3.58	3.24	3.24	3.00	3.39	3.66	3.24	3.32
Canada	2.47	2.37	2.36	2.52	2.52	2.45	2.32	2.35	2.48	2.48	2.41	2.35	2.33	2.49	2.48	2.41
Korea	2.61	2.62	2.49	2.57	2.65	2.58	2.63	2.55	2.57	2.70	2.61	2.68	2.59	2.61	2.73	2.65
Mexico	2.05	2.02	2.03	1.95	1.93	1.98	1.99	2.02	1.90	1.95	1.96	1.98	2.02	1.93	1.96	1.97
Iran	1.96	2.12	2.03	2.00	2.00	2.04	2.01	1.98	1.96	1.97	1.98	2.06	2.01	1.99	1.99	2.01
Total	**66.98**	**66.98**	**68.02**	**68.16**	**68.61**	**67.95**	**68.49**	**68.44**	**69.29**	**69.87**	**69.02**	**69.09**	**69.75**	**70.42**	**70.91**	**70.05**
% of World	69.5%	69.5%	69.4%	69.3%	69.5%	69.4%	69.6%	69.3%	69.5%	69.7%	69.5%	69.6%	69.4%	69.5%	69.6%	69.5%

https://www.iea.org/oilmarketreport/omrpublic/currentreport/

Petrol talep artışı

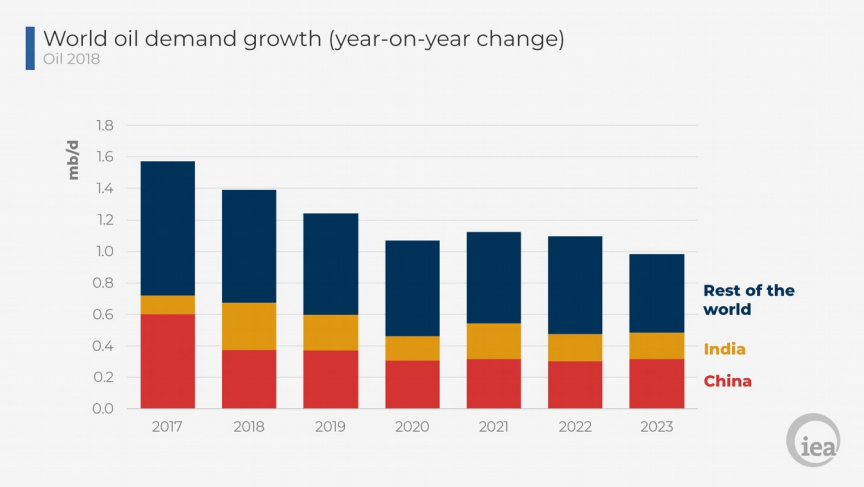


Figure 1.4 • Per capita consumption of plastics and nitrogen fertilisers

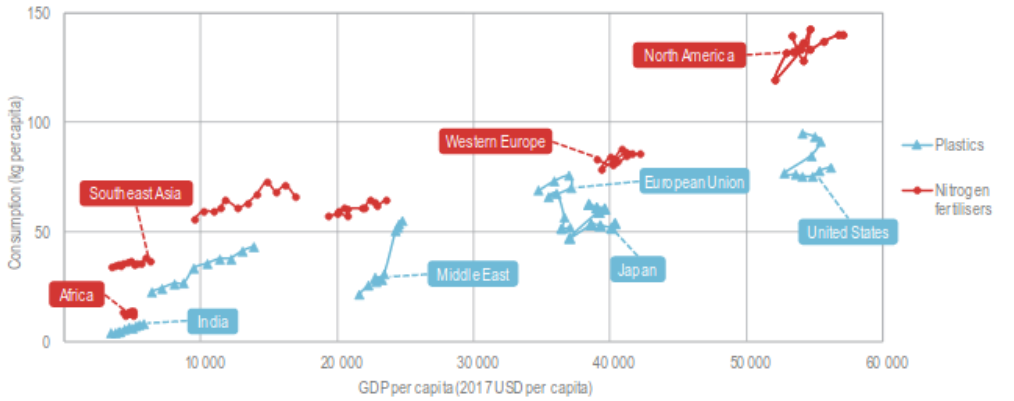
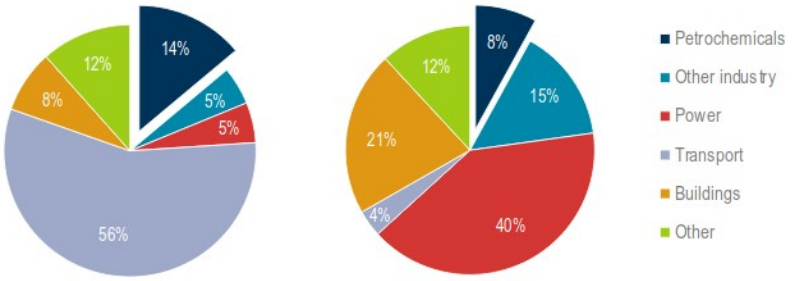
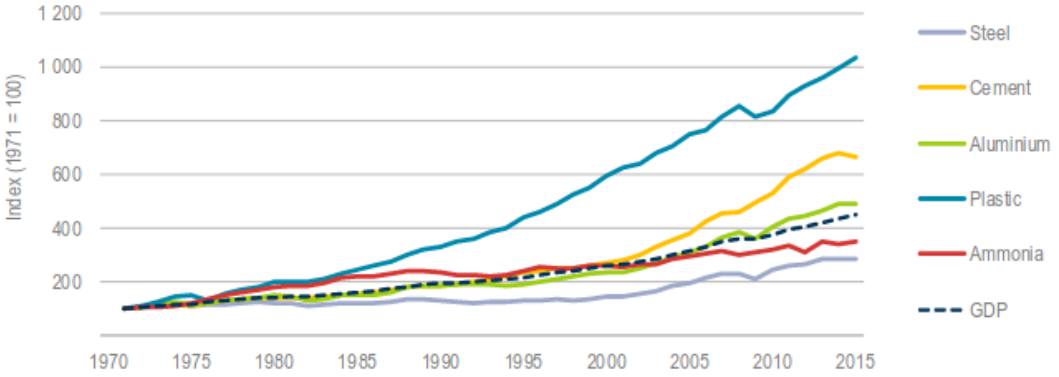


Figure 2.1 • Primary oil (left) and natural gas (right) demand in 2017 by sector



Note: *Petrochemicals* includes process energy and feedstock.

