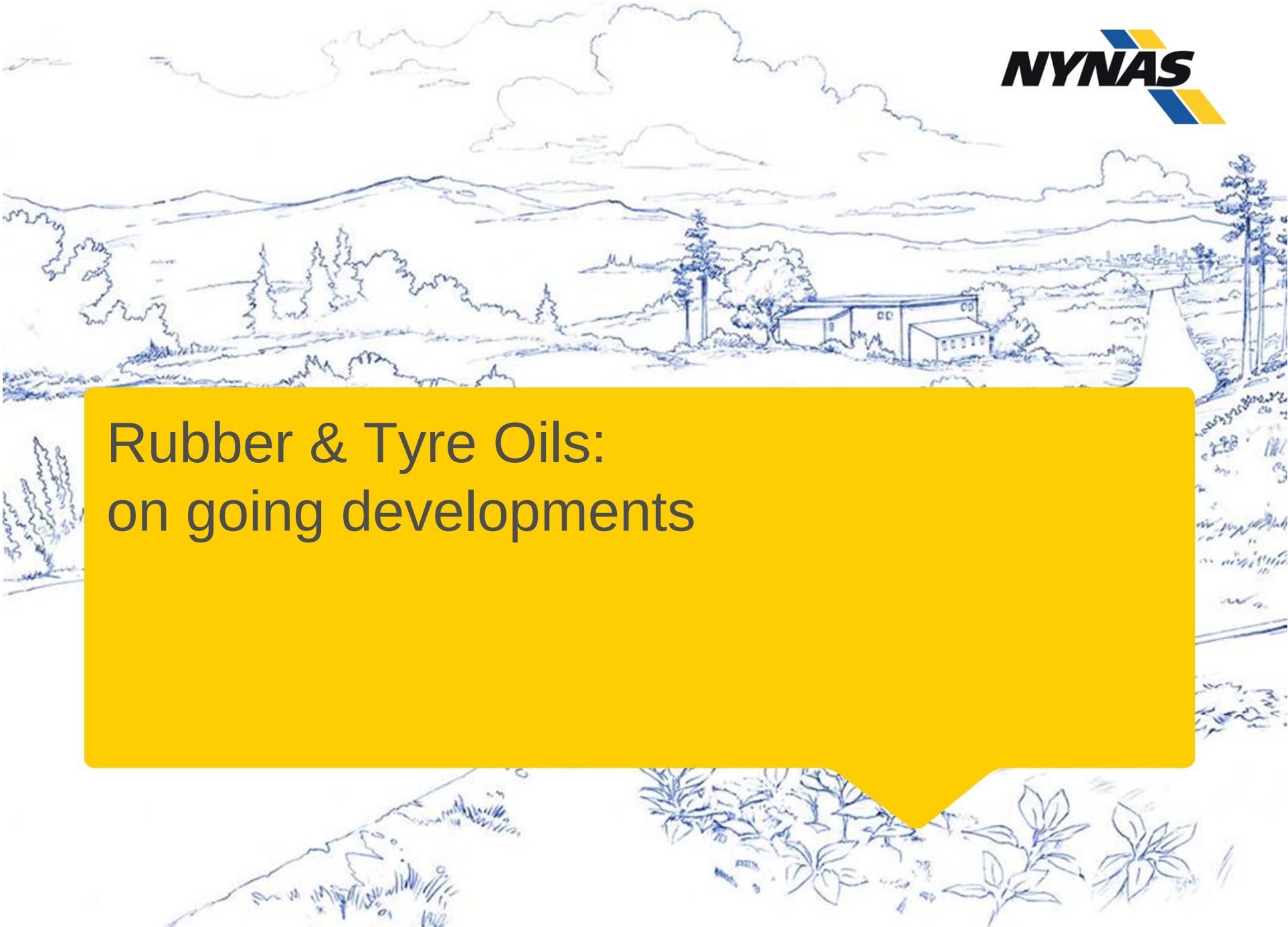
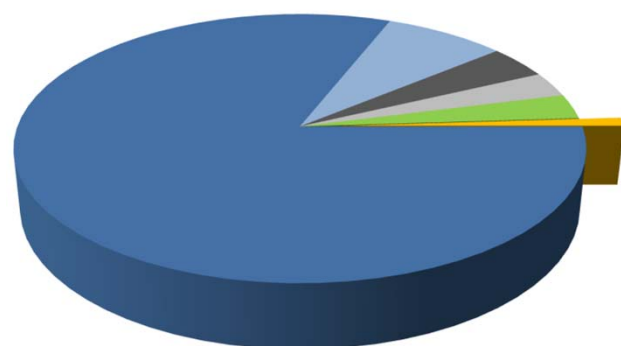


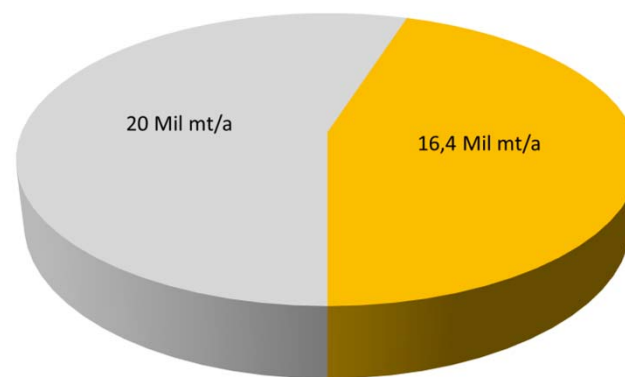
A blue line-art sketch of a landscape. In the background, there are rolling hills and a cloudy sky. In the middle ground, a factory with several buildings and a tall chimney is visible, surrounded by trees. In the foreground, there are more trees and some low-lying plants. A large yellow speech bubble is overlaid on the center of the image, containing the text "Rubber & Tyre Oils: on going developments".

