

Oil and Gas Industry Update and Career Prospect

Ardian Nengkoda, PhD.

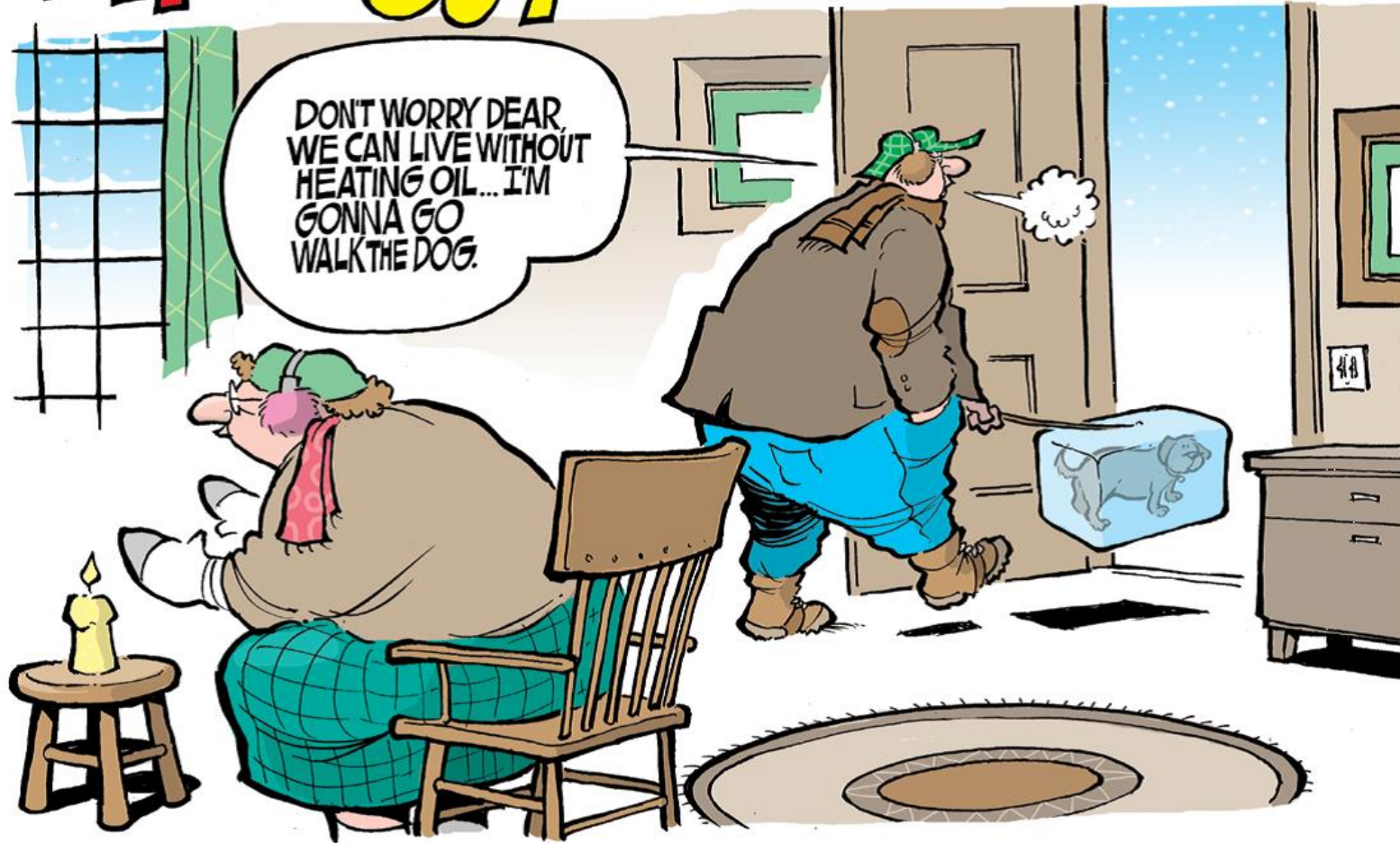
April, 2017

Outline

- ▶ Background
- ▶ Oil price crush history
- ▶ Upstream: Short and Mid Term Impact on Industry
- ▶ Service Company: Other Implications
- ▶ Global Chemical Industry
- ▶ What we can do as student, academic and professionals
- ▶ Fun Part...Ready?

