



Țițeiul



Definiție

- amestec de hidrocarburi gazoase și solide dizolvate în hidrocarburi lichide;
- alături de hidrocarburi, în țiței se întâlnesc și heterocompuși, compuși organici ce conțin în molecula lor sulf, oxigen, azot, compuși asfaltici, compuși organometalici;

Aspect

- lichid uleios
- culoare verde măslinie, brună sau neagră
- fluorescență verzuie
- inflamabil.

Compoziția țțeiului

- zona geografică (Golful Persic, SUA, Mexic, Rusia);
- vârsta zăcământului;
- adâncimea zăcământului.

Rezerve si resurse

- Resursele - cantitatile de produs cunoscute ca fiind disponibile sau deduse a fi prezente si potential accesibile
- Rezervele - cantitatile de produs pastrate pentru a fi utilizate mai tarziu.

Cantitati existente versus cantitati recuperabile

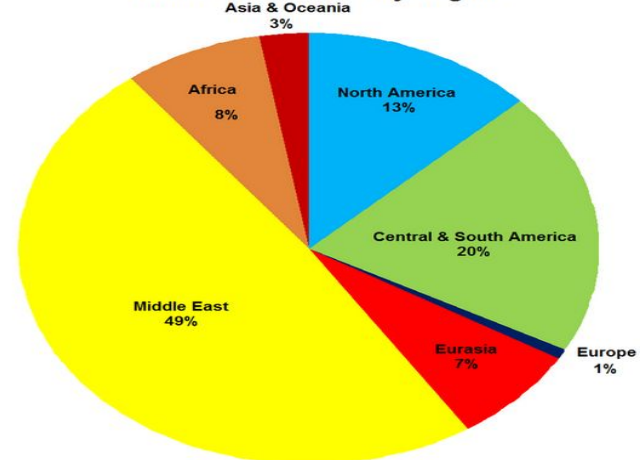
- Cantitati existente in zacamant, dovedite – resursele ramase in zacaminte naturale cunoscute, care au fost atent masurate si sunt considerate a fi exploatabile in conditiile economice si tehnologice prezente.
- Rezerve recuperabile dovedite, sigure, reprezentand partea de resurse dovedite ce pot fi exploatare in viitor cu tehnologia existenta in prezent.
- Cantitati estimate suplimentare in zacamant – resurse suplimentare fata de cantitatile dovedite, existente din zacamant, si care prezinta interes economic previzibil. Cantitatile speculative nu sunt incluse.
- Rezerve estimate suplimentare recuperabile – partea din cantitatile estimate suplimentare din zacamant despre care informatiile geologice si ingineresti disponibile arata ca ar putea fi recuperata in viitor cu eforturi rezonabile.

Țițeiul



1,646 miliarde barili rezerve
dovedite 2014

World Oil Reserves by Region

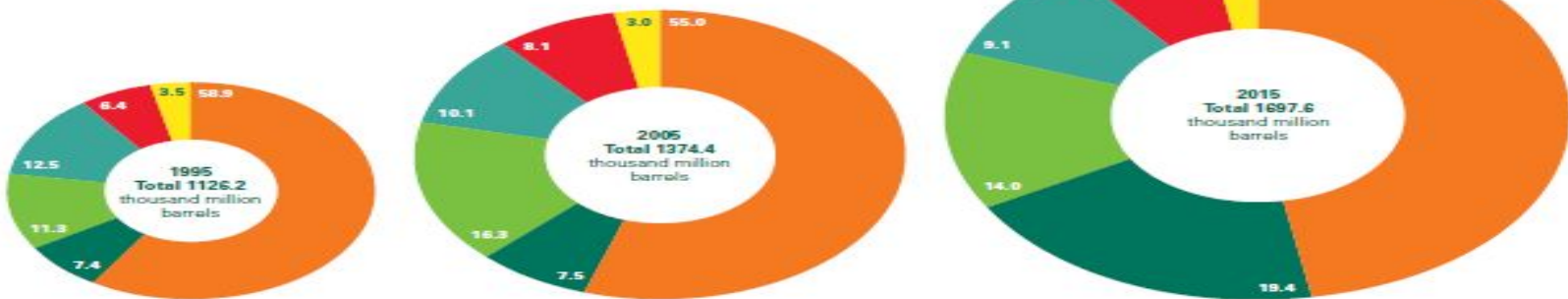


Data source: US Energy Information Administration (2013)
Reserves are the estimated quantities of crude oil, which are, with reasonable certainty to be recoverable