Rubber & Tyre Oils: on going developments

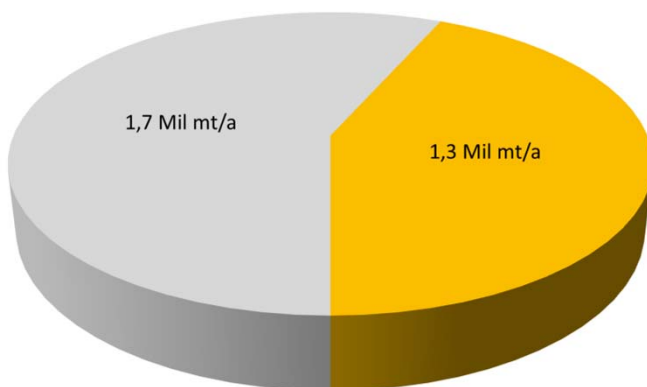
Global oil consumption



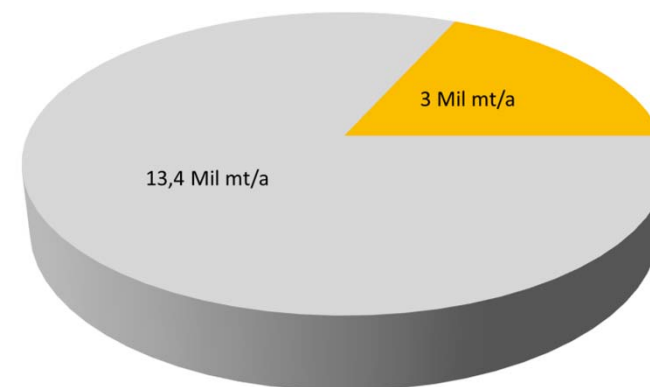
■ Fuels: 81% ■ Gas: 8%
 ■ Coke: 4% ■ Bitumen: 3%
 ■ Chemical feedstocks: 3% ■ Lubricants: 1%