Figure 1.3 • Production growth for selected bulk materials and GDP



https://www.iea.org/oil2018/

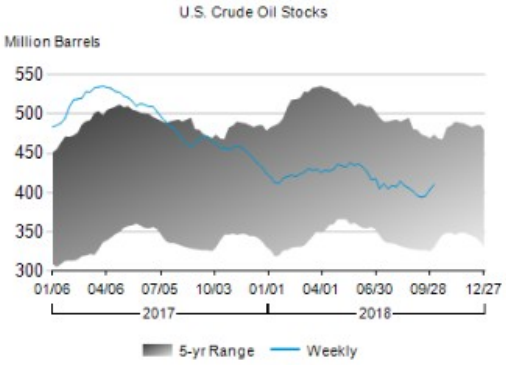
https://webstore.iea.org/download/direct/2310?fileName=The_Future_of_Petrochemicals.pdf

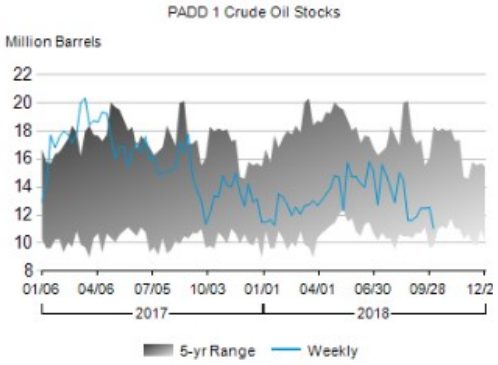
Stoklar

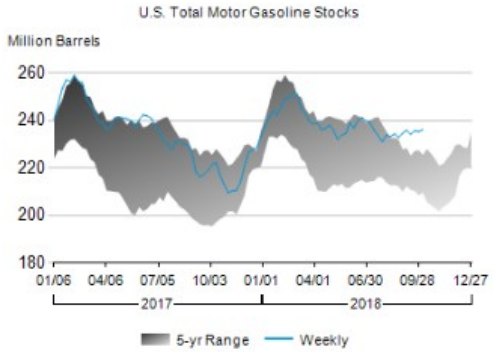
- American Petroleum Institute (API) Weekly Statistical Bulletin Report
  - Her Salı, Türkiye Saati 23:30
- EIA, ABD Petroleum Status Report
  - Her çarşamba Türkiye Saati 17:30
- Twitter'da #OOTT
- Kuyu rakamları (petrol kule)
  - ABD, çalışma haftasının son iş günü Türkiye Saati 20:00
  - Uluslararası, her ayın 5.çalışma günü

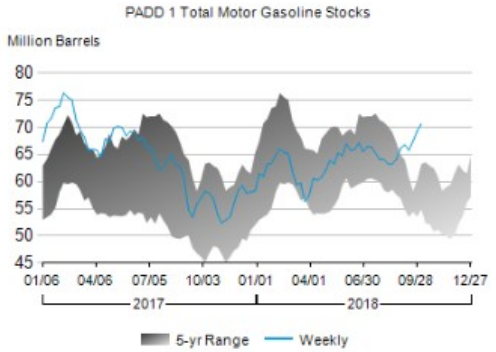
https://institute.cmegroup.com/courses/learn-about-key-economic-events/modules/understanding-the-oil-data-report