Distribution of proved reserves in 1995, 2005 and 2015

Percentage

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

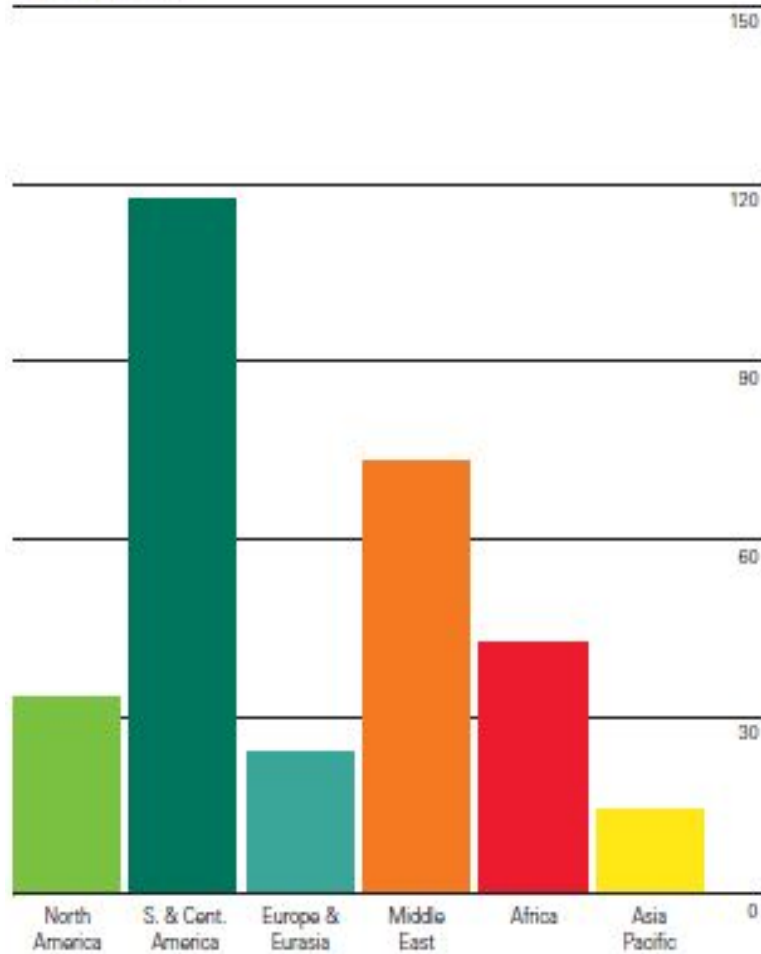


Total proved reserves

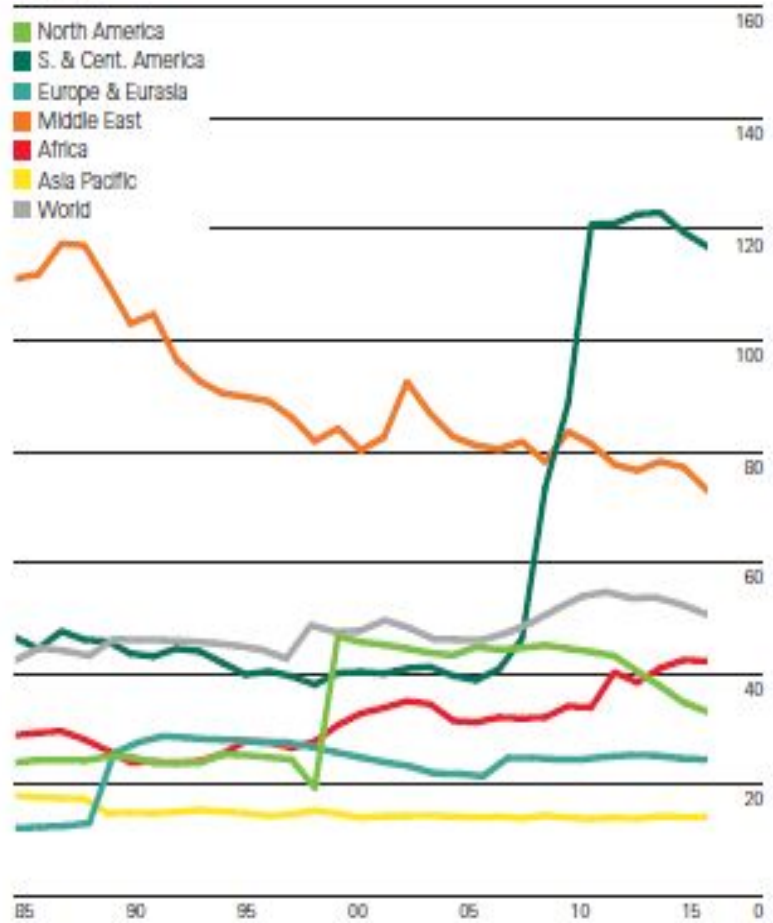
	At end 1995	At end 2005	At end 2014	At end 2015			R/P ratio
	Thousand million barrels	Thousand million barrels	Thousand million barrels	Thousand million barrels	Thousand million tonnes	Share of total	
US	29.8	29.9	55.0	55.0	6.6	3.2%	11.9
Canada	48.4	180.0	172.2	172.2	27.8	10.1%	107.6
Mexico	48.8	13.7	10.8	10.8	1.5	0.6%	11.5
Total North America	126.9	223.6	238.0	238.0	35.9	14.0%	33.1
Argentina	2.4	2.2	2.4	2.4	0.3	0.1%	10.2
Brazil	6.2	11.8	16.2	13.0	1.9	0.8%	14.1
Colombia	3.0	1.5	2.4	2.3	0.3	0.1%	6.3
Ecuador	3.4	4.9	8.0	8.0	1.2	0.5%	40.4
Peru	0.8	1.1	1.4	1.4	0.2	0.1%	34.3
Trinidad & Tobago	0.7	0.8	0.8	0.7	0.1	*	18.1
Venezuela	66.3	80.0	300.0	300.9	47.0	17.7%	313.9
Other S. & Cent. America	1.0	1.5	0.5	0.5	0.1	*	9.9
Total S. & Cent. America	83.7	103.6	331.7	329.2	51.0	19.4%	117.0
Azerbaijan	1.2	7.0	7.0	7.0	1.0	0.4%	22.8
Denmark	0.9	1.3	0.6	0.6	0.1	*	9.6
Italy	0.8	0.5	0.6	0.6	0.1	*	14.7
Kazakhstan	5.3	9.0	30.0	30.0	3.9	1.8%	49.3
Norway	10.8	9.7	6.5	8.0	1.0	0.5%	11.3
Romania	1.0	0.5	0.6	0.6	0.1	*	19.5
Russian Federation	113.6	104.4	103.2	102.4	14.0	6.0%	25.5
Turkmenistan	0.5	0.5	0.6	0.6	0.1	*	6.3
United Kingdom	4.5	3.9	2.8	2.8	0.4	0.2%	8.0
Uzbekistan	0.3	0.6	0.6	0.6	0.1	*	25.3
Other Europe & Eurasia	2.2	2.2	2.1	2.1	0.3	0.1%	15.0
Total Europe & Eurasia	141.2	139.5	154.6	155.2	21.0	9.1%	24.4
Iran	93.7	137.5	157.8	157.8	21.7	9.3%	110.3
Iraq	100.0	115.0	143.1	143.1	19.3	8.4%	97.2
Kuwait	96.5	101.5	101.5	101.5	14.0	6.0%	89.8
Oman	5.2	5.6	5.2	5.3	0.7	0.3%	15.3
Qatar	3.7	27.9	25.7	25.7	2.7	1.5%	37.1
Saudi Arabia	261.5	264.2	267.0	266.6	36.6	15.7%	60.8
Syria	2.6	3.0	2.5	2.5	0.3	0.1%	263.7
United Arab Emirates	98.1	97.8	97.8	97.8	13.0	5.8%	68.7
Yemen	2.0	2.9	3.0	3.0	0.4	0.2%	176.5
Other Middle East	0.1	0.1	0.2	0.2	†	*	2.8
Total Middle East	663.3	755.5	803.8	803.5	108.7	47.3%	73.1
Algeria	10.0	12.3	12.2	12.2	1.5	0.7%	21.1
Angola	3.1	9.0	12.7	12.7	1.7	0.7%	19.0
Chad	-	1.5	1.5	1.5	0.2	0.1%	52.4
Republic of Congo	1.3	1.5	1.6	1.6	0.2	0.1%	15.8
Egypt	3.8	3.7	3.7	3.5	0.5	0.2%	13.2
Equatorial Guinea	0.6	1.8	1.1	1.1	0.1	0.1%	10.4
Gabon	1.5	2.1	2.0	2.0	0.3	0.1%	23.5
Libya	29.5	41.5	48.4	48.4	6.3	2.8%	306.8
Nigeria	20.8	36.2	37.1	37.1	5.0	2.2%	43.2
South Sudan	n/a	n/a	3.5	3.5	0.5	0.2%	64.9
Sudan	0.3	0.6	1.5	1.5	0.2	0.1%	39.2
Tunisia	0.4	0.6	0.4	0.4	0.1	*	18.6
Other Africa	0.7	0.5	3.7	3.7	0.5	0.2%	38.3
Total Africa	72.0	111.3	129.3	129.1	17.1	7.6%	42.2
Australia	3.8	3.7	4.0	4.0	0.4	0.2%	28.3
Brunei	1.1	1.1	1.1	1.1	0.1	0.1%	23.8
China	16.4	15.6	18.5	18.5	2.5	1.1%	11.7
India	5.5	5.9	5.7	5.7	0.8	0.3%	18.0
Indonesia	5.0	4.2	3.6	3.6	0.5	0.2%	12.0
Malaysia	5.2	5.3	3.6	3.6	0.5	0.2%	14.2
Thailand	0.3	0.5	0.4	0.4	†	*	2.3
Vietnam	0.8	3.1	4.4	4.4	0.6	0.3%	33.3
Other Asia Pacific	1.1	1.4	1.3	1.3	0.2	0.1%	12.0
Total Asia Pacific	39.1	60.8	42.6	42.6	5.7	2.5%	14.0
Total World	1126.2	1374.4	1700.0	1697.6	239.4	100.0%	60.7
of which: OECD	149.2	244.0	253.9	255.3	38.0	15.0%	29.7
Non-OECD	976.9	1130.4	1446.1	1442.3	201.3	85.0%	58.0
OPEC	786.6	927.8	1211.1	1211.6	169.9	71.4%	86.8
Non-OPEC	339.6	446.6	488.9	486.0	69.4	28.6%	24.9
European Union#	8.3	7.0	5.6	5.6	0.7	0.3%	10.1
CIS	121.5	122.2	141.9	141.1	19.1	8.3%	27.8

