

# **Enerji 101 – Ders 5**

## **Petrol ve Doğalgaz**

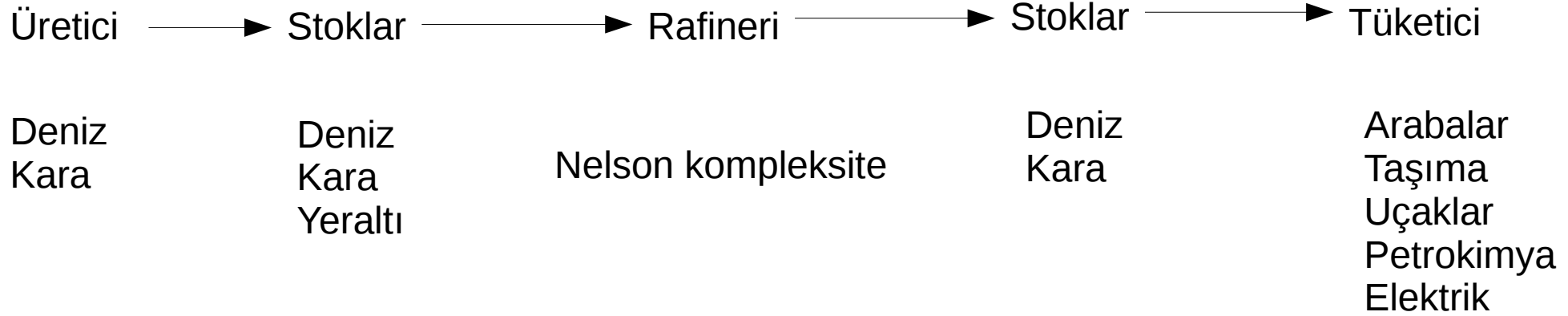
**Bariř Sanlı**

# 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,

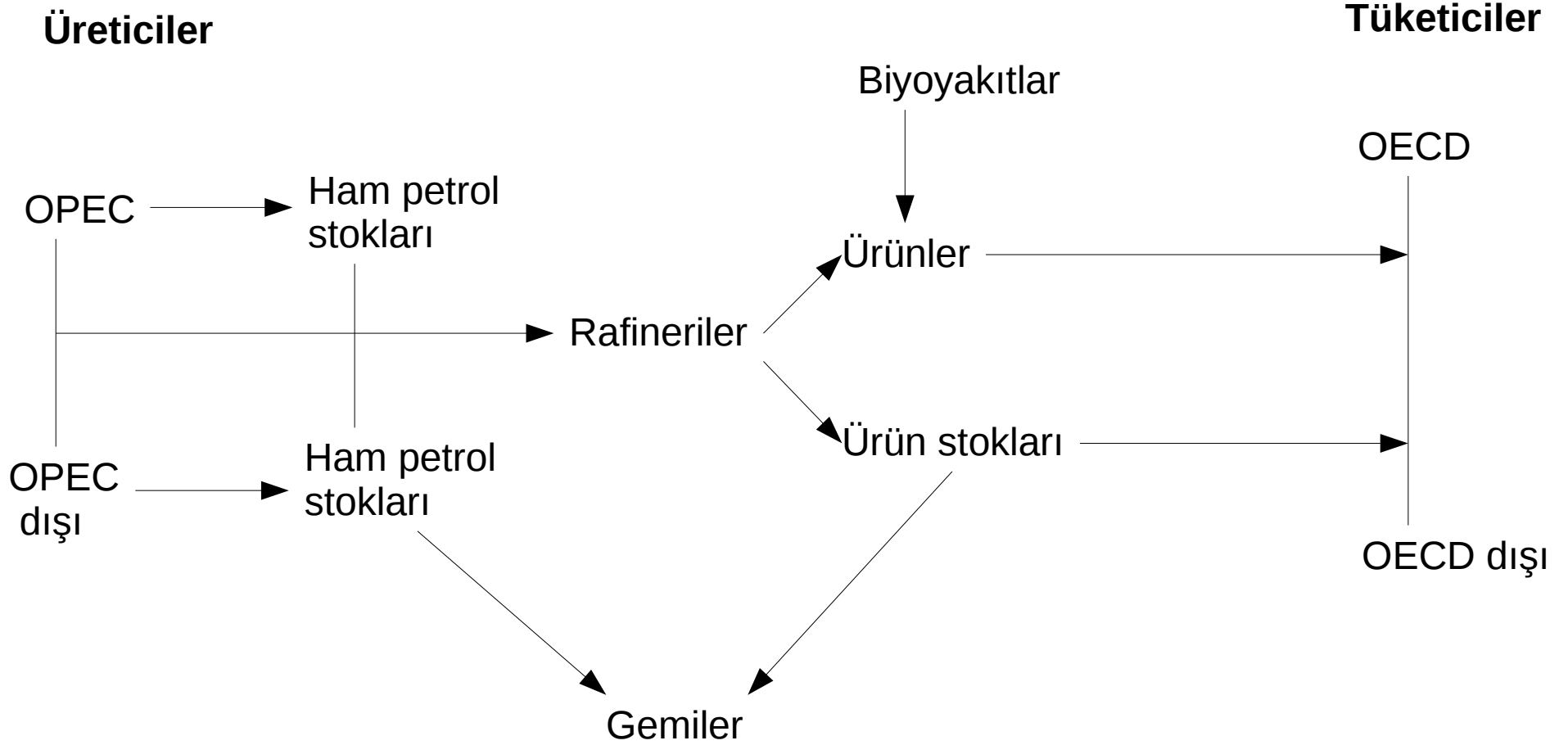
# Basit denge

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



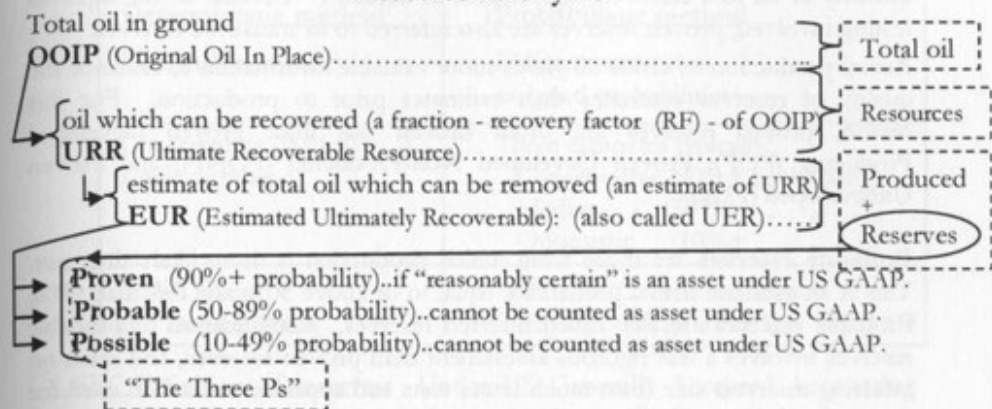
Arz talep nerede kesişiyor

# Petrolde

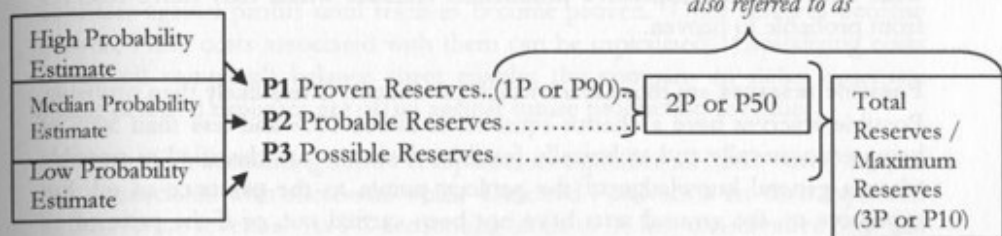


# Bazı teknik noktalar

## Reserves acronyms



Reserves are often categorized into groups referred to as the three Ps depending on their probability (Table 14-2):



P1, P2 and P3 are the individual components of reserves and 1P, 2P and 3P are the terminology used to describe the cumulative components. 1P, 2P and 3P are also referred to as P90, P50 and P10, respectively.