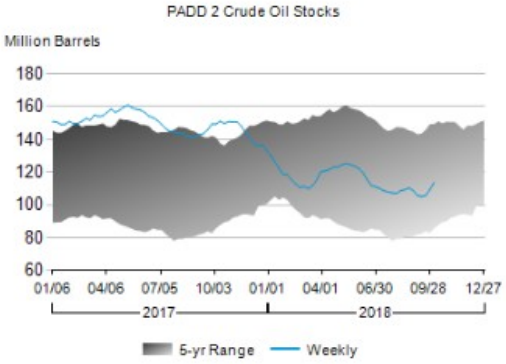
EIA stok

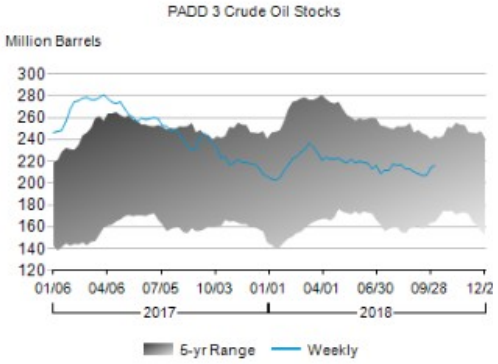


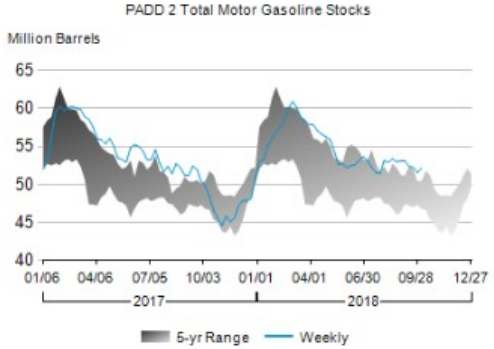


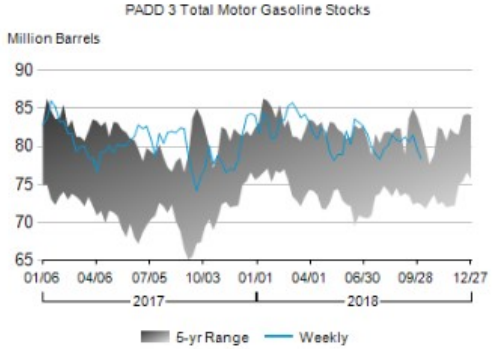


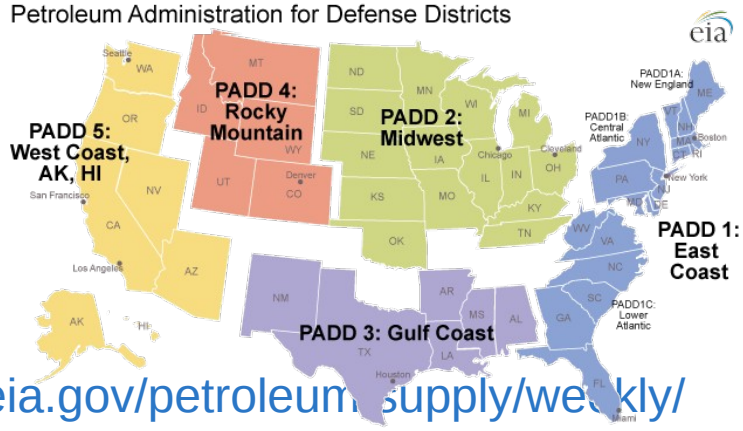








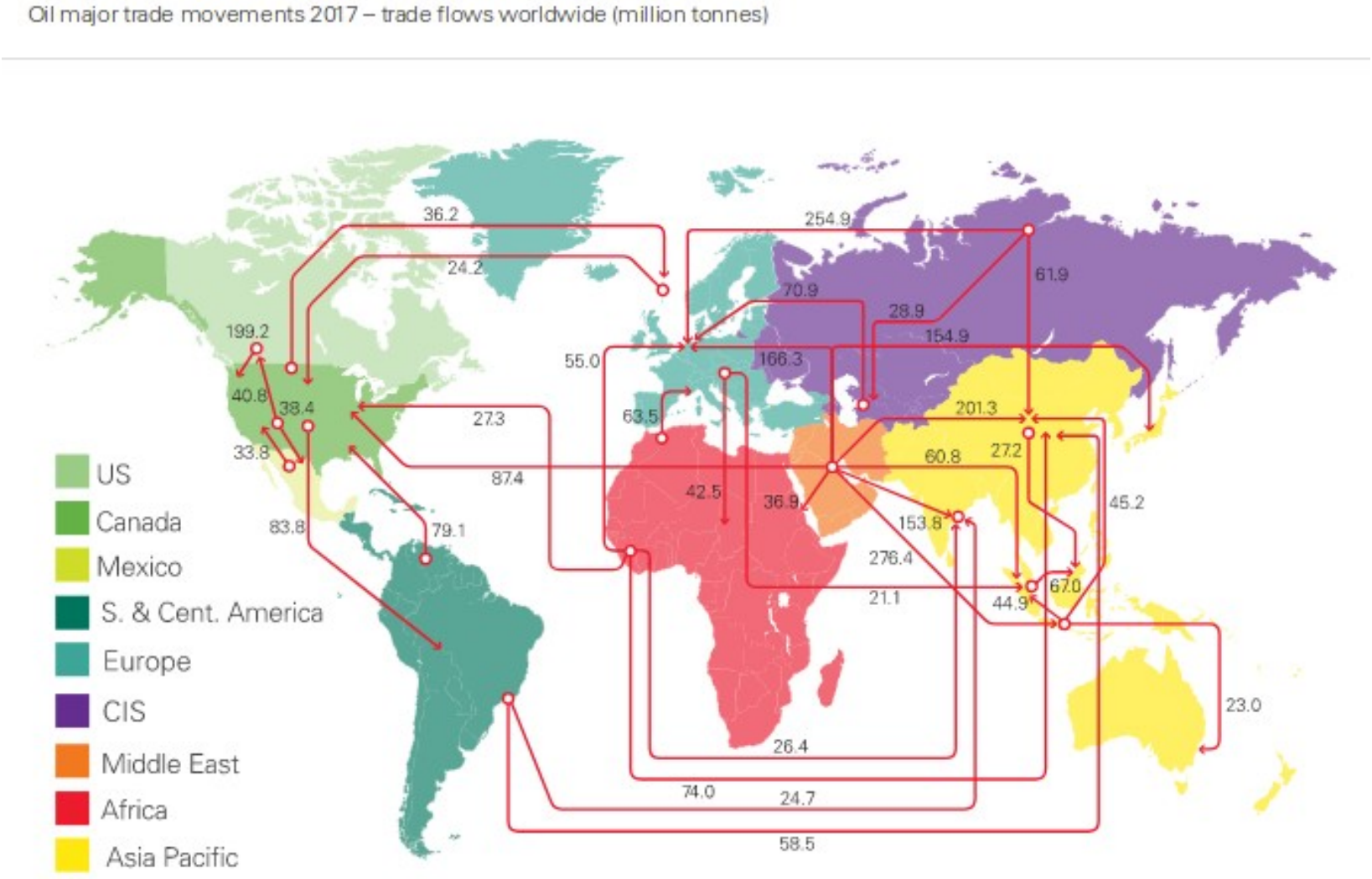




https://www.eia.gov/petroleum/supply/weekly/

https://www.eia.gov/todayinenergy/detail.php?id=4890

Petrol ticareti



https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil/oil-trade-movements.html

Ticarette bazı teknik hususlar

Main oil futures contracts

NYMEX (New York) Futures	Ticker root	ICE Futures (London)	Ticker root
WTI Crude Oil (contract size: 1,000 bbls)	CL	**Brent Crude** (contract size: 1,000 bbls)	LCO (Reuters) CO (Bloomberg)
Heating Oil (contract size: 42,000 gals)	HO	**Gasoil**** (contract size: 100 metric tonnes)	LGO (Reuters) QS (Bloomberg)
Gasoline* (contract size: 42,000 gals)	RB		

Notes: *42,000 gallons = 1,000 barrels; **Gasoil is a European product similar to heating oil in the US; 1 metric tonne of gasoil = 7.45 barrels.