Țițeiu

2015 by region



History



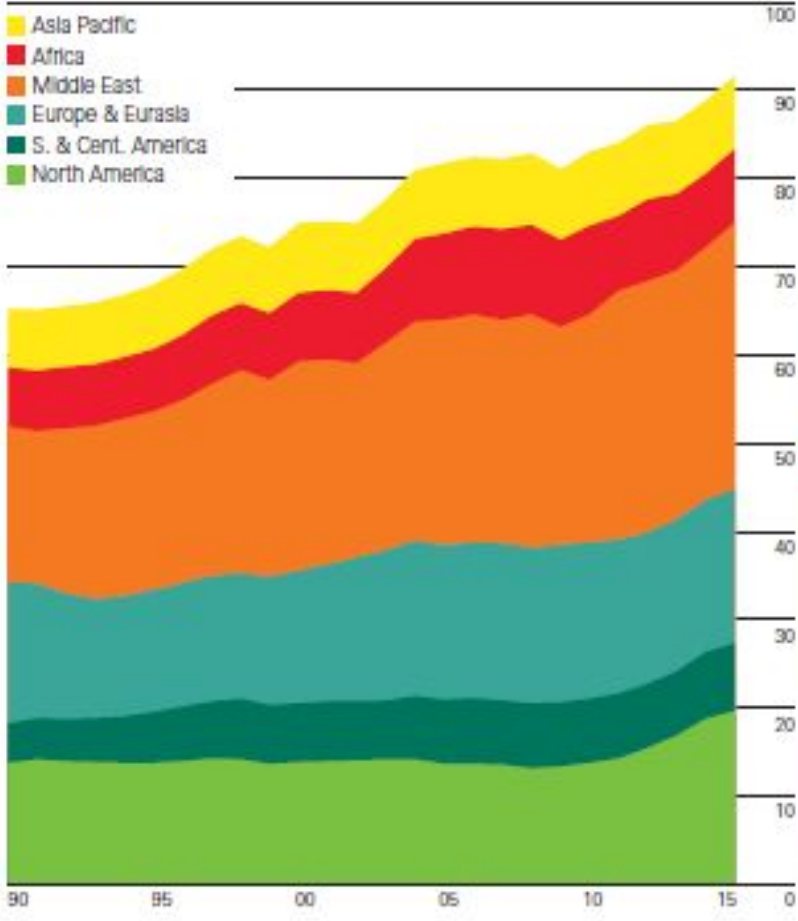
Oil Production in thousands of barrels per day*

Thousand barrels daily	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Change 2015 over 2014	2015 share of total
US	6900	6826	6860	6785	7264	7550	7853	8883	10059	11723	12704	8.5%	13.0%
Canada	3041	3208	3290	3207	3202	3332	3515	3740	4000	4278	4385	2.8%	4.9%
Mexico	3767	3692	3481	3167	2960	2961	2942	2912	2876	2785	2588	-7.0%	2.9%
Total North America	13708	13726	13631	13159	13447	13843	14310	15536	16934	18786	19676	4.7%	20.9%
Argentina	839	838	798	772	716	704	649	652	643	636	637	0.1%	0.7%
Brazil	1713	1809	1833	1899	2029	2137	2193	2149	2114	2346	2527	7.9%	3.0%
Colombia	526	529	531	588	671	786	915	944	1004	990	1008	1.7%	1.2%
Ecuador	534	538	513	507	488	488	501	505	527	557	543	-2.4%	0.7%
Peru	92	97	96	99	107	113	109	110	112	124	113	-11.1%	0.1%
Trinidad & Tobago	170	177	154	152	150	147	139	118	118	116	110	-4.8%	0.1%
Venezuela	3308	3336	3230	3222	3033	2838	2758	2701	2678	2685	2626	-2.1%	3.1%
Other S. & Cent. America	146	140	139	138	129	134	137	143	148	151	148	-1.8%	0.2%
Total S. & Cent. America	7328	7463	7295	7376	7322	7348	7401	7322	7344	7605	7712	1.5%	9.1%
Azerbaijan	445	646	856	895	1014	1023	919	872	877	849	841	-1.0%	1.0%
Denmark	380	346	311	287	265	249	225	204	178	167	158	-5.4%	0.2%
Italy	127	120	122	108	95	106	110	112	116	121	115	-5.1%	0.1%
Kazakhstan	1294	1368	1413	1483	1609	1676	1684	1662	1720	1701	1669	-1.9%	1.8%
Norway	2961	2772	2551	2466	2349	2136	2040	1917	1838	1889	1948	3.2%	2.0%
Romania	114	105	100	99	94	90	89	83	86	84	84	-1.1%	0.1%
Russian Federation	9597	9818	10043	9950	10139	10368	10518	10639	10779	10838	10980	1.2%	12.4%
Turkmenistan	193	187	199	211	214	220	220	229	240	249	261	5.0%	0.3%
United Kingdom	1843	1666	1659	1555	1477	1361	1116	949	867	855	965	13.4%	1.0%
Uzbekistan	115	114	104	102	95	78	77	68	68	66	64	-3.1%	0.1%
Other Europe & Eurasia	454	445	442	420	409	394	394	390	397	398	378	-2.4%	0.4%
Total Europe & Eurasia	17523	17587	17800	17577	17760	17699	17390	17124	17166	17206	17483	1.4%	19.4%
Iran	4216	4290	4333	4361	4250	4420	4466	3814	3611	3736	3920	4.5%	4.2%
Iraq	1833	1999	2143	2428	2452	2490	2801	3116	3141	3285	4031	22.9%	4.5%
Kuwait	2668	2737	2661	2786	2500	2561	2915	3171	3134	3120	3096	-1.1%	3.4%
Oman	777	738	710	757	813	865	895	918	942	943	952	0.8%	1.1%
Qatar	1151	1241	1267	1438	1421	1638	1834	1931	1903	1893	1888	-0.4%	1.8%
Saudi Arabia	10931	10671	10268	10663	9663	10075	11144	11635	11393	11505	12014	4.6%	13.0%
Syria	448	421	404	406	401	385	353	171	59	33	27	-18.2%	+
United Arab Emirates	2919	3088	3002	3027	2725	2895	3320	3403	3640	3685	3902	5.3%	4.0%
Yemen	421	387	341	315	307	306	241	190	150	145	47	-67.8%	+
Other Middle East	185	182	194	192	192	192	201	183	207	213	212	-0.5%	0.2%
Total Middle East	25549	25764	25322	26372	24723	25827	28160	28532	28181	28557	30098	5.4%	32.4%
Algeria	1990	1979	1992	1969	1775	1689	1642	1537	1485	1589	1586	-0.4%	1.6%
Angola	1282	1432	1699	1916	1804	1863	1726	1784	1799	1712	1826	6.8%	2.0%
Chad	173	153	144	127	118	122	114	101	83	82	78	-4.8%	0.1%
Republic of Congo	247	279	224	237	276	314	301	294	281	276	277	0.4%	0.3%
Egypt	672	679	698	715	730	725	714	715	710	714	723	1.4%	0.8%
Equatorial Guinea	358	342	350	347	307	274	252	272	267	281	289	3.3%	0.3%
Gabon	270	242	246	240	241	255	254	245	236	236	233	-1.4%	0.3%
Libya	1745	1816	1820	1820	1652	1656	479	1509	989	498	432	-13.4%	0.5%
Nigeria	2527	2433	2314	2134	2234	2535	2476	2430	2321	2389	2352	-1.5%	2.6%
South Sudan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	31	100	155	148	-4.9%	0.2%
Sudan	294	356	483	457	475	462	291	103	118	120	105	-12.3%	0.1%
Tunisia	80	77	106	98	93	85	78	84	78	73	63	-14.1%	0.1%
Other Africa	172	222	192	186	184	162	221	221	245	245	264	7.9%	0.3%
Total Africa	9811	10011	10269	10246	9990	10142	8548	9327	8711	8371	8375	0.1%	9.1%
Australia	570	532	549	538	507	548	483	479	407	436	385	-10.9%	0.4%
Brunei	206	221	194	175	168	172	165	159	135	126	127	0.4%	0.1%
China	3642	3711	3742	3814	3805	4077	4074	4155	4216	4246	4309	1.5%	4.9%
India	737	760	768	803	816	882	916	906	906	887	876	-1.1%	0.9%
Indonesia	1096	1018	972	1006	994	1003	952	918	882	852	825	-3.0%	0.9%
Malaysia	757	713	742	741	701	717	650	654	621	650	693	6.9%	0.7%
Thailand	297	325	341	362	376	388	421	460	454	450	477	6.0%	0.4%
Vietnam	389	354	334	309	341	322	326	357	361	373	362	-3.4%	0.4%
Other Asia Pacific	285	304	319	340	330	315	299	290	272	289	292	1.4%	0.3%
Total Asia Pacific	7978	7937	7961	8088	8039	8424	8287	8378	8254	8310	8346	0.5%	9.1%
Total World	81996	82487	82277	82818	81182	83283	84097	86218	86591	88234	91670	3.2%	100.0%
of which: OECD	19894	19458	19141	18434	18443	18535	18571	19474	20623	22541	23534	4.4%	24.9%
Non-OECD	62003	63029	63136	64384	62739	64748	65526	66744	65968	66293	68136	2.7%	75.1%
OPEC	35104	35570	35241	36269	33998	35149	36061	37536	36621	36652	38226	4.2%	41.4%
Non-OPEC	46792	46918	47036	46549	47184	48134	48035	48682	49970	52182	53445	2.4%	58.6%
European Union	2711	2471	2425	2264	2127	1987	1724	1528	1436	1414	1507	6.6%	1.6%
CIS	11702	12238	12758	12789	12312	12484	12542	12582	12388	12887	13014	0.7%	15.8%