Number of carbon atoms	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

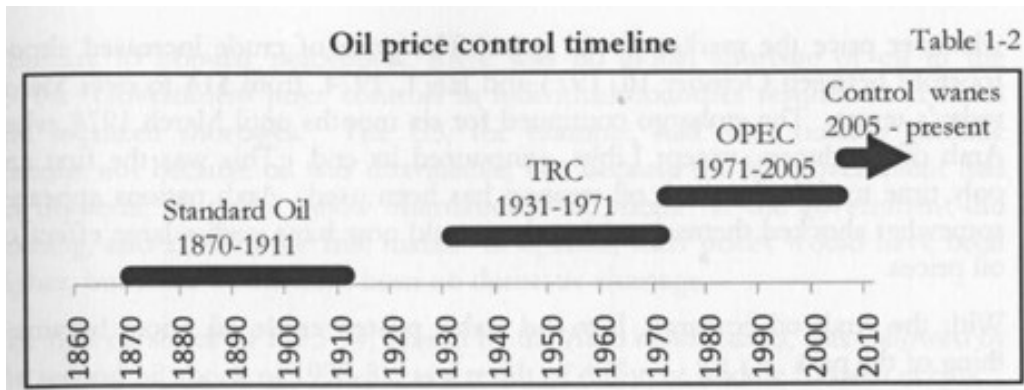
	2017	2018	2019	1Q18	2Q18	3Q18	4Q18	1Q19	Jun 18	Jul 18	Aug
<b>OPEC</b>											
Crude Oil											
Saudi Arabia	9.96			9.95	10.14				10.46	10.35	10.4
Iran	3.81			3.83	3.84				3.83	3.78	3.8
Iraq	4.47			4.45	4.47				4.54	4.56	4.6
UAE	2.93			2.84	2.88				2.90	2.98	2.9
Kuwait	2.71			2.70	2.71				2.72	2.80	2.8
Neutral Zone	0.00			0.00	0.00				0.00	0.00	0.0
Qatar	0.61			0.60	0.61				0.62	0.62	0.6
Angola	1.64			1.55	1.49				1.45	1.47	1.4
Nigeria	1.53			1.66	1.51				1.46	1.52	1.5
Libya	0.83			1.01	0.89				0.71	0.67	0.6
Algeria	1.05			1.01	1.03				1.05	1.06	1.0
Congo	0.26			0.31	0.32				0.33	0.31	0.3
Gabon	0.20			0.21	0.19				0.20	0.18	0.1
Equatorial Guinea	0.13			0.13	0.12				0.12	0.12	0.1
Ecuador	0.53			0.52	0.53				0.53	0.53	0.5
Venezuela	1.97			1.54	1.36				1.30	1.26	1.2
<b>Total Crude Oil</b>	<b>32.62</b>			<b>32.32</b>	<b>32.08</b>				<b>32.22</b>	<b>32.21</b>	<b>32.2</b>
Total NGLs <sup>1</sup>	6.91	6.98	7.05	6.94	6.95	7.01	7.03	7.05	6.95	7.01	7.0
<b>Total OPEC<sup>2</sup></b>	<b>39.52</b>			<b>39.26</b>	<b>39.03</b>				<b>39.17</b>	<b>39.22</b>	<b>39.2</b>

## WORLD OIL PRODUCTION

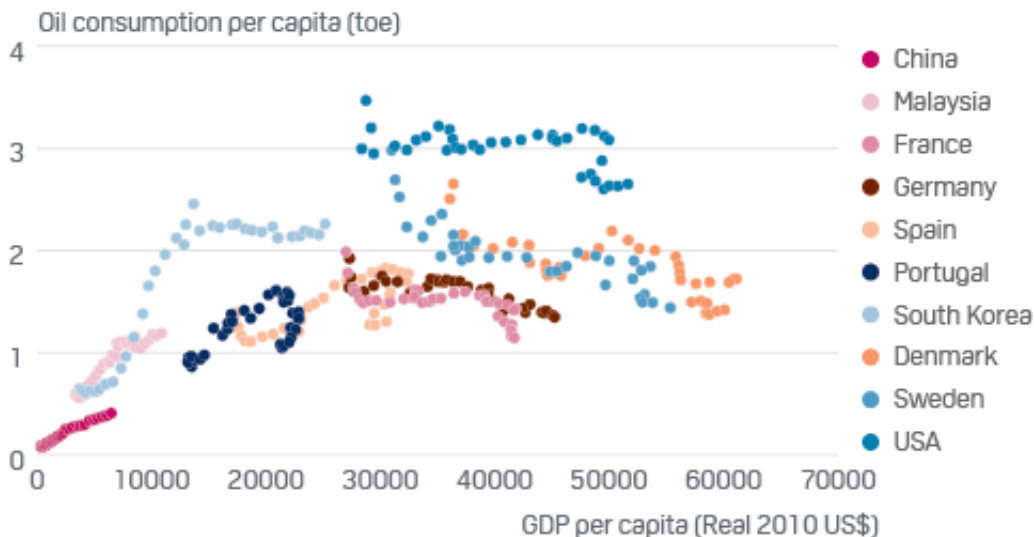
(million barrels per day)

	2017	2018	2019	1Q18	2Q18	3Q18	4Q18	1Q19	Jun 18	Jul 18	Aug 18
<b>NON-OPEC<sup>2,3</sup></b>											
<b>OECD</b>											
<b>Americas</b>	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
<b>Europe</b>	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
<b>Asia Oceania</b>	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
<b>Total OECD</b>	<b>24.20</b>	<b>26.02</b>	<b>27.43</b>	<b>25.69</b>	<b>25.86</b>	<b>26.01</b>	<b>26.50</b>	<b>27.11</b>	<b>25.94</b>	<b>26.27</b>	<b>26.05</b>
<b>NON-OECD</b>											
<b>Former USSR</b>	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
<b>Asia<sup>2</sup></b>	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
<b>Europe</b>	0.13	0.12	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
<b>Americas<sup>2</sup></b>	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	0.34	0.34	0.36	0.34	0.35
<b>Middle East<sup>2,4</sup></b>	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
<b>Africa</b>	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
<b>Total Non-OECD</b>	<b>28.99</b>	<b>29.07</b>	<b>29.37</b>	<b>28.96</b>	<b>29.06</b>	<b>29.08</b>	<b>29.20</b>	<b>29.32</b>	<b>29.22</b>	<b>29.14</b>	<b>29.03</b>
Processing gains <sup>5</sup>	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
<b>TOTAL NON-OPEC</b>	<b>57.96</b>	<b>59.97</b>	<b>61.81</b>	<b>59.06</b>	<b>59.95</b>	<b>60.38</b>	<b>60.48</b>	<b>60.96</b>	<b>60.49</b>	<b>60.75</b>	<b>60.41</b>

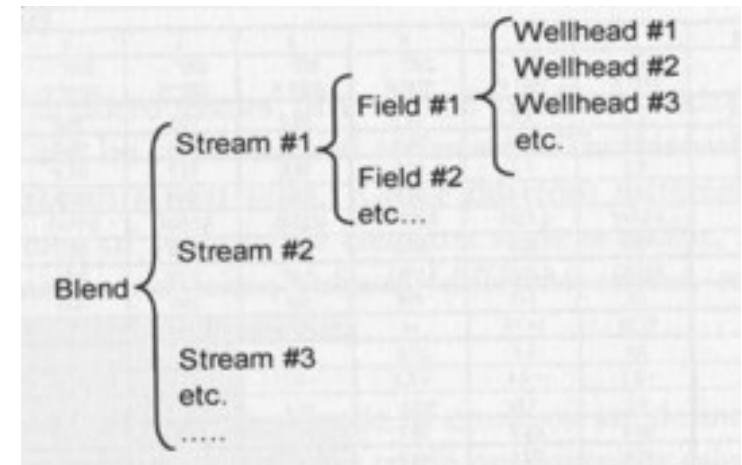
# Petrol fiyatları



## PER CAPITA OIL CONSUMPTION AND PER CAPITA GDP



Source: BP Statistical Review of World Energy (June 2016), Oxford Economics, Platts



API density classifications

Crude oil density classification	API gravity
1. Condensate/Extra-light	>50°
2. Light	40-50°
3. <b>Intermediate/Medium</b>	<b>30 - 39°</b>
4. Medium-heavy	25-29°
5. Heavy	< 25°
6. Extra-heavy	<10°

Intermediate density crudes are most commonly produced.