	Code		Code
January	F	July	N
February	G	August	Q
March	H	September	U
April	J	October	V
May	K	November	X
June	M	December	Z

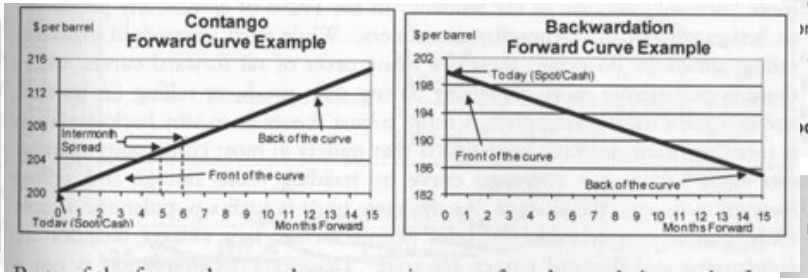


Table 19-1

Market Price at Expiry ($/bbl)	$105 Strike call option ($/bbl) payoff (net of $5 premium)	$105 Strike put option ($/bbl) payoff (net of $5 premium)
↑	↑	-$5
$120	+$10	-$5
$115	+$5	-$5
$110	0	-$5
$105	-$5	-$5
$100	-$5	0
$ 95	-$5	+$5
$ 90	-$5	+$10
↓	-$5	↓

Fig. 18-3

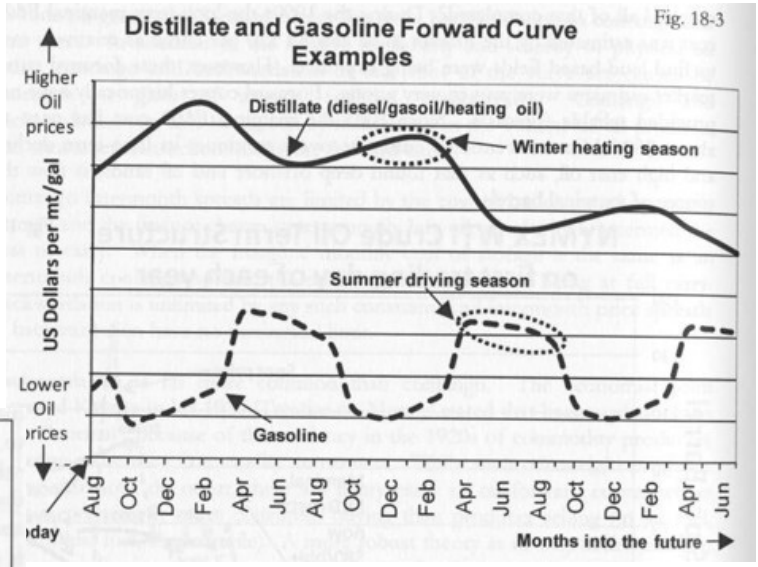
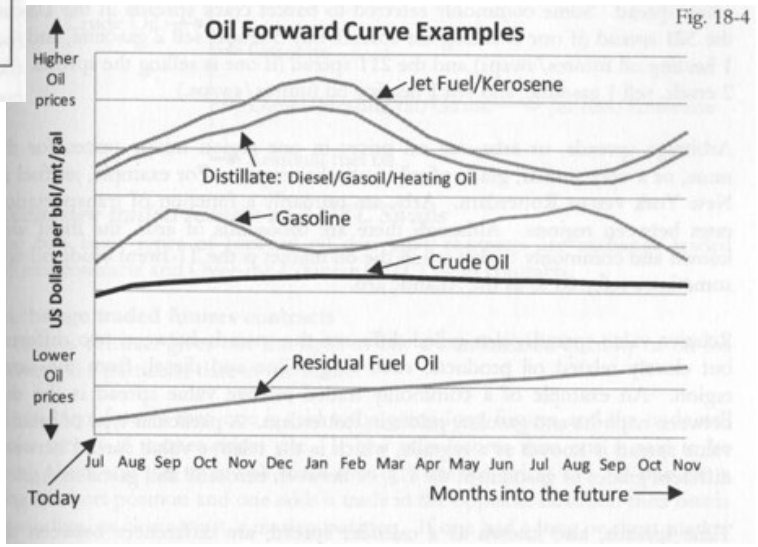
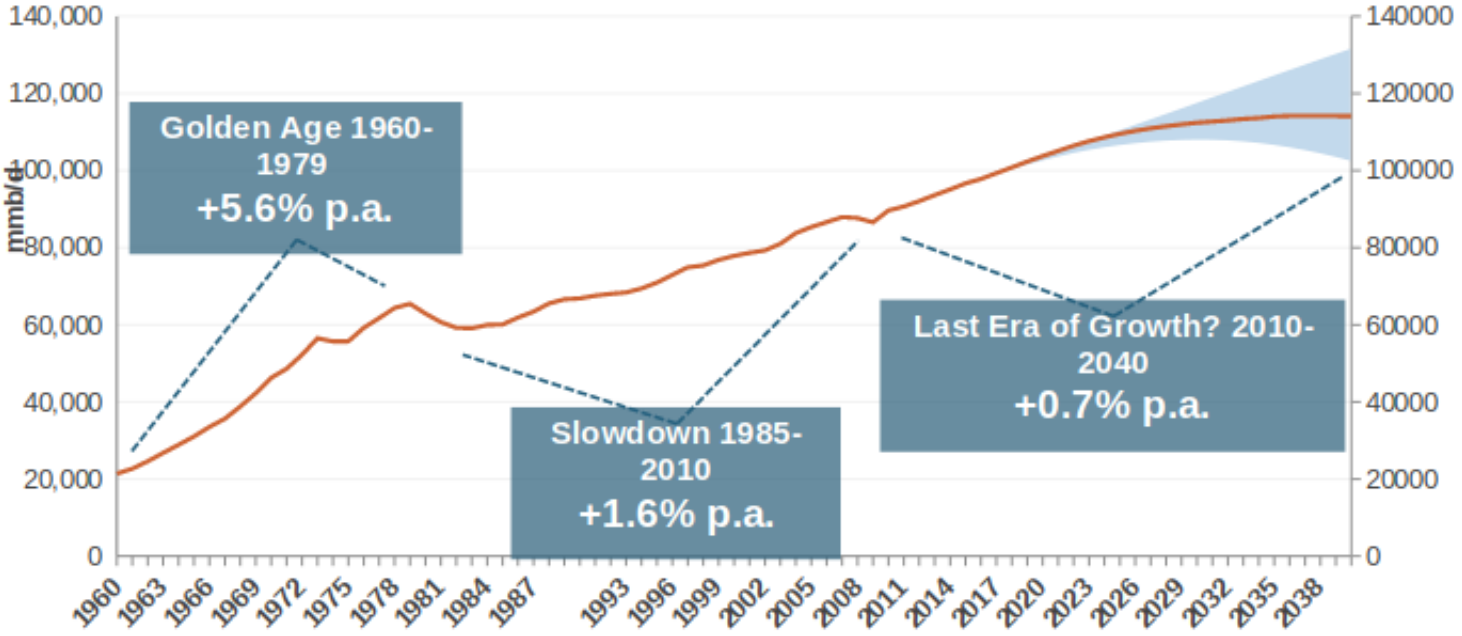