Țițeiul

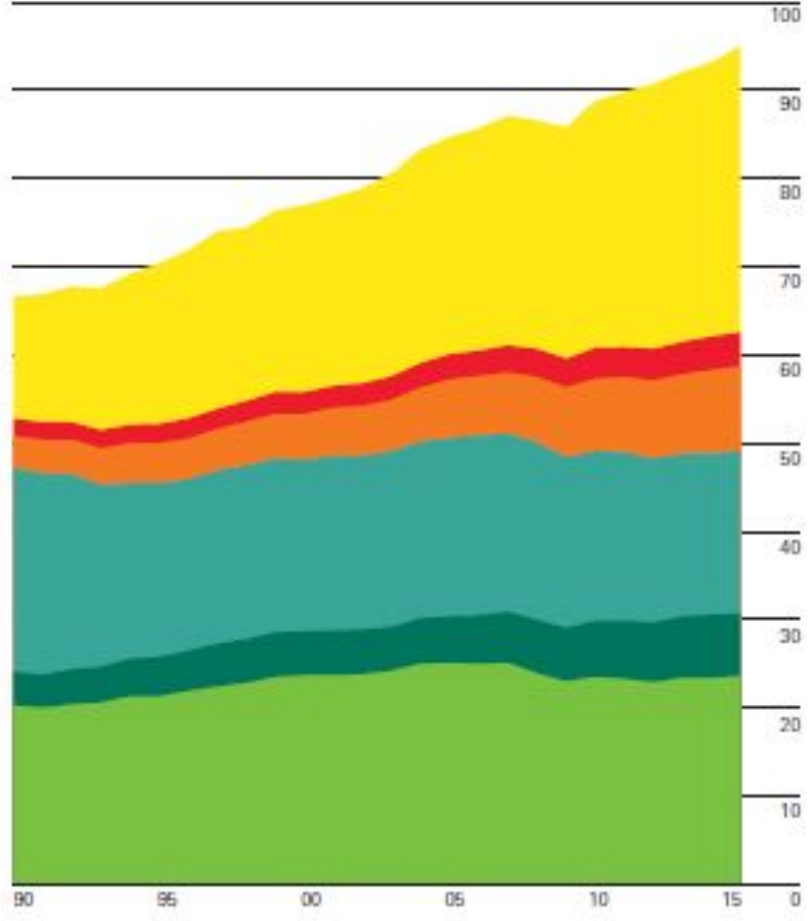
Oil: Production by region

Million barrels daily



Oil: Consumption by region

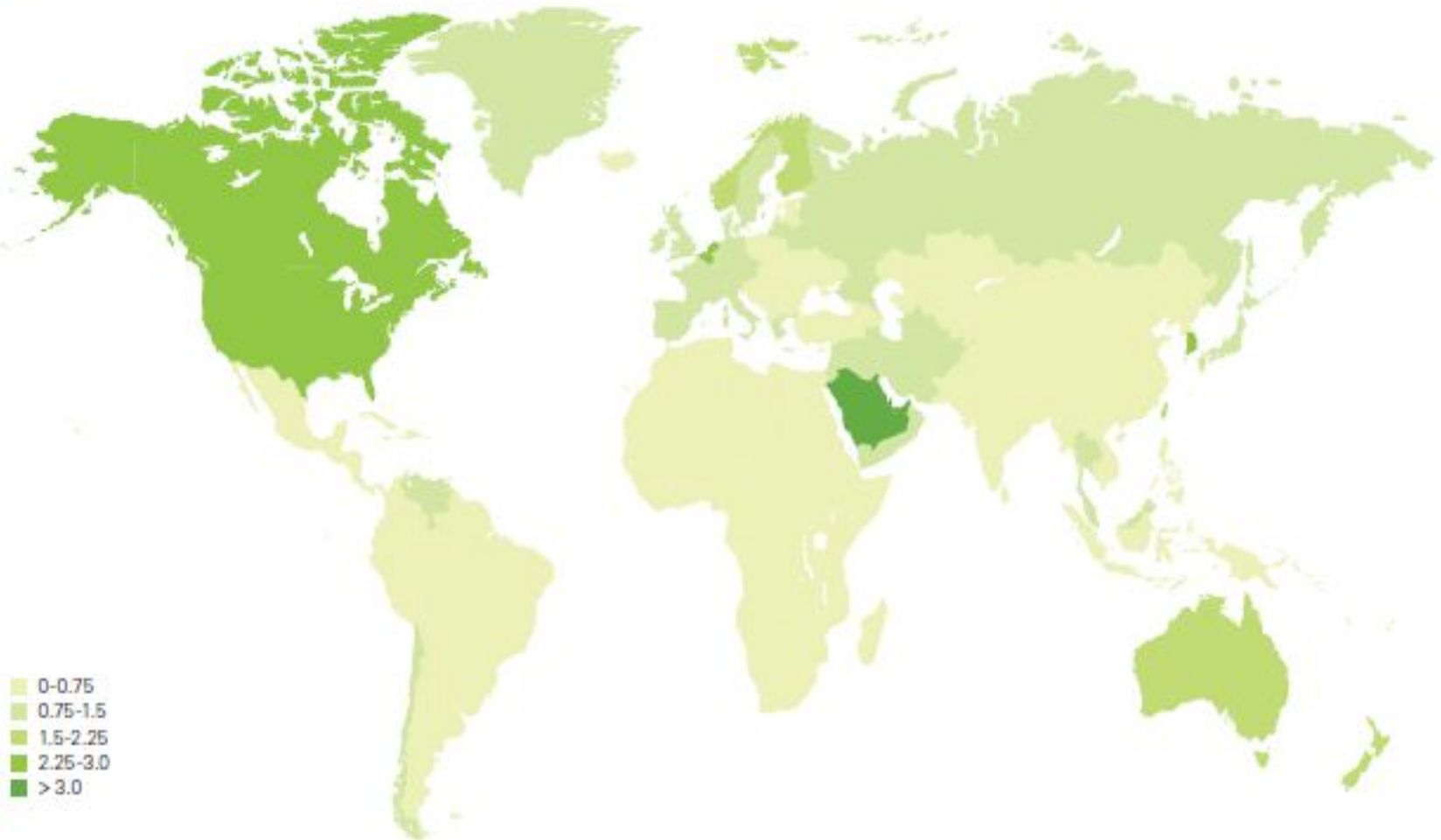
Million barrels daily



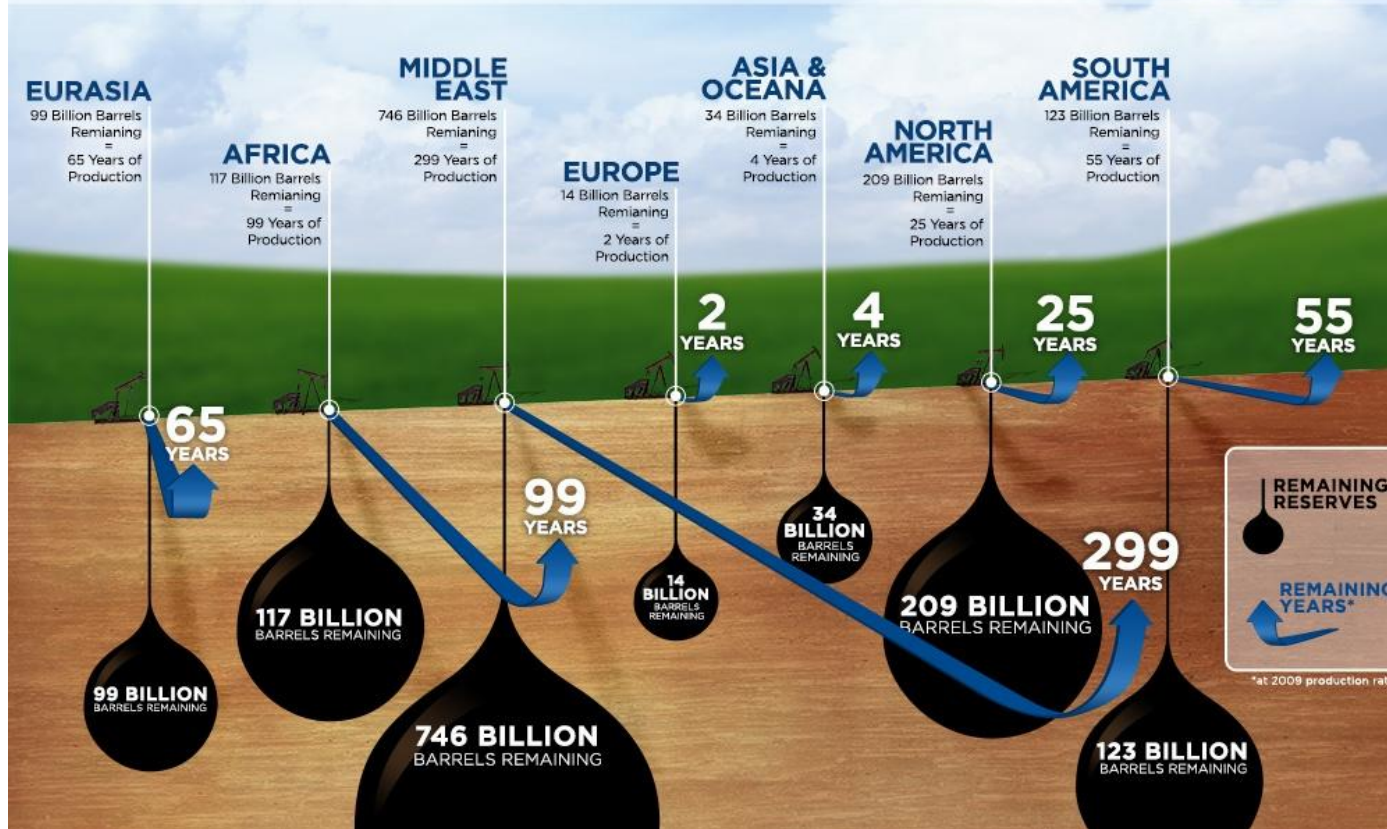
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Oil Consumption per capita 2015