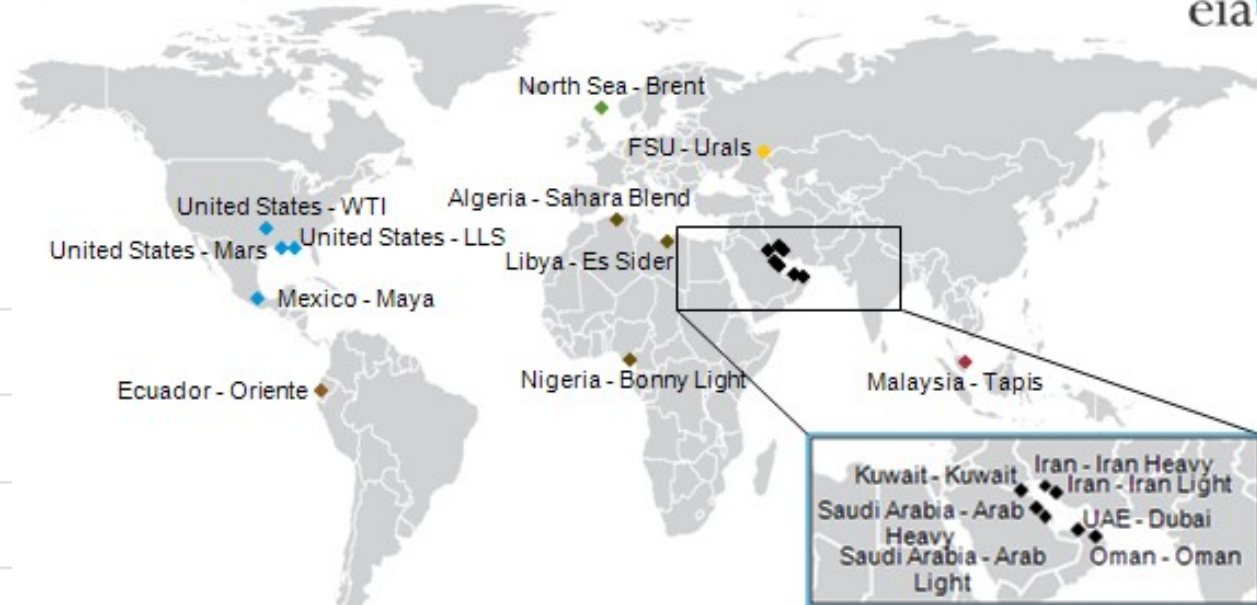
Crude oil sulfur content (% by weight)

Sour	> 1.5
Medium sour	0.5-1.5
Sweet	< 0.5

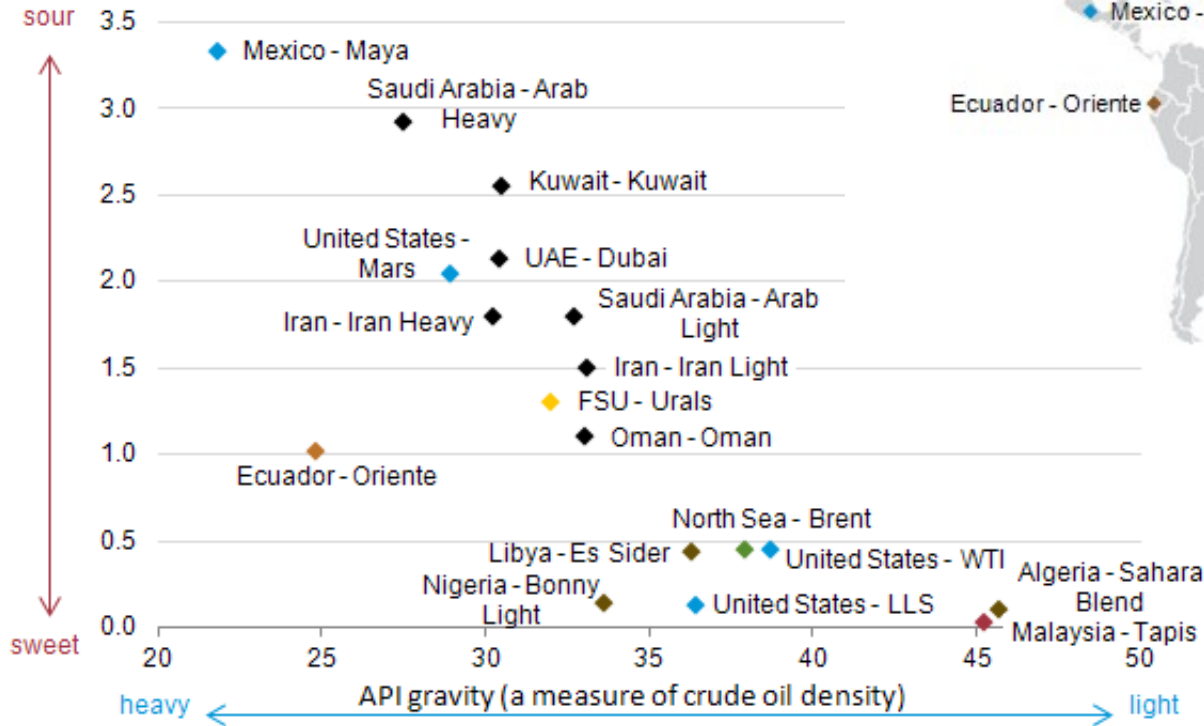


# Bir çok ürün ve nokta

Select crude oil price points



Density and sulfur content of selected crude oils  
sulfur content (percentage)





# Petrol talebi

## SUMMARY OF GLOBAL OIL DEMAND

	2016	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	1Q19	2Q19	3Q19	4Q19	2019
<b>Demand (mb/d)</b>																
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
<b>Total OECD</b>	<b>46.97</b>	<b>46.91</b>	<b>47.02</b>	<b>47.66</b>	<b>48.06</b>	<b>47.42</b>	<b>47.82</b>	<b>47.13</b>	<b>47.70</b>	<b>48.03</b>	<b>47.67</b>	<b>47.60</b>	<b>47.62</b>	<b>48.09</b>	<b>48.40</b>	<b>47.93</b>
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
<b>Total Non-OECD</b>	<b>49.39</b>	<b>49.53</b>	<b>50.95</b>	<b>50.76</b>	<b>50.65</b>	<b>50.48</b>	<b>50.53</b>	<b>51.58</b>	<b>52.07</b>	<b>52.26</b>	<b>51.62</b>	<b>51.67</b>	<b>52.86</b>	<b>53.27</b>	<b>53.46</b>	<b>52.83</b>
<b>World</b>	<b>96.36</b>	<b>96.44</b>	<b>97.98</b>	<b>98.41</b>	<b>98.71</b>	<b>97.90</b>	<b>98.36</b>	<b>98.71</b>	<b>99.77</b>	<b>100.29</b>	<b>99.29</b>	<b>99.27</b>	<b>100.48</b>	<b>101.37</b>	<b>101.87</b>	<b>100.76</b>
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
<b>Total</b>	<b>66.98</b>	<b>66.98</b>	<b>68.02</b>	<b>68.16</b>	<b>68.61</b>	<b>67.95</b>	<b>68.49</b>	<b>68.44</b>	<b>69.29</b>	<b>69.87</b>	<b>69.02</b>	<b>69.09</b>	<b>69.75</b>	<b>70.42</b>	<b>70.91</b>	<b>70.05</b>
% 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%