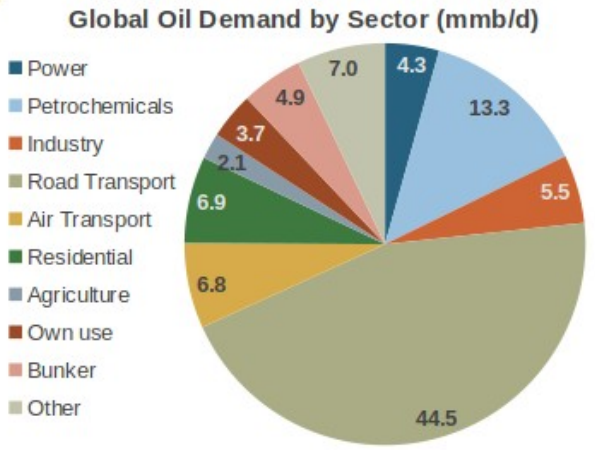
Fig. 18-4

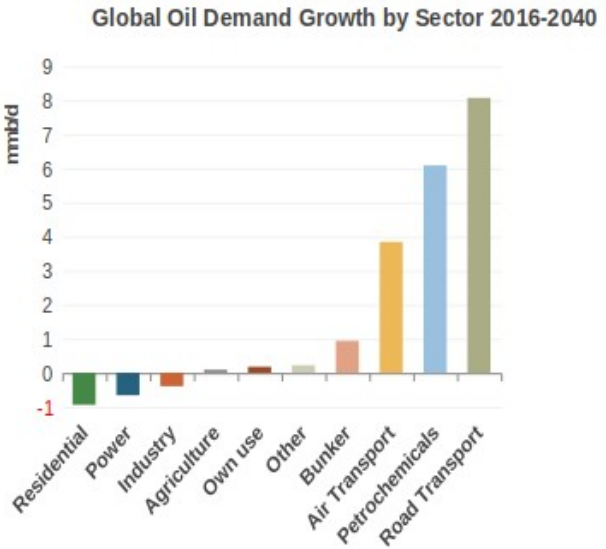


Oil 101, Morgan Downey

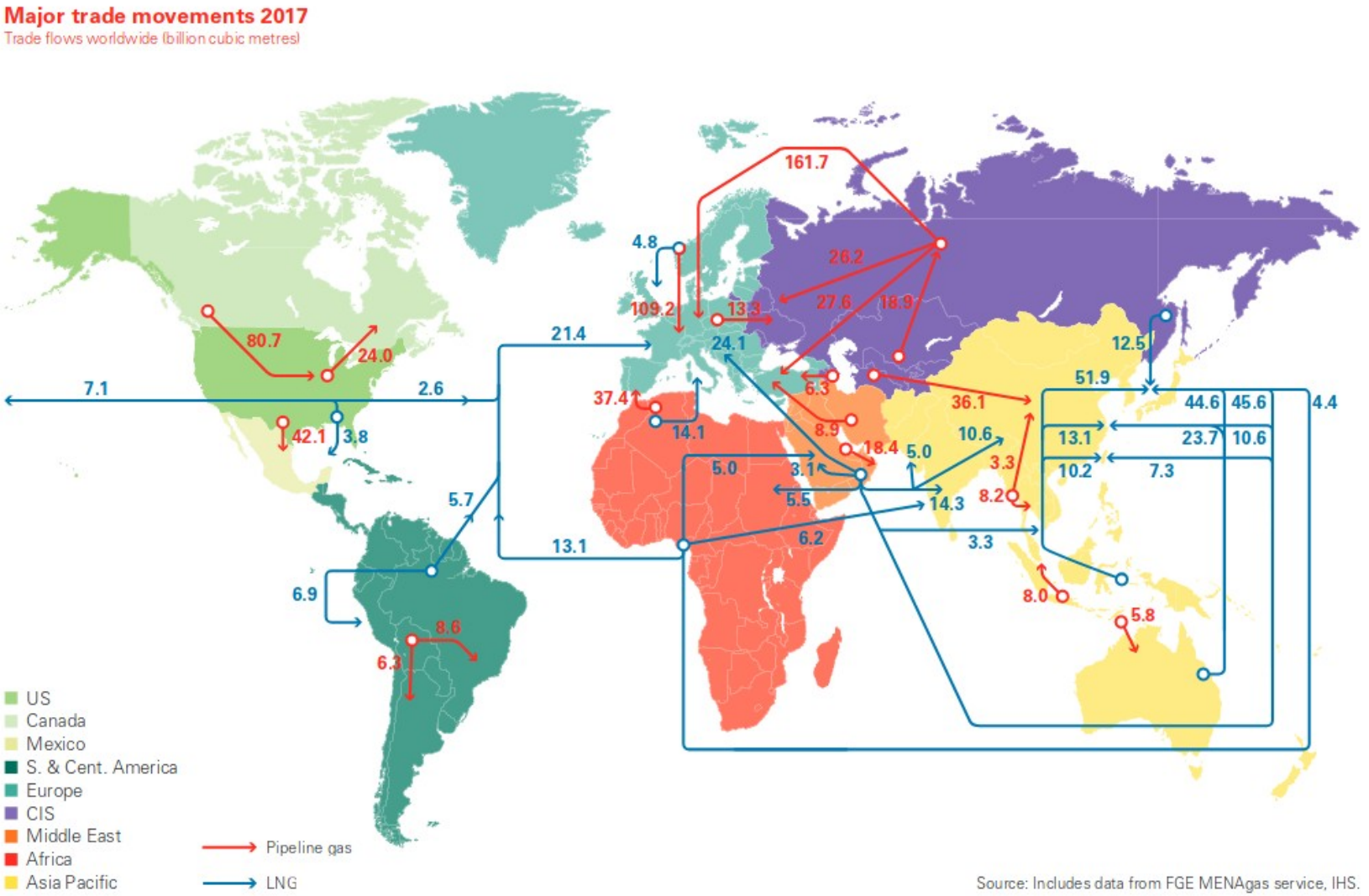
Gelecek


Golden Age 1960-1979
+5.6% p.a.
Slowdown 1985-2010
+1.6% p.a.
Last Era of Growth? 2010-2040
+0.7% p.a.
mmb/d
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023
2026
2029
2032
2035
2038


Global Oil Demand by Sector (mmb/d)
Power
Petrochemicals
Industry
Road Transport
Air Transport