Tommas



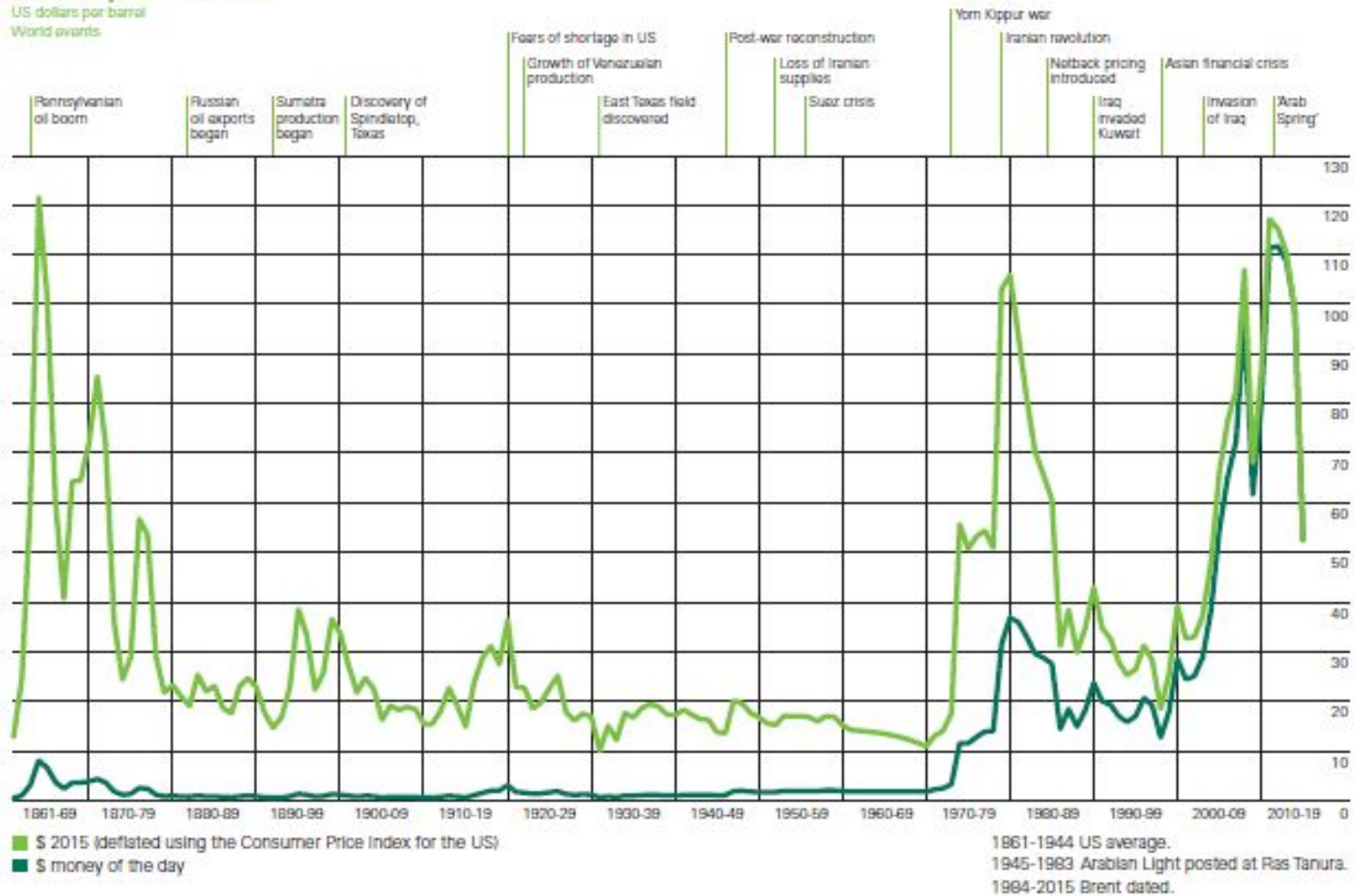
PRODUCTION REMAINING ON PROVEN RESERVES



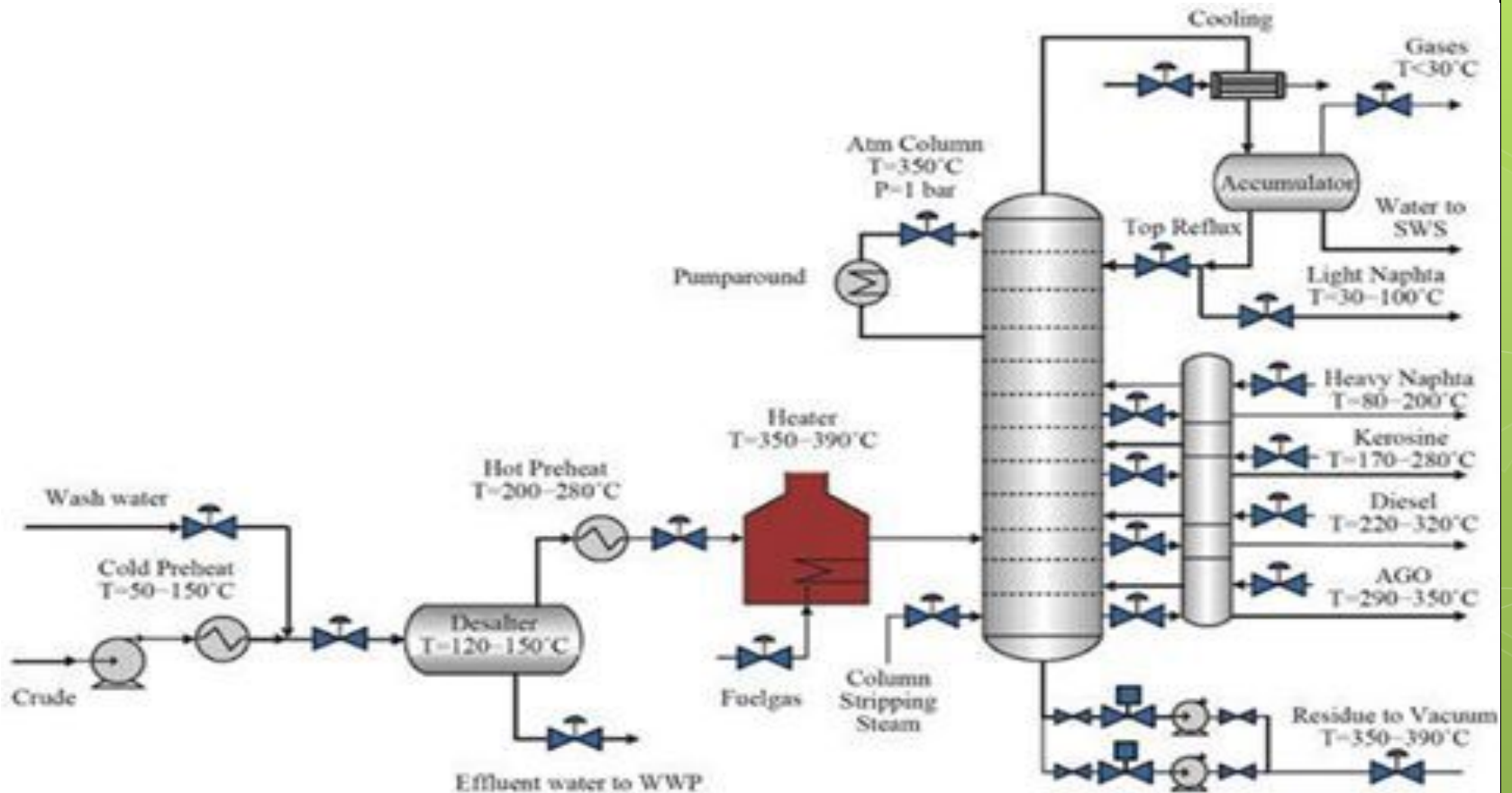
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Crude oil prices 1861-2015