■ Automotive ■ Industrial



■ Other Rubber Oils ■ Tyre Rubber Oils

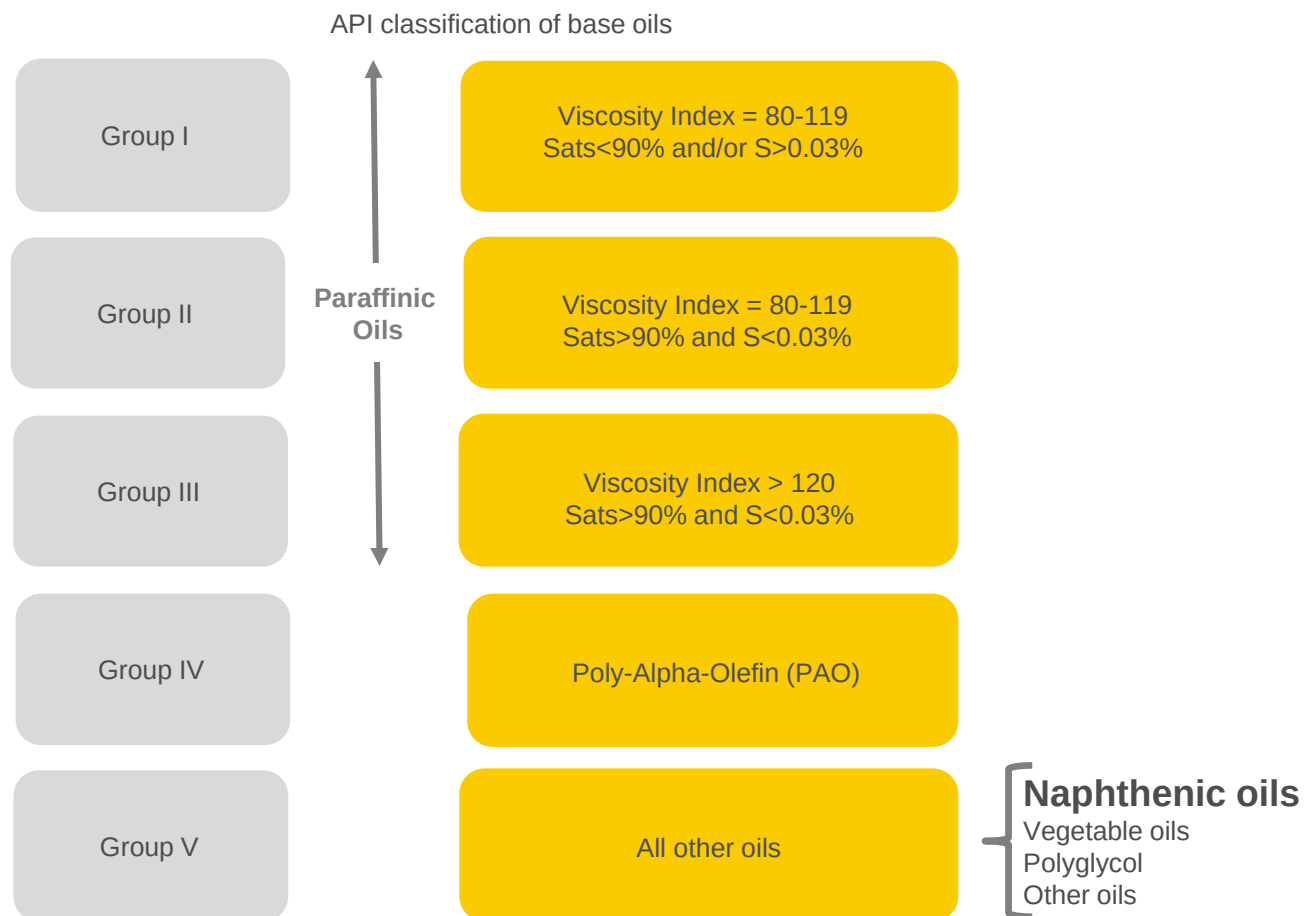


■ Other Industrial applications ■ Rubber Process oils

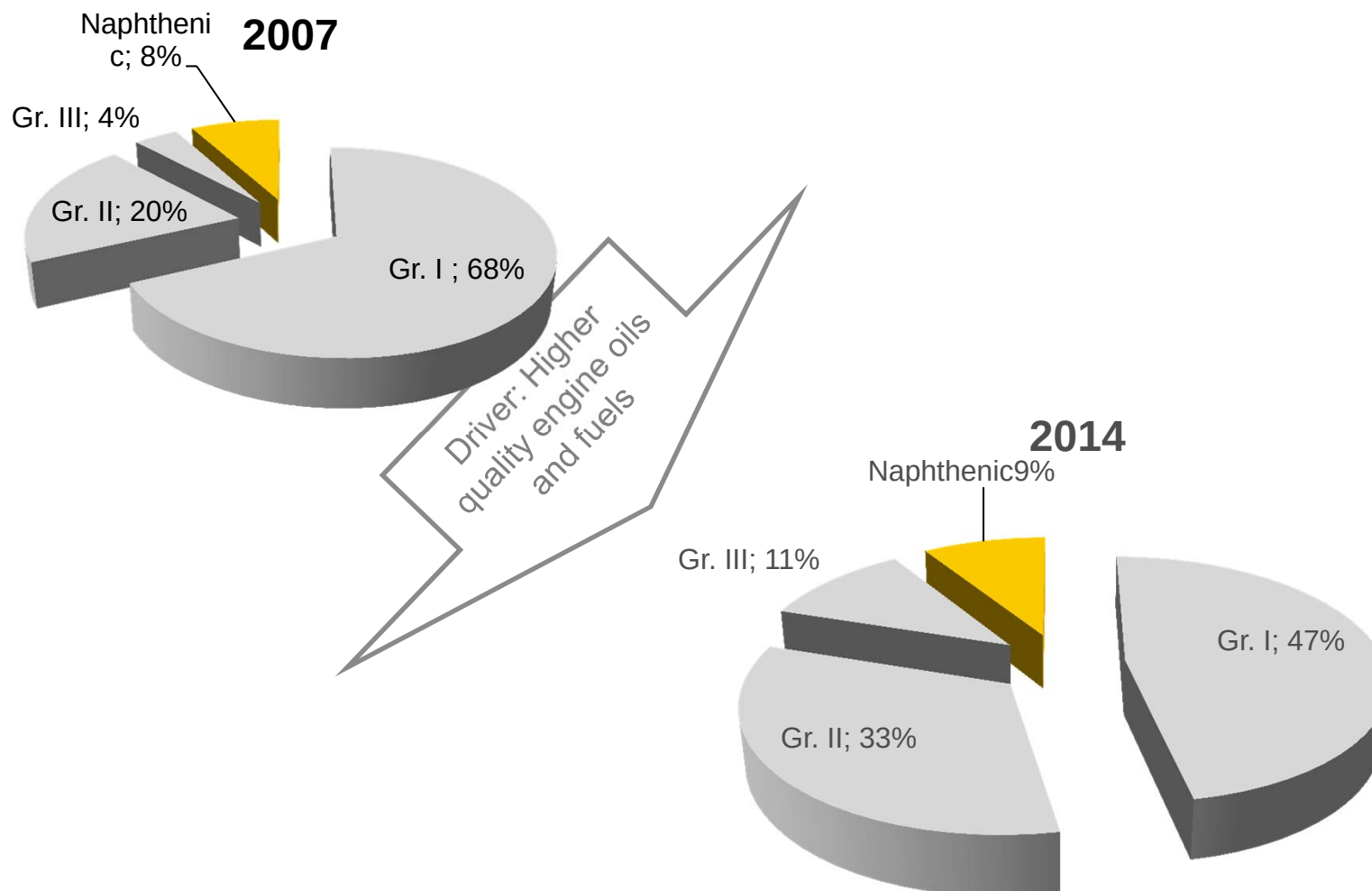
Rubber process oils: ca 0.082% of total oil consumption
Tyre oils: ca 0.035% of total oil consumption

Sources:
 Nynas Internal research
 Kline

Global Base Oil Market (1%)