Residential
Agriculture
Own use
Bunker
Other
4.3
13.3
5.5
44.5
6.8
6.9
2.1
3.7
4.9
7.0

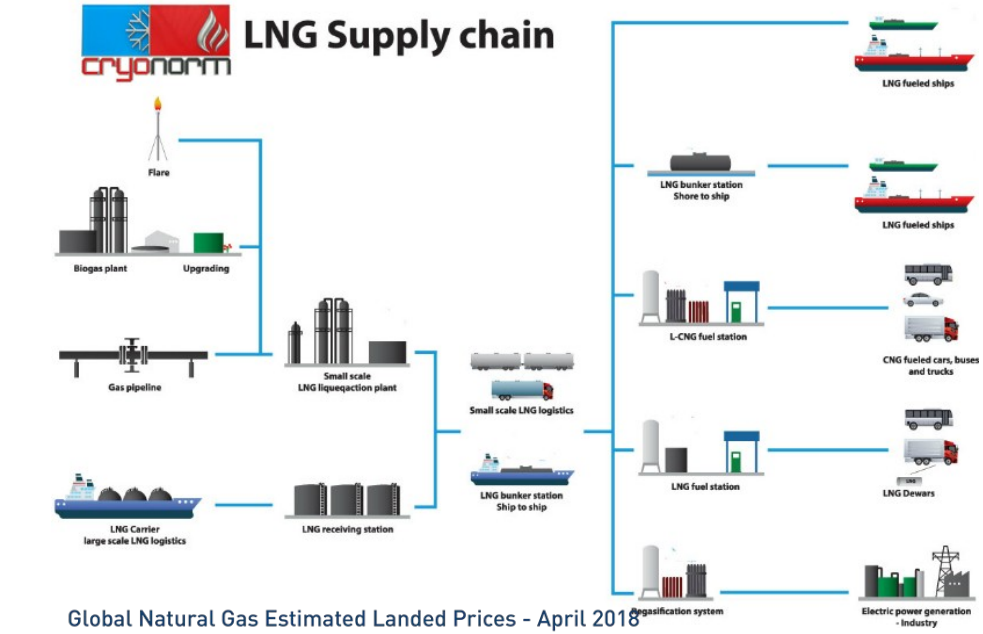

Global Oil Demand Growth by Sector 2016-2040
mmb/d
9
8
7
6
5
4
3
2
1
0
-1
Residential
Power
Industry
Agriculture
Own use
Other
Bunker
Air Transport
Petrochemicals
Road Transport

Doğalgaz



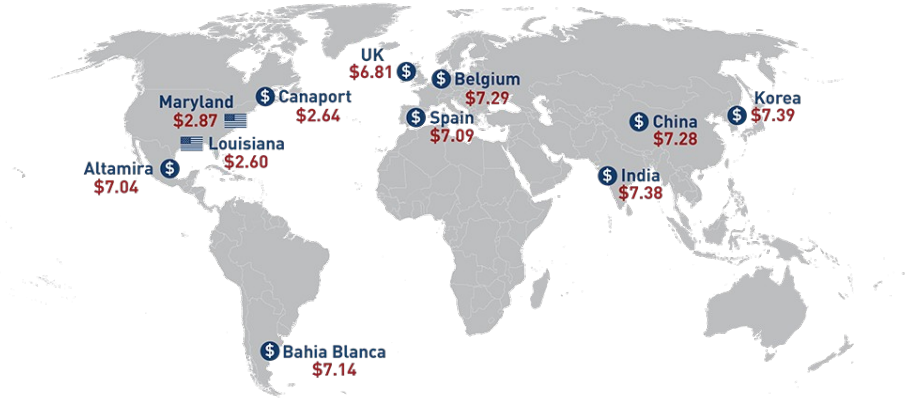
https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review/bp-stats-review-2018-natural-gas.pdf