US dollars per barrel
World events

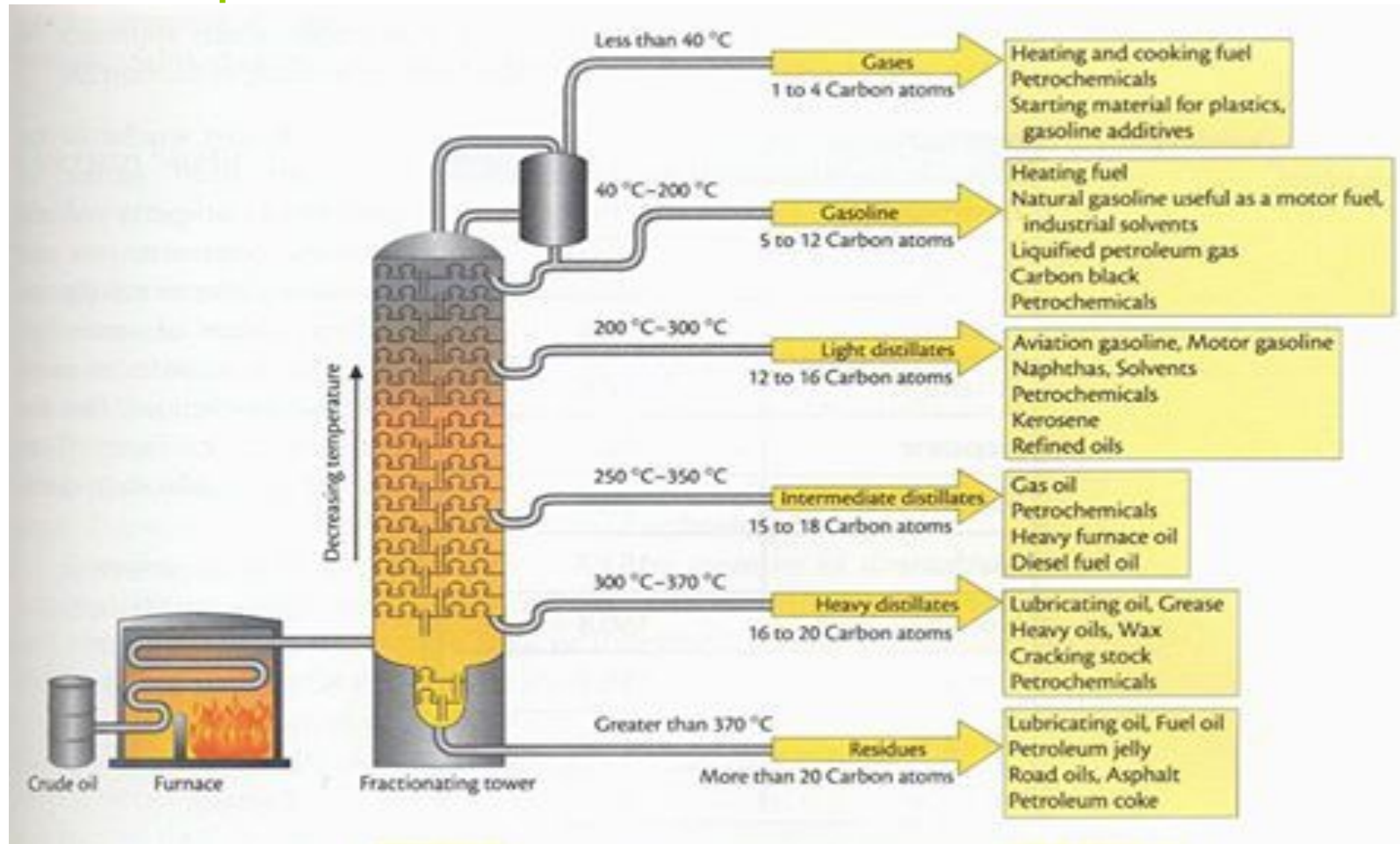


Distilarea titeiului



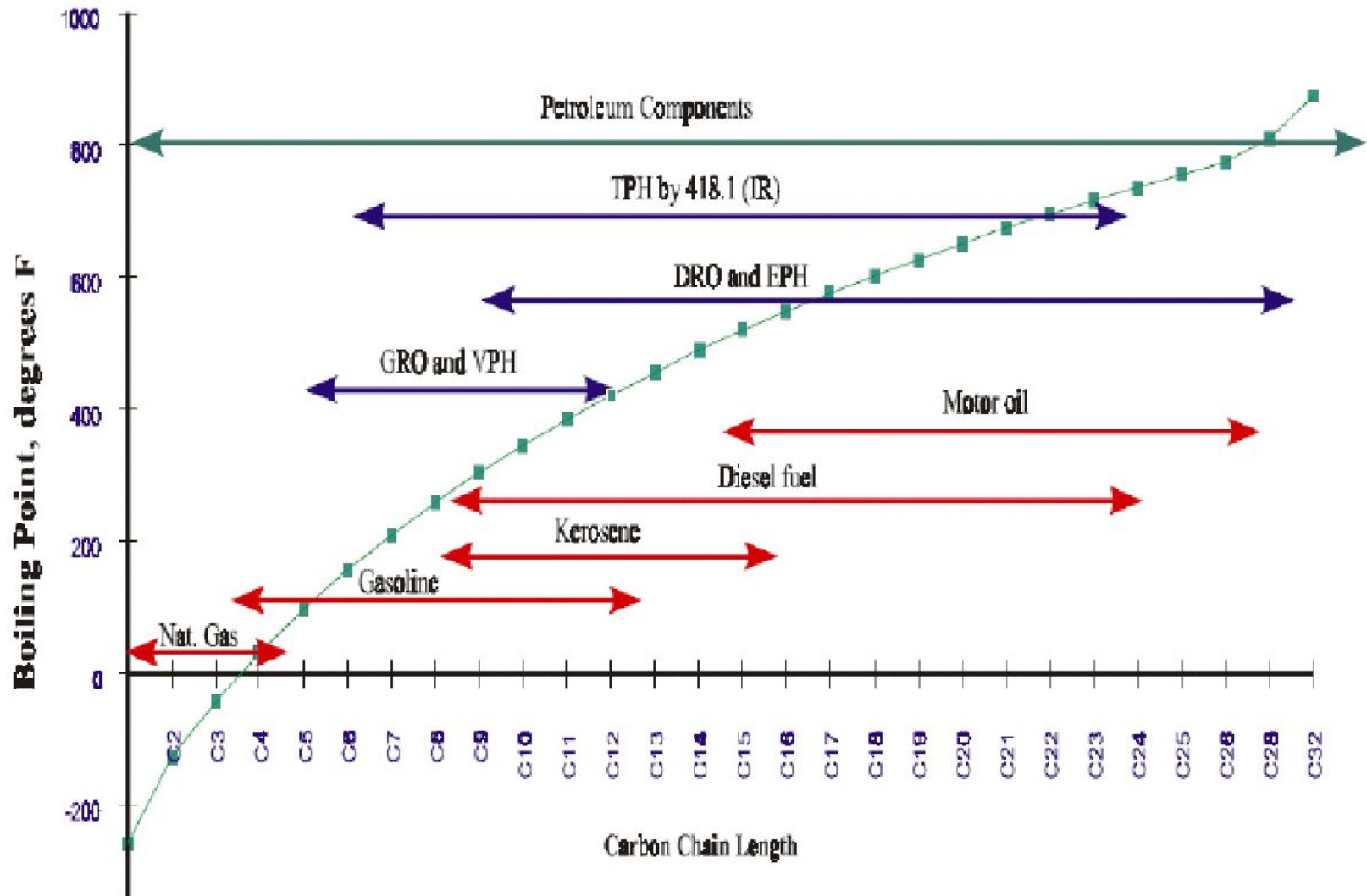
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Compozitia