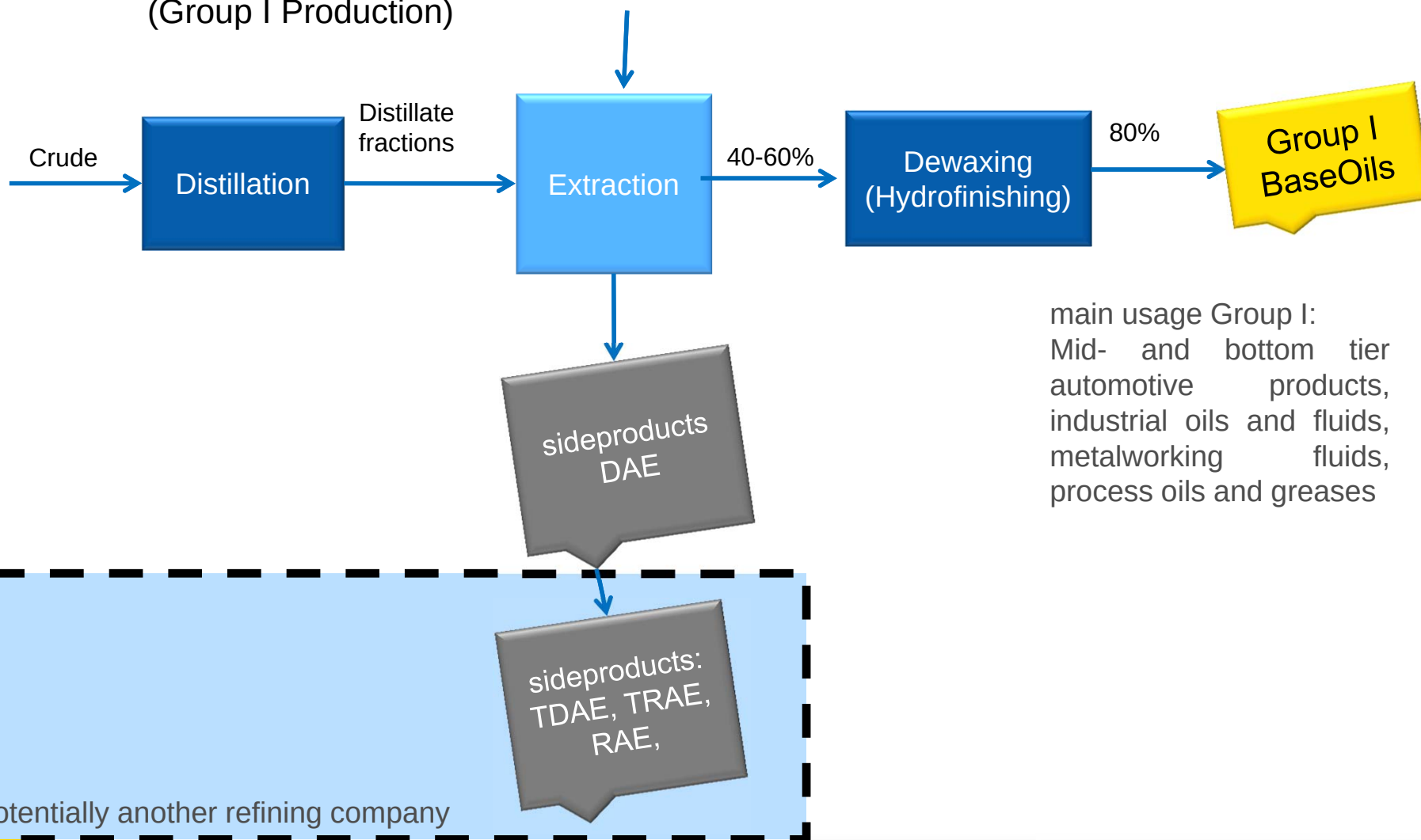


Changes in the Base Oil Industry



Why is this of importance for you?

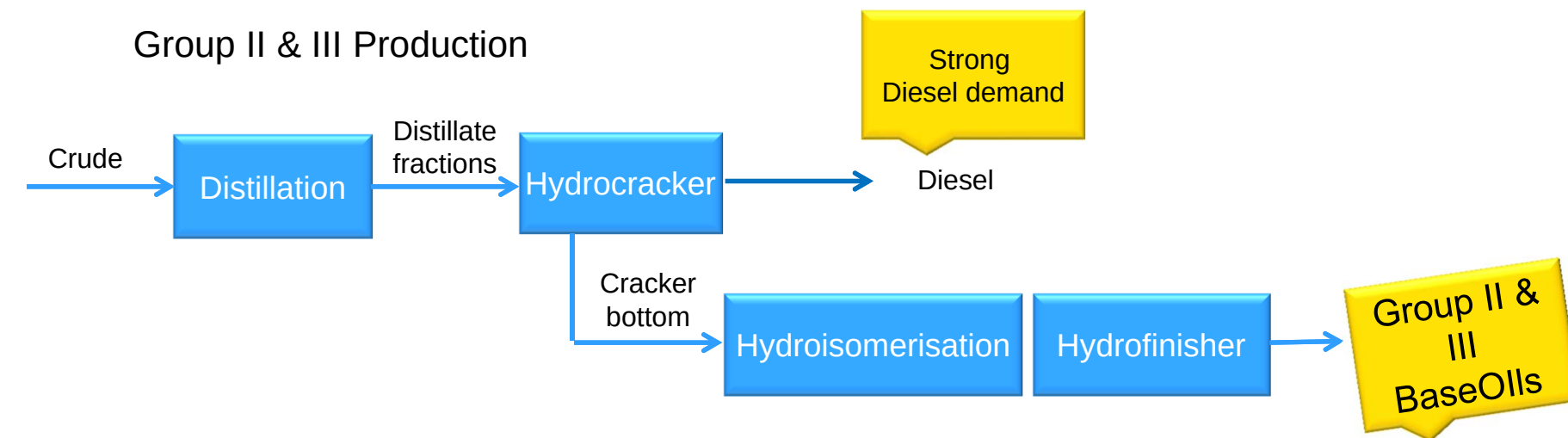
(Group I Production)



main usage Group I:
Mid- and bottom tier
automotive products,
industrial oils and fluids,
metalworking fluids,
process oils and greases

Why is this of importance for you?

Group II & III Production



main usage Group II:

PCMO mid tier, HDMO mid- and top-tier, unlincensed ATF. other automotive products, white oils, select industrial oils (turbine oils, hydraulics, gear and process oils)

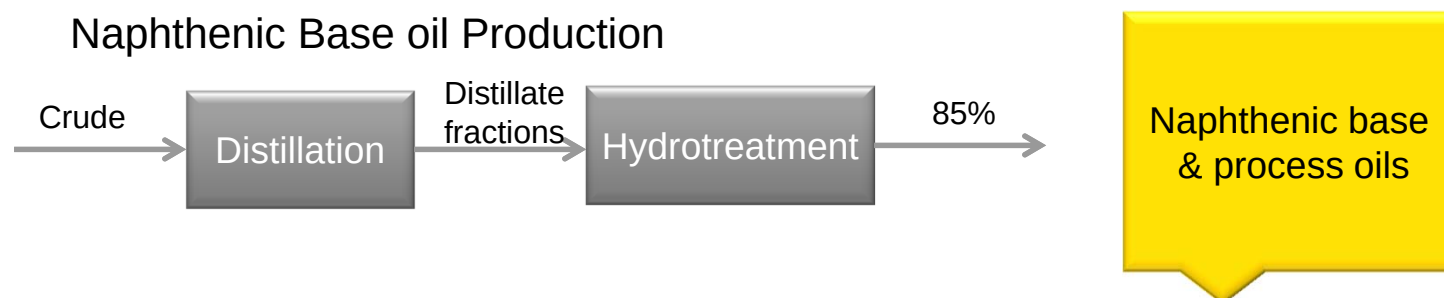
low compatibility to NR & SBR, good for EPDM

main usage Group III:

PCMO top-tier, HDMO top-tier, factory fill ATF, white oils, food grade lubricants

NO
sideproducts
such as
TDAE, TRAE,
RAE,

Why is this of importance for you?