# Petrol talep artışı

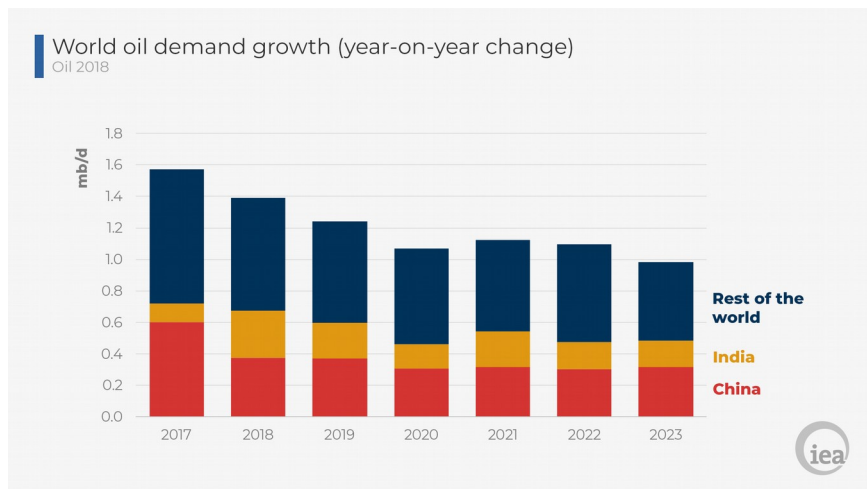


Figure 1.4 • Per capita consumption of plastics and nitrogen fertilisers

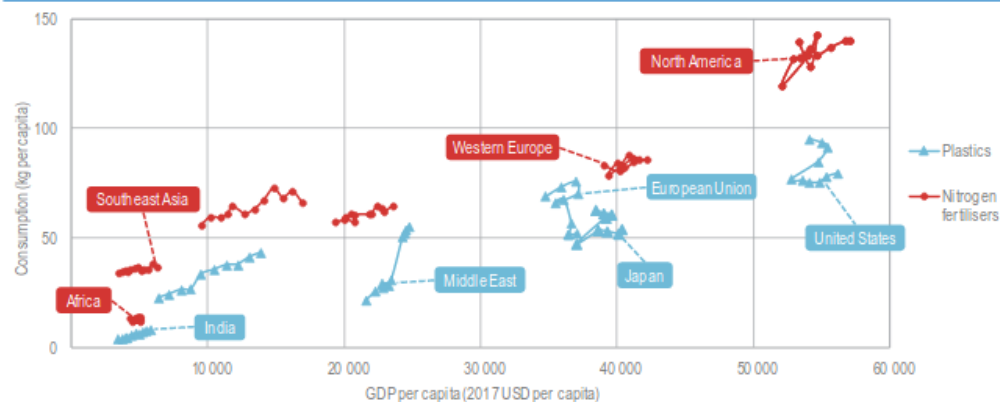


Figure 1.3 • Production growth for selected bulk materials and GDP

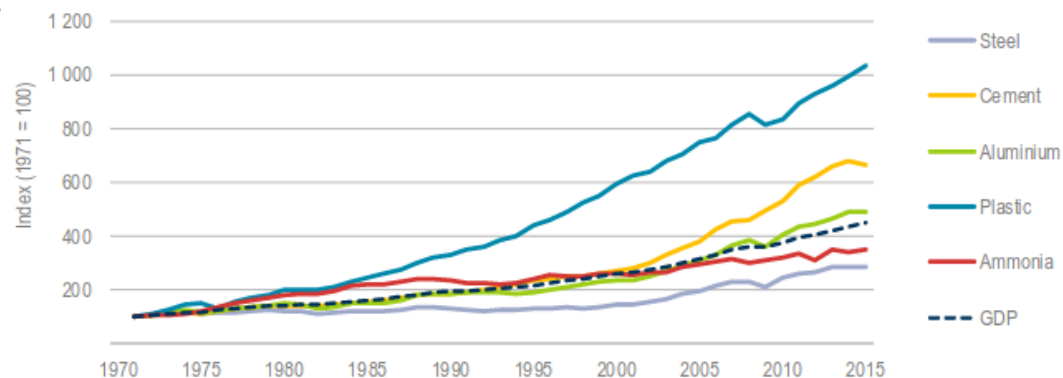
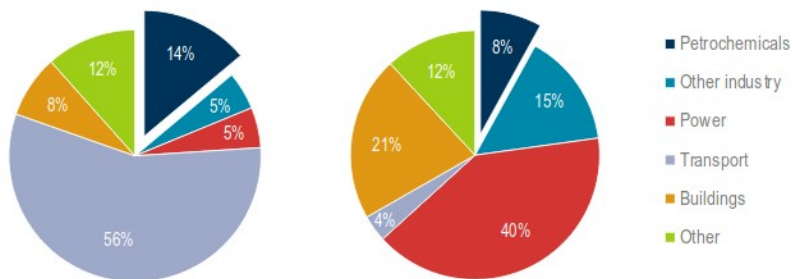