si utilitatea fractiunilor

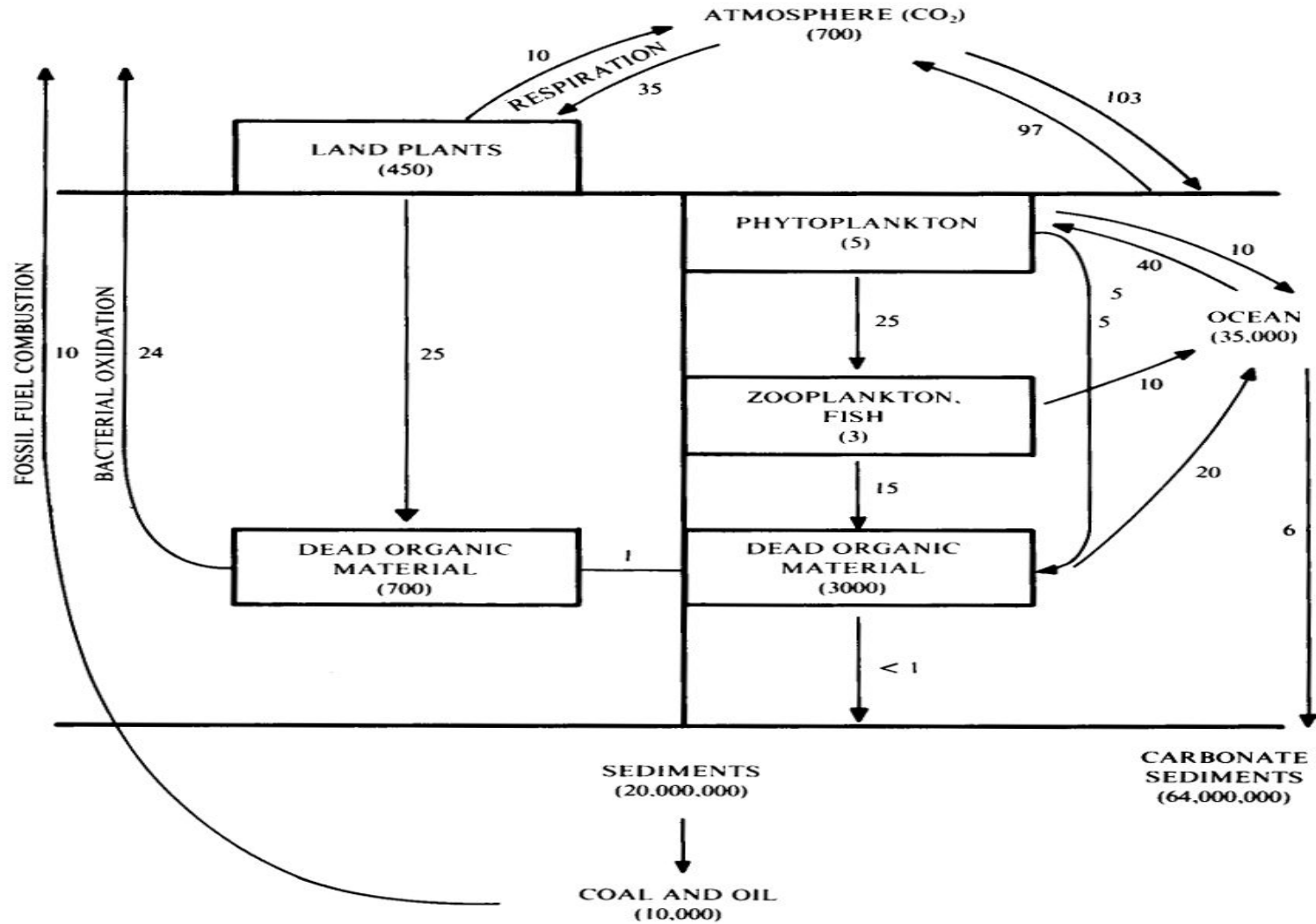


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□ Hidrocarburi prezente în fracțiuni