WESTERN EUROPE



Company	Location	Paraffinic			Naph- thenic	Total
		Group I	Group II	Group III		
1 Agip Plas	Livorno, Italy	11,500				11,500
2 Cepsa	San Roque, Spain	5,400				5,400
3 Colas Group	Dunkerque, France	5,100		1,500		6,600
4 Essar	Stanlow, UK	5,060				5,060
5 ExxonMobil	Port-J/Gravenchon, Fr.	12,000				12,000
6 ExxonMobil	Augusta, Italy	14,000				14,000
7 ExxonMobil	Fawley, UK	7,800		810		8,610
8 H&R Chemische	Hamburg, Germany	4,850				4,850
9 H&R Chemische	Salzbergen, Germany	4,000				4,000
10 Kuwait Petroleum	Rotterdam, Neth.	4,650				4,650
11 Motor Oil Hellas	Agii Theodori, Gr.	4,300				4,300
12 Neste	Porvoo, Finland			5,000		5,000
13 Nynas	Nynasham, Sweden				7,800	7,800
14 Petrogal	Porto, Portugal	3,640				3,640
15 Repsol	Cartagena, Spain	2,700		200		2,900
16 Repsol	Puertollano, Spain	2,100				2,100
17 Shell	Harburg, Germany ¹	3,300			3,000	6,300
18 Shell	Pemis, Netherlands	7,100				7,100
19 Total	Gonfreville, France	9,600		800		10,400
20 Cator *	Tarragona, Spain	800				800
21 Cyclon Hellas *	Attika, Greece	800				800
22 Danske Olie	Kahlundborg, Denmark	800				800
23 Eco Huile *	Lillebone, France	2,400				2,400
24 L & T Recoil Oy *	Hamina, Finland		1,200			1,200
25 Mineralolraff.	Dollbergen, Germany	2,300				2,300
26 Puralube *	Troeglit, Germany		3,560			3,560
27 Viscolube *	Ceccano, Italy	1,670				1,670
28 Viscolube *	Pieve Fissiraga, Italy	390	1,600			1,990
29 Whelan *	Stoke-on-Trent, UK	1,000				1,000
Region's Totals		117,260	6,360	9,310	10,800	143,730

now:
Nynas, doubling
capacity

Base Oil
Refineries
Europe:

2012-
2016

re-refiners

CENTRAL & EASTERN EUROPE

Company	Location	----- Paraffinic -----			Naph- thenic	Total
		Group I	Group II	Group III		
1 Azerneftiyag Baku	Baku, Azerbaijan	8,000				8,000
2 Bashneft	Novo-Ufa, Russia	7,200				7,200
3 Gazprom-neft	Omsk, Russia	4,600				4,600
4 Lotos	Gdansk, Poland	4,800				4,800
5 Lukoil	Nizhni Novgorod, Russia	4,600				4,600
6 Lukoil	Perm, Russia	7,700				7,700
7 Lukoil	Volgograd, Russia	10,200		600		10,800
8 MOL	Szazhalombatta, Hung	3,800				3,800
9 Naftan	Novopolotsk, Belarus	3,800				3,800
10 PKN Orlen Oil	Kolin, Czech Rep.	2,200		300		2,500
11 PKN Orlen Oil	Plock, Poland	3,100				3,100
12 Raf. ulja Modrica	Modrica, Bosnia & Herz.			1,050		1,050
13 Rosneft	Angarsk, Russia	5,750				5,750
14 Rosneft	Novo-Kuibyshev, Russia	3,800				3,800
15 RussNeft	Orsk, Russia	3,700				3,700
16 Slavneft	Yaroslavl, Russia	4,800				4,800
17 Tupras	Izmir, Turkey	5,750				5,750
18 Turkmenbashi Oil	Turkmenbashi, Turkmen.	120	1,450			1,570
19 Ukratnafta	Kremenchuk, Ukraine	6,700				6,700
20 Uzbekneftegaz	Fergana, Uzbek.	3,800				3,800
21 PKN Orlen Oil*	Jedlicze, Poland	1,600				1,600
Two others	Ea. under 1,000 bpd	1,200				1,200
Region's Totals		97,220	1,450	1,950		100,620

Base Oil
Refineries
Central &
Eastern
Europe:

2012-
2016

Market news

Lukoil to Close Group I Base Oil Plant

BY BORIS KAMCHEV • MARCH 25, 2015

Lukoil plans to permanently shut down its API Group I base oil plant in Nizhny Novgorod early next month, a source close to Lukoil



RELATED TOPICS

Facility News

Shell to close Netherlands Pernis base oils unit

Source: LinkedIn

Jose Luis M.

Marketing and Business Development Manager at H&R Group-Americas

Shell to close Netherlands Pernis base oils unit

Shell will close its 370,000 t/yr base oils unit at the 385,000 b/d Pernis refinery in the Netherlands, the company said today.

The company said the unit — which produces lubricant waxes — is no longer efficient enough to compete, and global outlook for base oils is too weak to warrant the investment required to upgrade it.