Figure 2.1 • Primary oil (left) and natural gas (right) demand in 2017 by sector

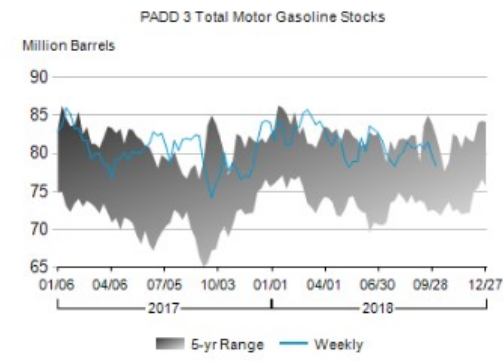
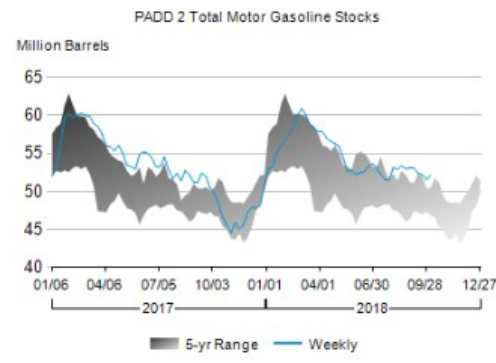
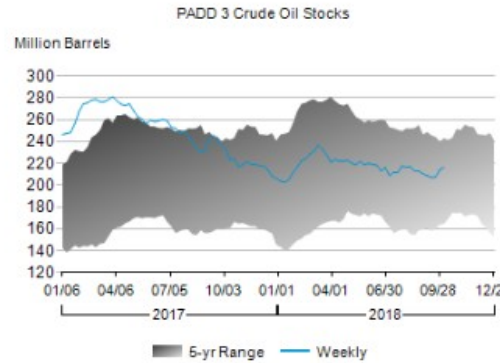
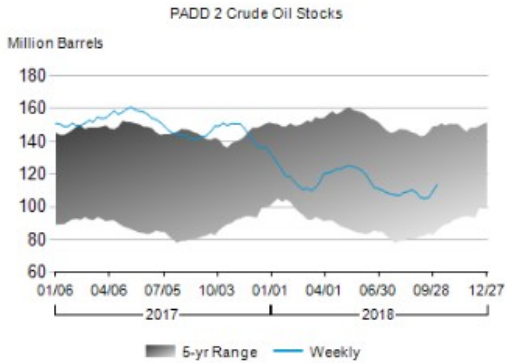
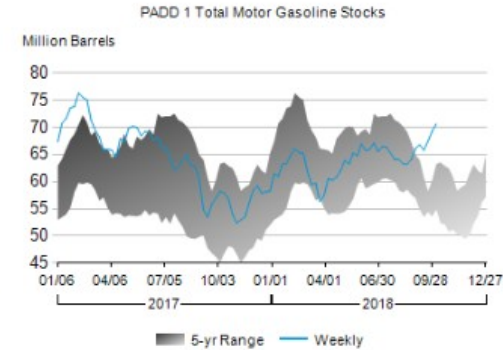
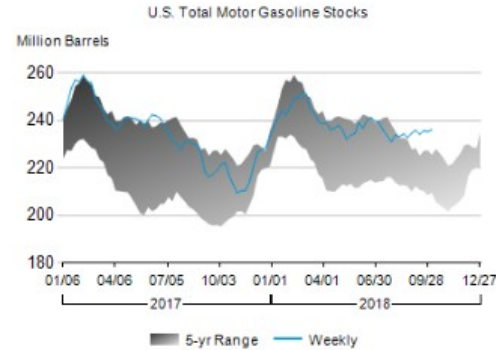
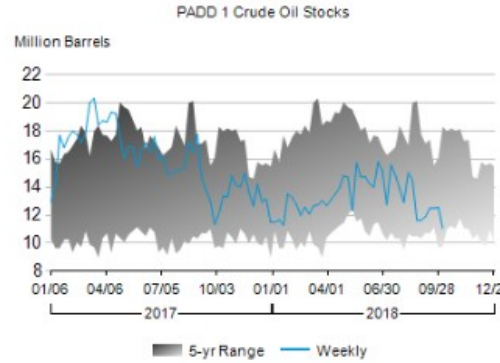
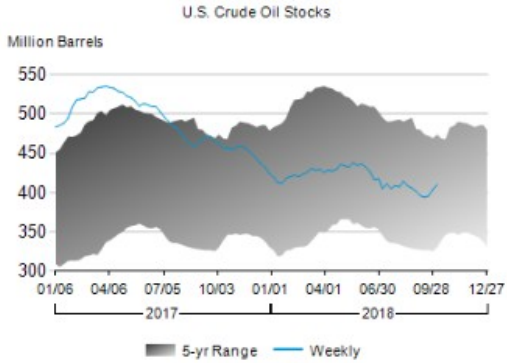


Note: Petrochemicals includes process energy and feedstock.

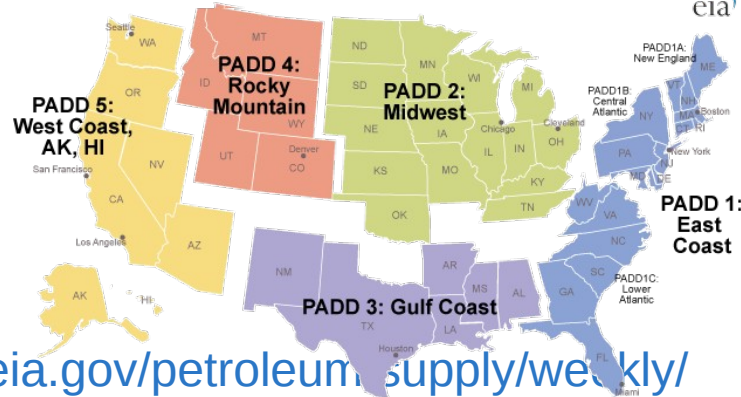
# Stoklar

- 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

# EIA stok



Petroleum Administration for Defense Districts

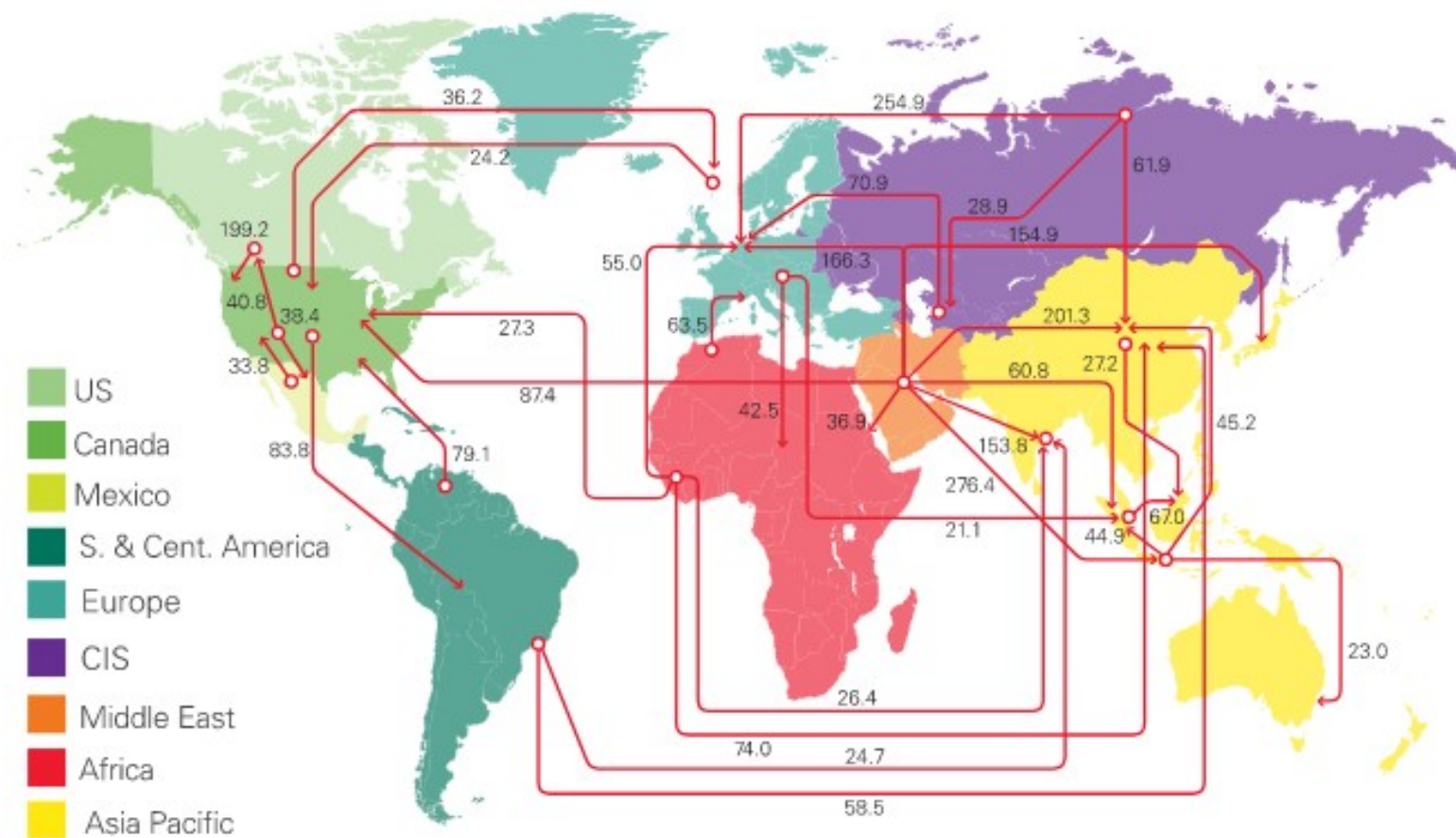


<https://www.eia.gov/petroleum/supply/weekly/>  
<https://www.eia.gov/todayinenergy/detail.php?id=4890>