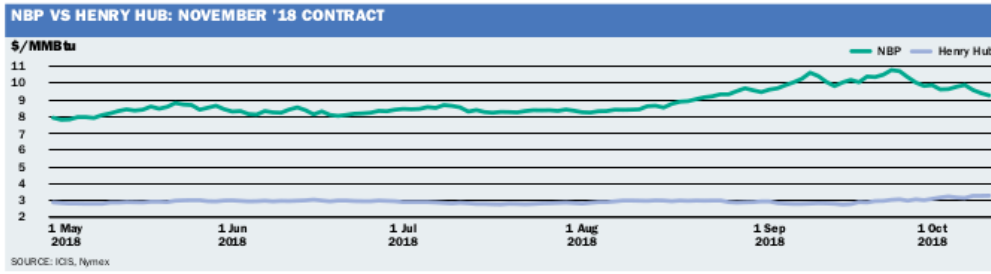
LNG

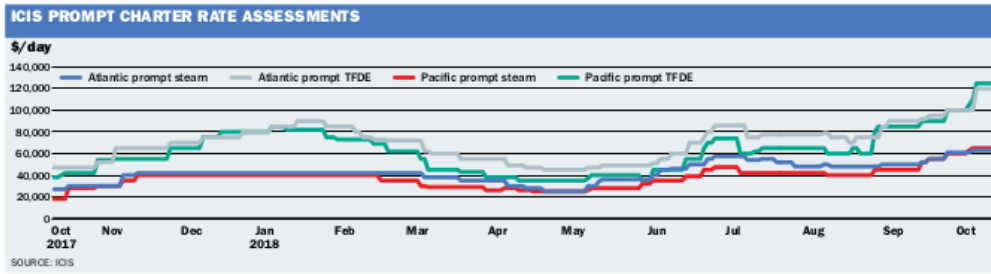


Global Natural Gas Estimated Landed Prices - April 2018

US Dollars per MMBtu





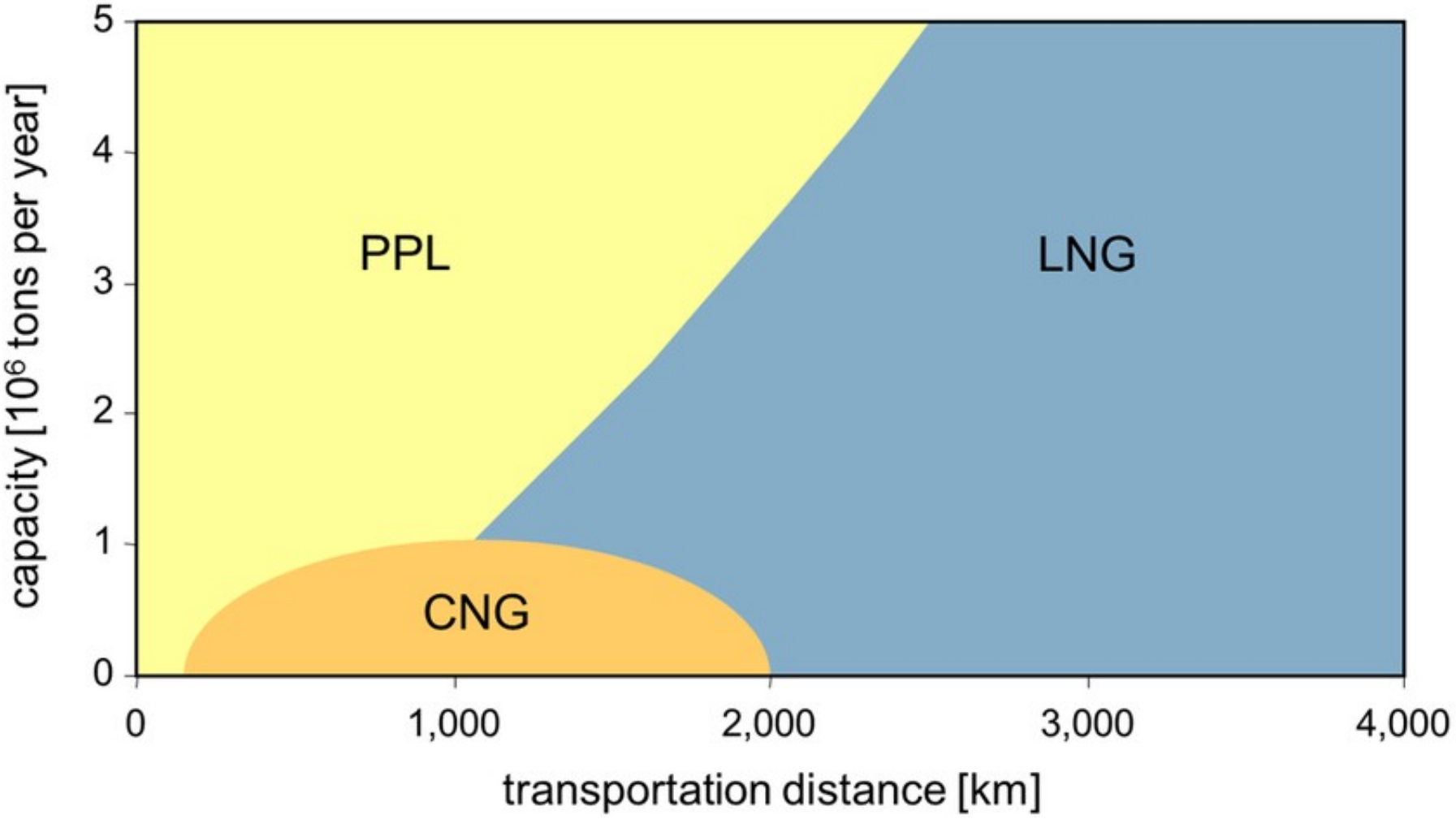


https://www.ship-technology.com/contractors/propulsion/cryonorm/attachment/cryonorm2/