The closure will take place in two phases, with one train ending of 2015 and the second likely to close in late 2015. The refinery declined to specify which grades of base oil produced at the train that is likely to close first. The 70% impacted will be offered jobs elsewhere at the Pernis refinery.

industrial

UPDATE 1-Total to shut lubricant production unit at Normandy refinery - sources

Russia's Orsk refinery to close base oils unit

17 Apr 2013 04:09 (+01:00 GMT)

Singapore, 17 April (Argus) — Fortinvest, which owns the 132,600 b/d Orsk refinery in Russia, has decided to close and remove the plant's 195,000 t/yr base oils unit. The refinery stopped production temporarily last December because of low margins. The producer is considering building a bitumen unit in its place, company sources said.

The Orsk refinery is heavily dependent on base oil exports. The low quality of its base oils prevented it from redirecting its sales into the domestic market or the growing central Asian markets. But the producer has always faced high transportation costs. Ukraine, where it was supplying its base oils.

the company is now making all it down the capacity by April 1," said the source. Lukoil has not officially announced the light petrochemical products."

specialists in Russia, "light petrochemical diesel or kerosene.

is one of three base oil plants operated in Russia. The Nizhny Novgorod plant is also operated by Lukoil. Lukoil also operates plants in Vietnam.

CPC-SHELL TO SHUT DOWN BASE OIL REFINERY IN KAOHSIUNG

June 24, 2014 - by admin - in Base Oils, Volume 6 Issue 25



CPC Corporation, Taiwan, has decided to permanently shut down its 250,000-ton-per-year Group I base oil refinery and lube blending plant in Kaohsiung, Taiwan.

The plants are operated by CPC-Shell Lubricants Co. (CSLC), a joint venture between CPC (49%) and Shell (51%). Established in 1963, CSLC is located at CPC's Kaohsiung Refinery and produces mainly base oils and lubricants.

Refinery will close in November 2014 and the lube blending plant in February 2015, it was

Source: F&L

CPC will shut down its 220,000-barrel-per-day (bpd) topping unit, including its secondary units, 100,000-bpd (tpy) naphtha cracker and derivative plants at the Kaohsiung Refinery chemical Complex by the end of next year.

located

located in the industrial zone of the city of Kaohsiung, Taiwan.

Source: ARGUS

Europe to Shut 10 Refineries as Profits Tumble

Source: Bloomberg

By Konstantin Rozhnov / Apr 5, 2013 2:50 PM GMT+0200 8 Comments Email Print

Oil refiners in Europe will shut 10 percent of their plants this decade as fuel demand falls to a 19-year low.

Of the region's 104 facilities, 10 will shut permanently by 2020 from France to Italy to the Czech Republic, a Bloomberg survey of six European refinery executives showed. Oil consumption is headed for a fifth year of declines to the lowest level since 1994, the International Energy Agency estimates. Two-

money in
by Plc
and-largest



Photographer: Kostas Tsiros/Bloomberg

Two-thirds of European refineries lost money in 2011, according to Essar Energy Plc.

Oil demand is expected to fall by two percent in Europe this year, according to analysts. Refiners advise oil companies and governments as managing director at said in a phone interview from Vienna. "And it's not even assuming competitive refining markets in other regions."



PETRONAS SAYS IT WILL DEFER BASE OIL PLANT UPGRADE IN MELAKA

October 15, 2013

by admin

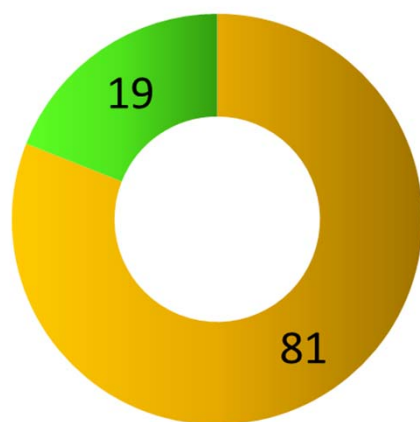
Source: F&L

Petronas Penapisan (Melaka) Sdn Bhd, a wholly-owned subsidiary of Petronas, said it will defer the proposed retrofitting project at its lube base oil plant in Malacca, which would have boosted [...]

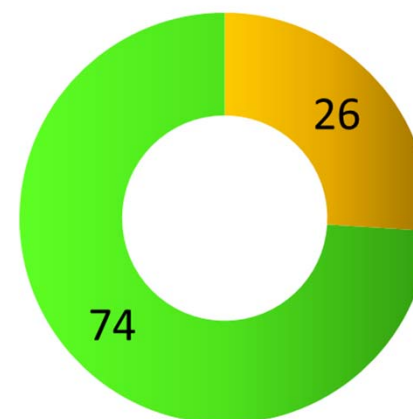
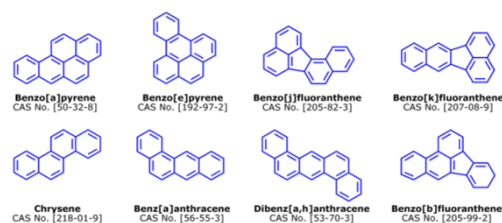
Tyres: A world in motion