# Petrol ticareti

Oil major trade movements 2017 – trade flows worldwide (million tonnes)



# Ticarette bazı teknik hususlar

Main oil futures contracts

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

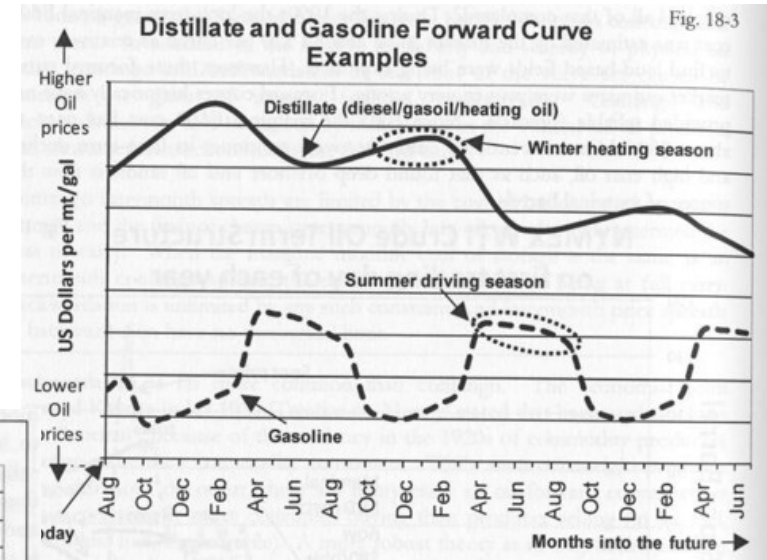
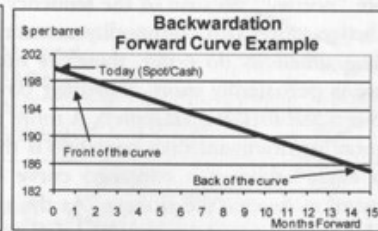
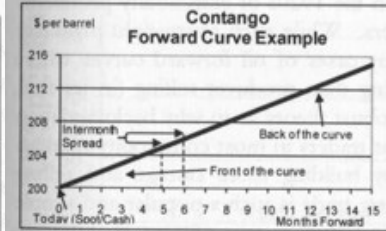


Fig. 18-3

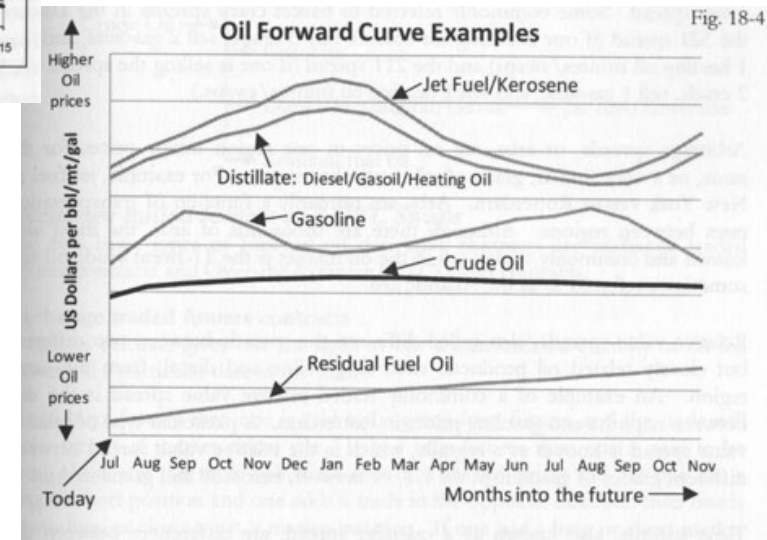
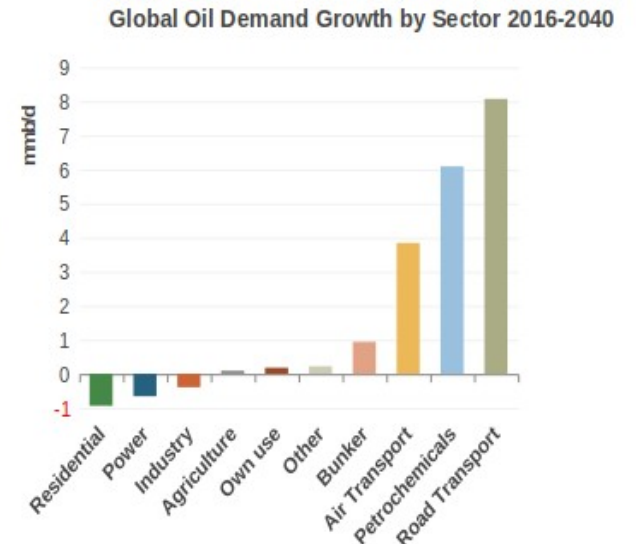
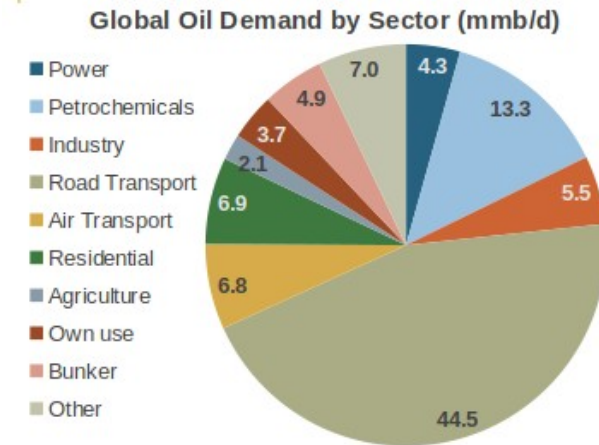
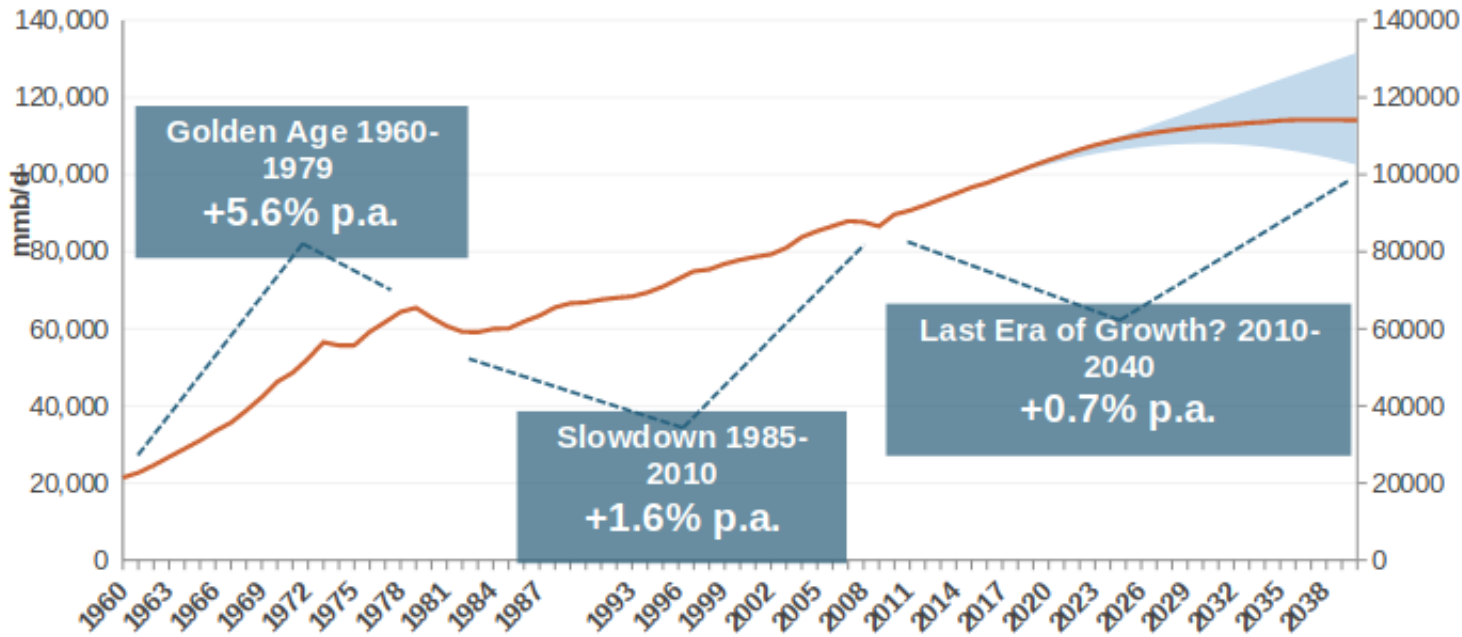