ICIS Heren, Global LNG markets

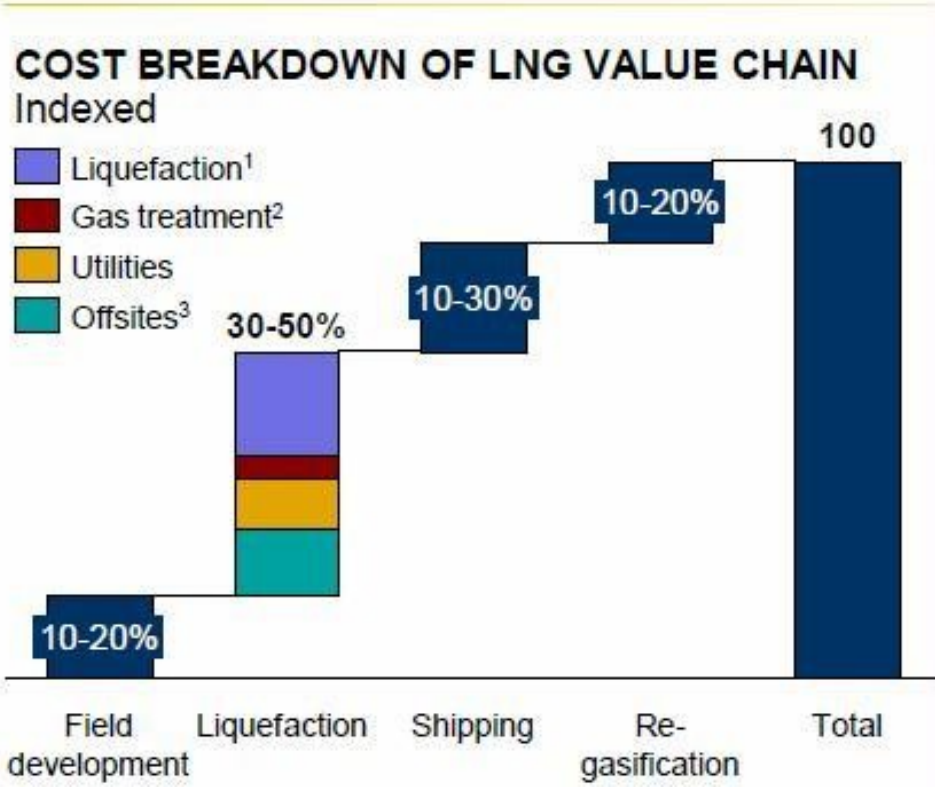
https://clearpath.org/policy/natural-gas/

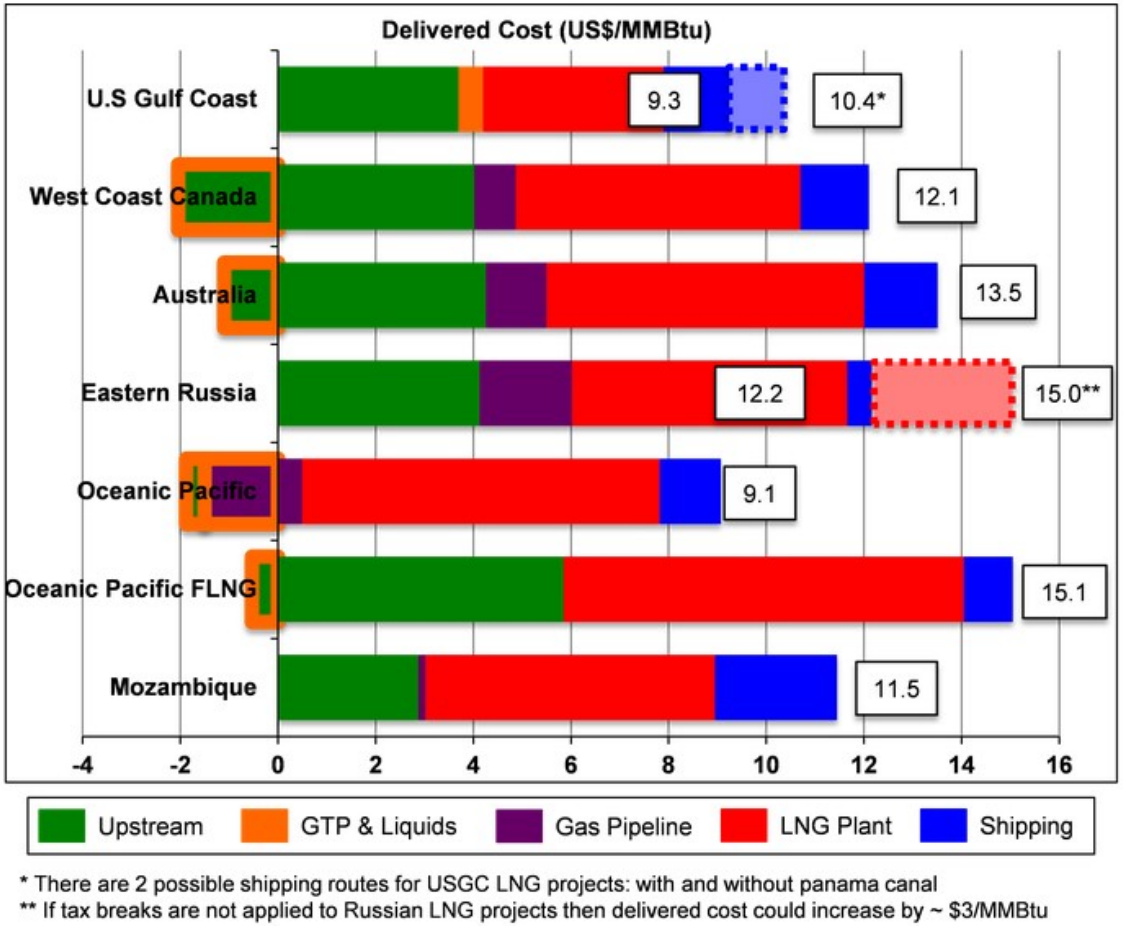
Boru hattı mı LNG mi?



https://www.researchgate.net/figure/Economic-comparison-of-natural-gas-transportation-technologies-in-a_fig5_266350395

LNG maliyetleri





* There are 2 possible shipping routes for USGC LNG projects: with and without panama canal
** If tax breaks are not applied to Russian LNG projects then delivered cost could increase by ~ $3/MMBtu

http://energyskeptic.com/2013/natural-gas-statistics/
http://gaffney-cline-focus.com/lng-the-key-to-unlocking-energy-diversification

Özet ve Sorular