DAE

Low PAH Oils



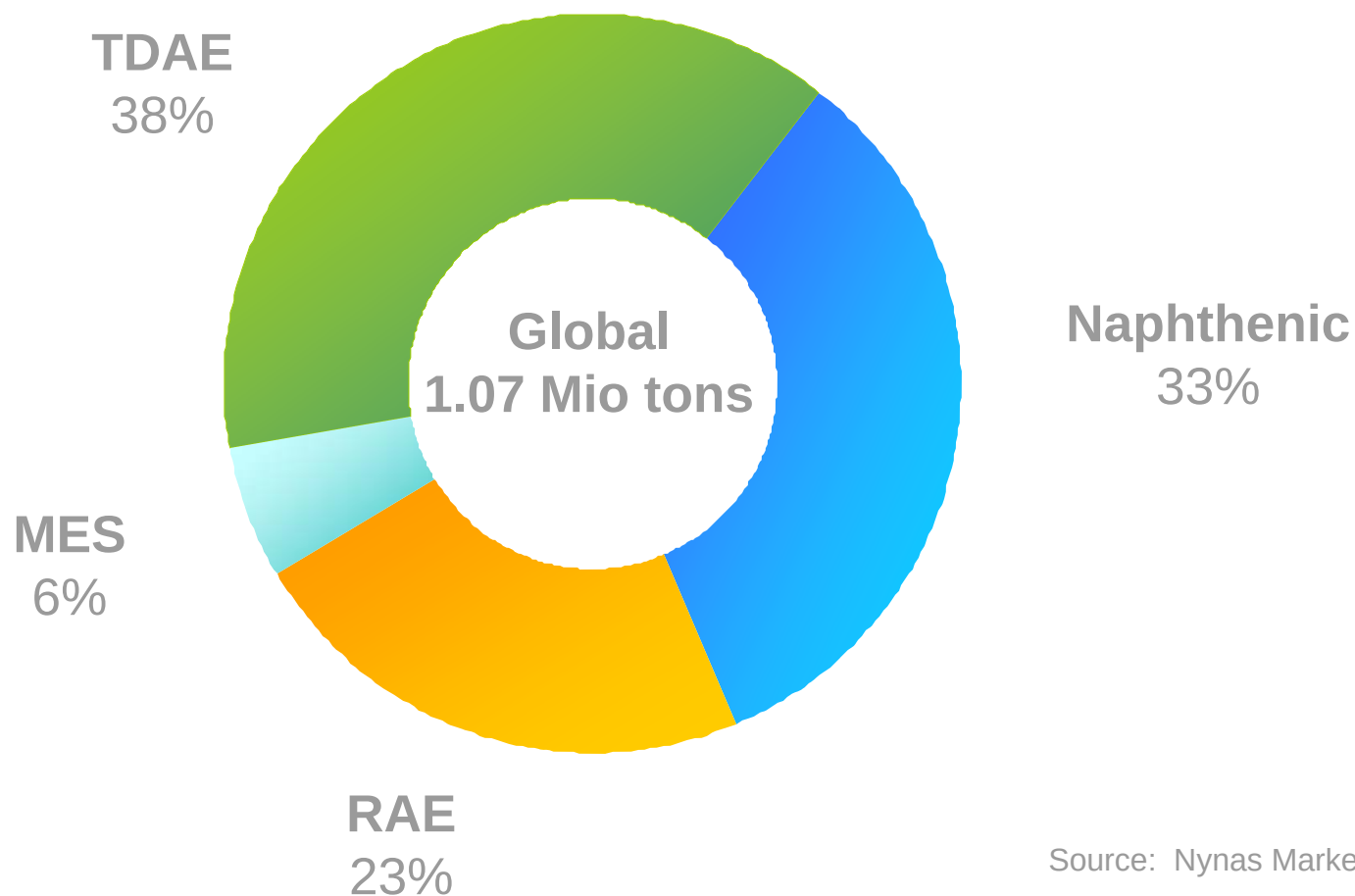
**Traditional
Producer**



**Specialty
Producer**

Source: Nynas Market Research

Product Types – Global Tyre Oil Usage excl. DAE



Source: Nynas Market Research

What has already changed for you?

- ▶ European tyre oil legislation had a global impact on tyre oils
 - ▶ Health awareness increased globally
 - ▶ Aromatic extracts (DAE) usage in tyre and polymer production is further declining

- ▶ Higher complexity
 - ▶ Numerous alternatives to DAE
 - ▶ Naphthenic alternatives
 - ▶ Heavy, Light, NBO
 - ▶ Grl alternatives
 - ▶ TDAE, MES, RAE / TRAE

At the same time in the synthetic rubber industry

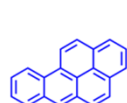
DAE

Low PAH Oils

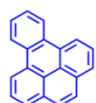
Naphthenic Black Oil

Heavy Naphthenics MES

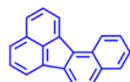
TDAE RAE T/S-RAE



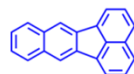
Benzo[a]pyrene
CAS No. [50-32-8]



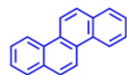
Benzo[e]pyrene
CAS No. [192-97-2]



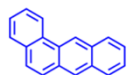
Benzo[j]fluoranthene
CAS No. [205-82-3]



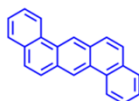
Benzo[k]fluoranthene
CAS No. [207-08-9]



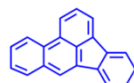
Chrysene
CAS No. [218-01-9]



Benz[a]anthracene
CAS No. [56-55-3]



Dibenz[a,h]anthracene
CAS No. [53-70-3]



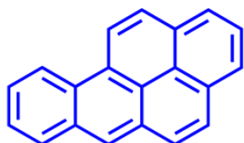
Benzo[b]fluoranthene
CAS No. [205-99-2]

Oil Type	IISRP Grade	Styrene Cont.
DAE	1712	23.5%
	1721	40.0%
T-DAE	1723	23.5%
2000 SUS	1739	40.0%
MES	1732	31.5%
1200 SUS	1740	40.0%
Naphthenic Black Oil	1753	23.5%
3200 SUS	1756	31.5%
	1759	40.0%
Heavy Naphthenic	1763	23.5%
2000 SUS	1766	31.5%
	1769	40.0%
Naphthenic	1778	23.5%
<1200 SUS	1779	40.0%
RAE	1783	23.5%
	1789	40.0%
T- or S-RAE	1793	23.5%
	1799	40.0%