Fig. 18-4

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)
↑	↑	↓
\$120	+\$10	-\$5
\$115	+\$5	-\$5
\$110	0	-\$5
\$105	-\$5	-\$5
\$100	-\$5	0
\$ 95	-\$5	+\$5
\$ 90	-\$5	+\$10
↓	↓	↓

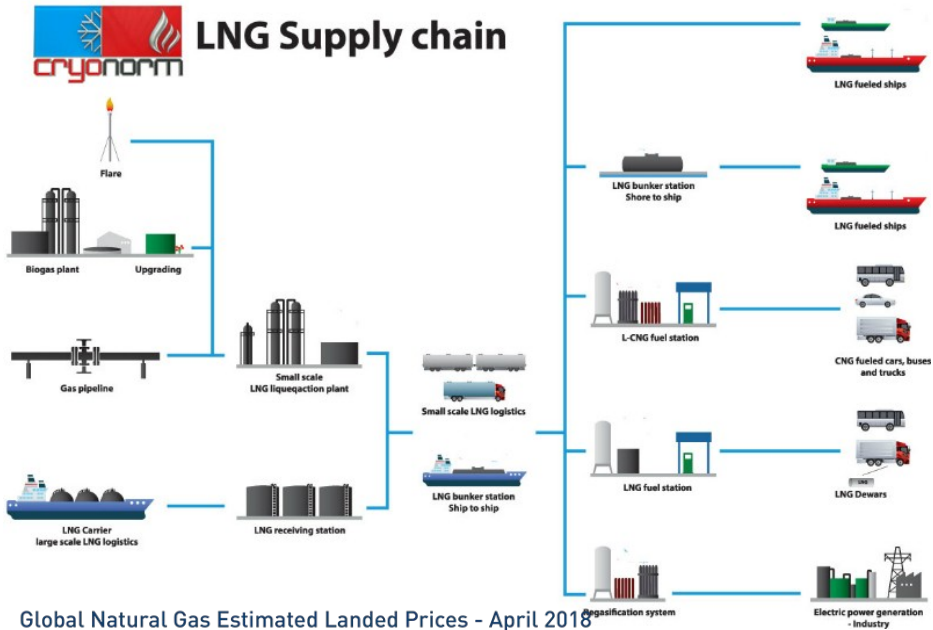
# Gelecek





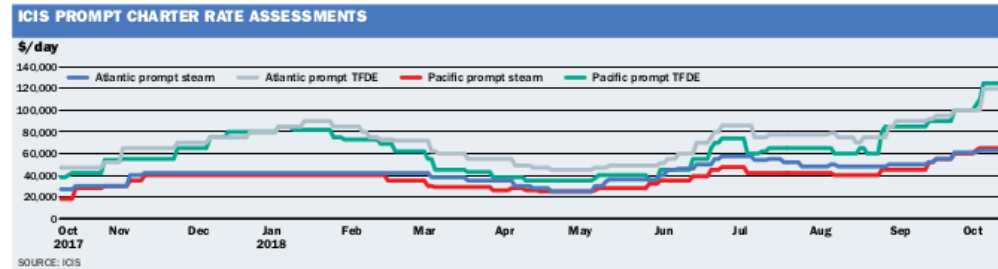
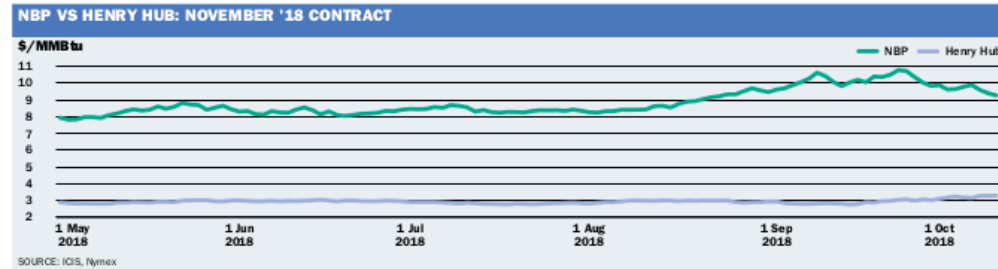
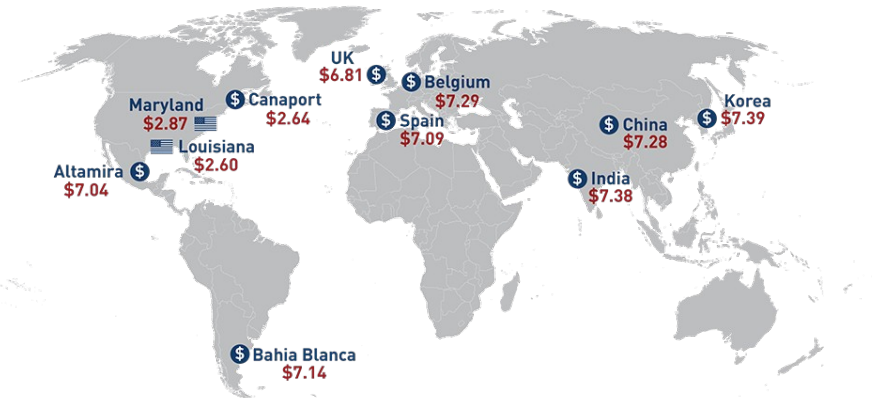