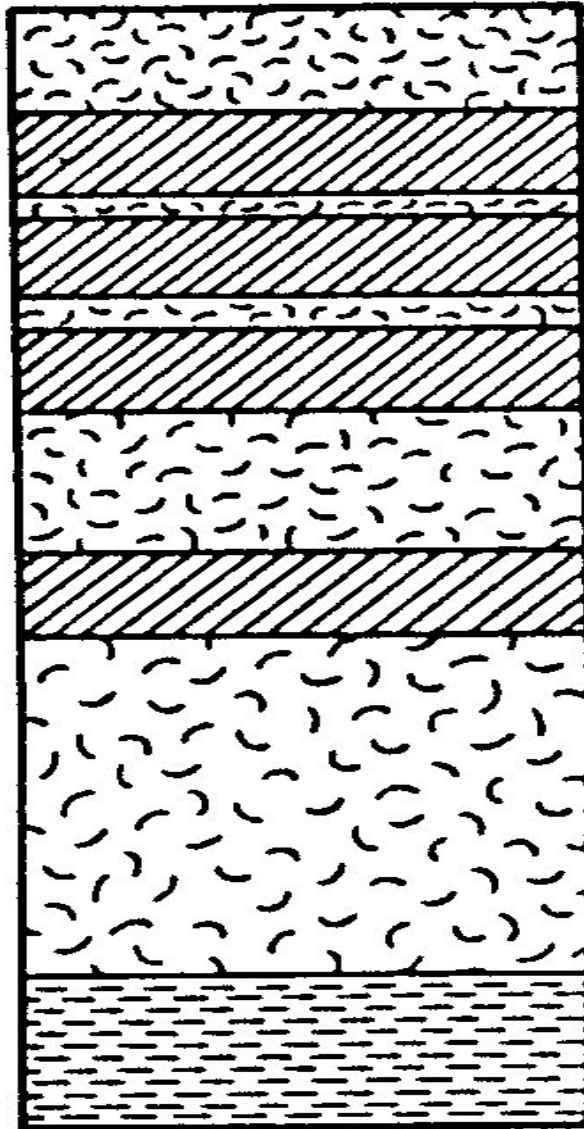


Țițeiul



Țițeiul

SECONDARY MIGRATION



PARAFFINS

NAPHTHENES

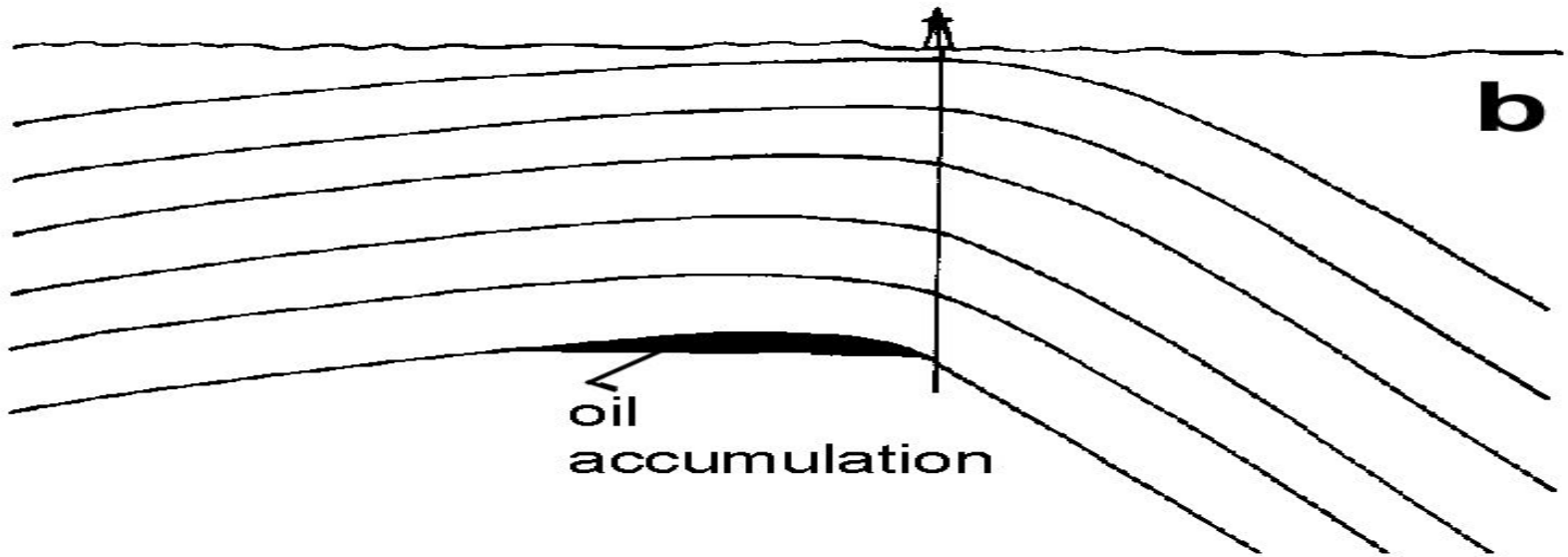
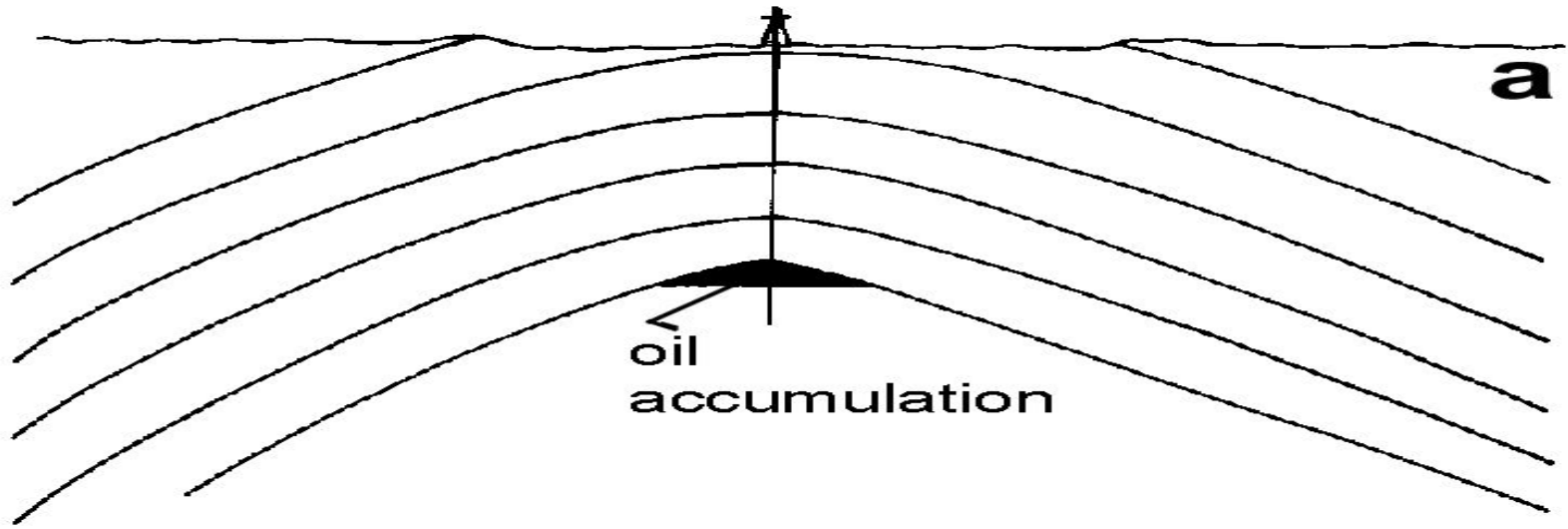
AROMATICS

NON-HYDROCARBONS

CARRIER ROCK

SOURCE ROCK

Țițeiul



Repere istorice

- 1440 domnitorul Moldovei donează Mănăstirii Bistrița satul Lucăcești, cu toate gropile cu țiței
- 1550 “fântânarii” din Păcureți - Prahova
- 1780 - 1820 prin porturile dunărene se exporta țiței extras din Moldova și Muntenia.
- Printre cele mai cunoscute exploatări: Păcureți - Prahova, care în anul 1837 extrăgea cca 225 000 kg țiței.
- Exploatarea industrială a țițeiului 1830-1840, separarea petrolului lampant, prin distilarea țițeiului.
- Prima distălărie, numită “găzărie”, s-a construit la Lucăcești în 1840.
- În 1847, la Râfov, Prahova, Teodor Mehedințeanu – prima găzărie, “Lumina”, capacitate de 2 700 tone pe an, petrolul lampant - pentru iluminarea orașului București
- În 1857 țara noastră este prima și singura înregistrată în statistica mondială cu o producție de țiței de circa 275 tone. De menționat că S U A apar în această statistică în 1859.

Compozitia titeiului brut si a fractiunilor petroliere

- Hidrocarburi – parafine, naftene, aromatice, mixte
- Nehidrocarburi – compusi cu sulf, azot, oxigen, compusi asfaltici, saruri dizolvate, compusi organometalici

Parafine - alcani ; $C_n H_{2n+2}$

De la C_1 la C_{40} apar curent in titei;

Cca.20% din petrolul brut;

Liniare si ramificate;

Stabile in timp

Naftene

Naftene – cicloalcani – hidrocarburi saturate ciclice; C_nH_{2n} .
-ciclopentani, ciclohexani, cicloheptani și alchil derivați ai acestora.

- Cele mai stabile termodinamic sunt cele cu 5 – 6 atomi de carbon în moleculă
- 60% din total

Aromaticice

Aromaticice - ciclice nesaturate; $C_n H_{2n-6}$

- mono-, bi-, policiclice
- Condensate sau izolate
- Alchil derivati ai acestora