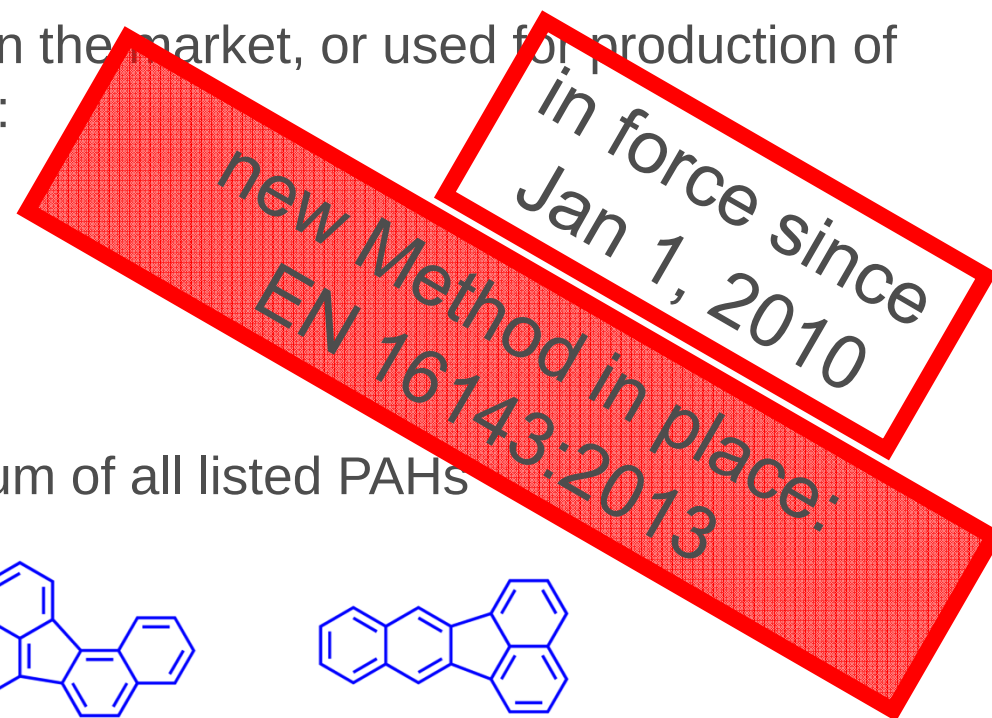
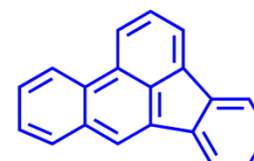
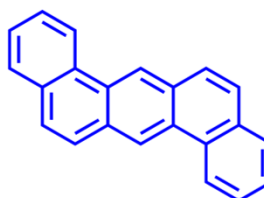
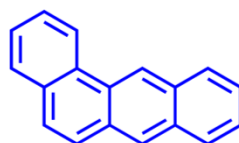
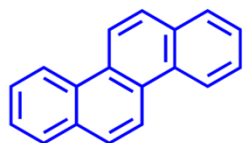
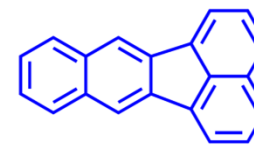
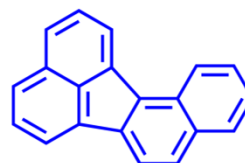
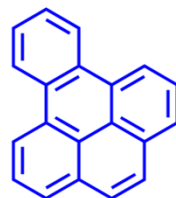
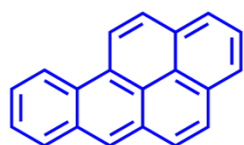
1907/2006/EC (REACH), Annex XVII, Entry 50

Extender oils shall not be placed on the market, or used for production of tires or parts of tires if they contain:

- ▶ more than **1 ppm** of



- ▶ or, more than **10 ppm** of the sum of all listed PAHs

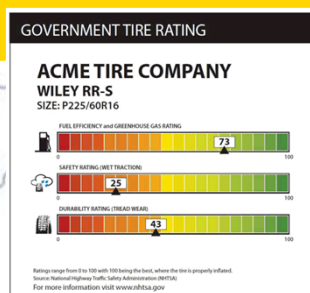


Rubber and tyre oil market trends

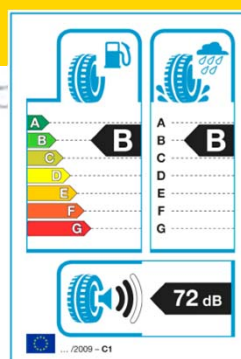
- ▶ Global rubber process oil to grow by ca 3% CAGR in 2013-2023 (Kline)
- ▶ Group I refinery shutdowns will leave a gap in high viscosity and solvency products and eventually in sideproducts of Gr. I refining
- ▶ DAE and RAE to lose market share and decrease
 - ▶ Effect already seen by closure of Gr I refineries
 - ▶ DAE still relatively common in Asia
 - ▶ Ban of DAE in China would to change this significantly
- ▶ Naphthenics & TDAE will grow to address the new needs of the market

Consumer Tire Labelling

US
Label on its way?



EU
Label in place



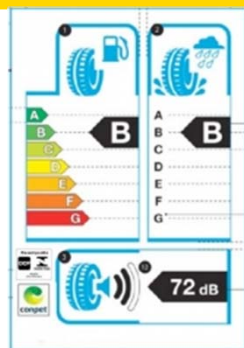
Japan
label in place



Korea
label in place



Brazil
Label in 2016



China
Label on its way

Key Performance Parameters for Tyres



Rolling Resistance (Fuel Economy)



Wet Grip (Road Safety)



Noise Emissions



Tread Wear

Conclusions / Summary

- ▶ Increasing HSE –awareness causing a major change to the industry, further consequences foreseen
- ▶ Increasing number of Gr I refinery shutdowns and expectations of more to come
- ▶ Installation of additional Gr. II capacity is good news for EPDM
- ▶ Closures leave a gap in the global process oil product slate
 - ▶ lack of products for rubber industry
- ▶ Naphthenic process oils offer a sustainable solution to address the gap in the process oil market for tyres and rubbers globally



Taking oil further

THANK YOU!