# LNG

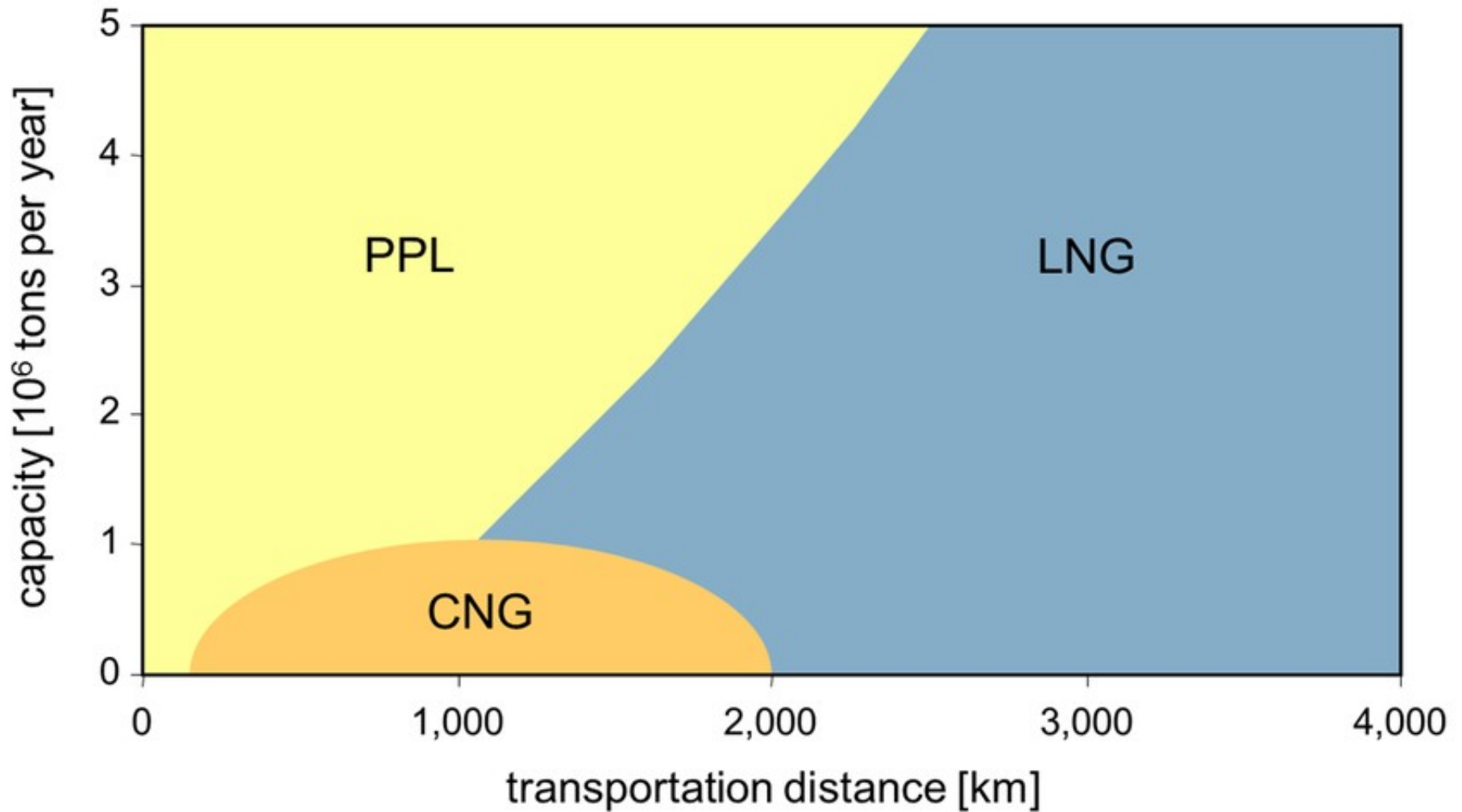


Global Natural Gas Estimated Landed Prices - April 2018

US Dollars per MMBtu

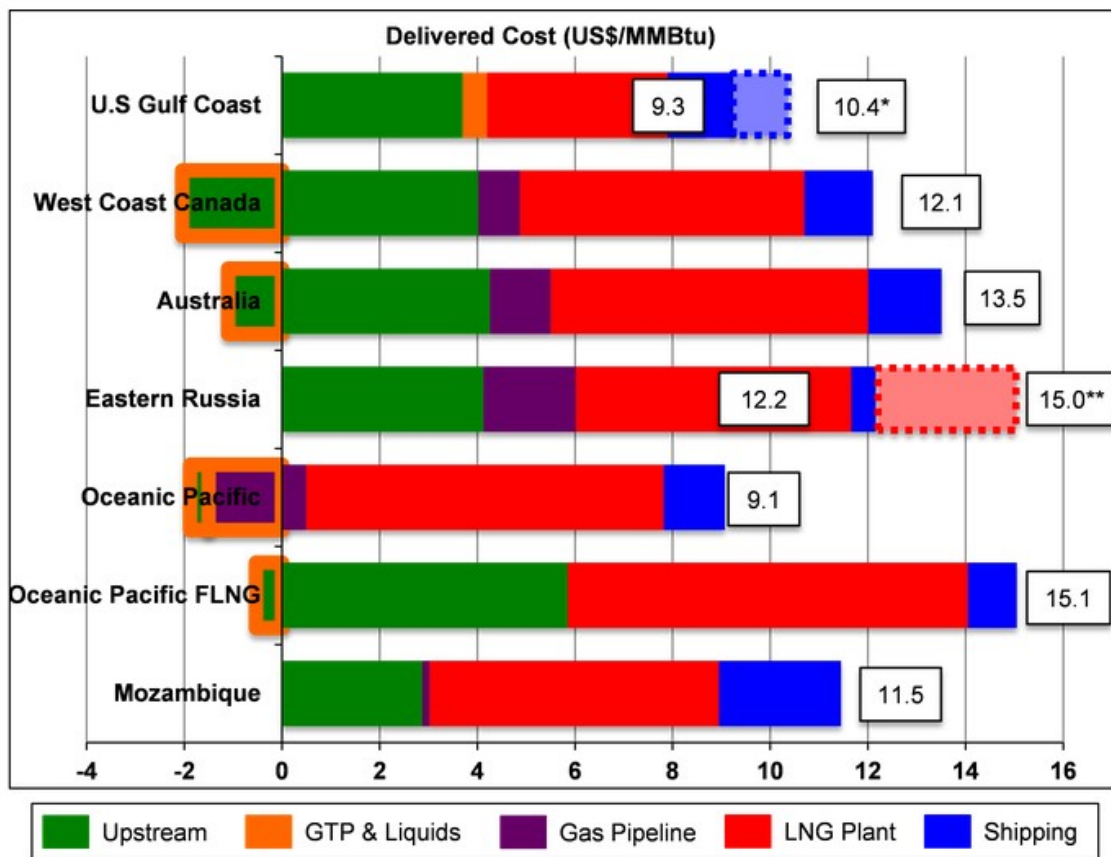
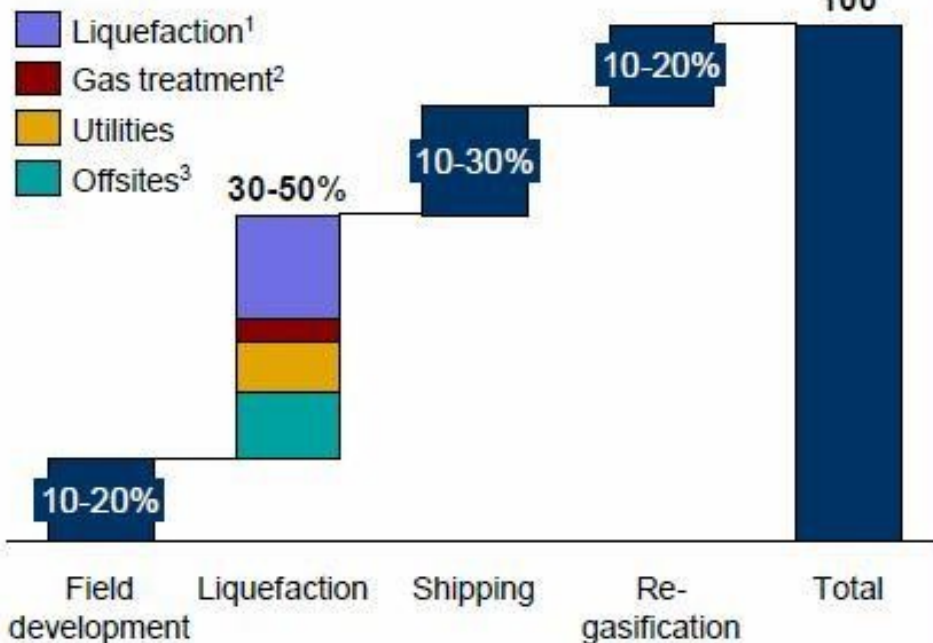


# Boru hattı mı LNG mi?



# LNG maliyetleri

## COST BREAKDOWN OF LNG VALUE CHAIN Indexed



\* 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



# Özet ve Sorular