Background (1)

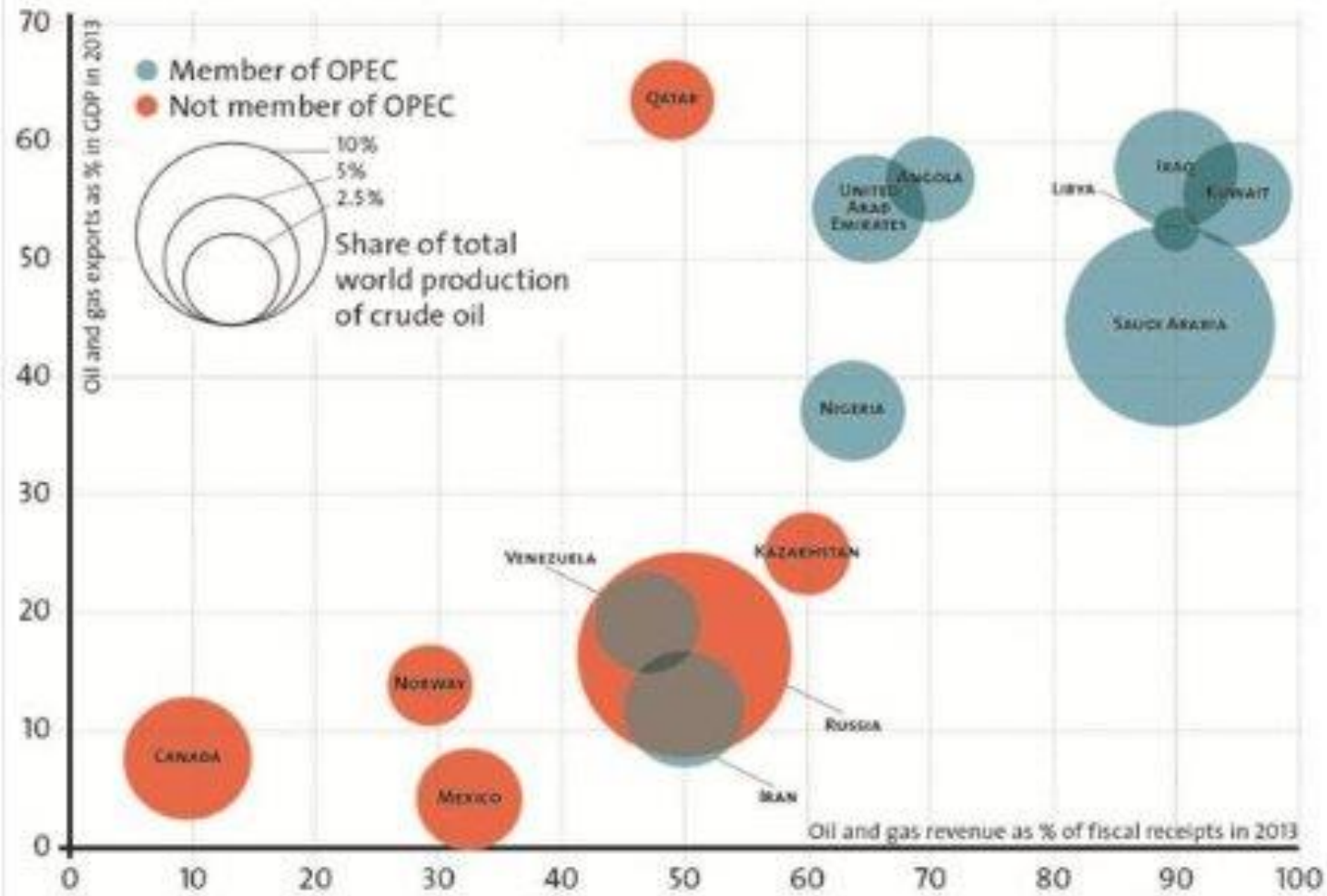
Life **WITH-OUT** Fossil Fuels



Background (2)

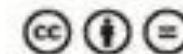
Sensitivity to the oil price plunge

The 15 largest exporters of crude oil in comparison



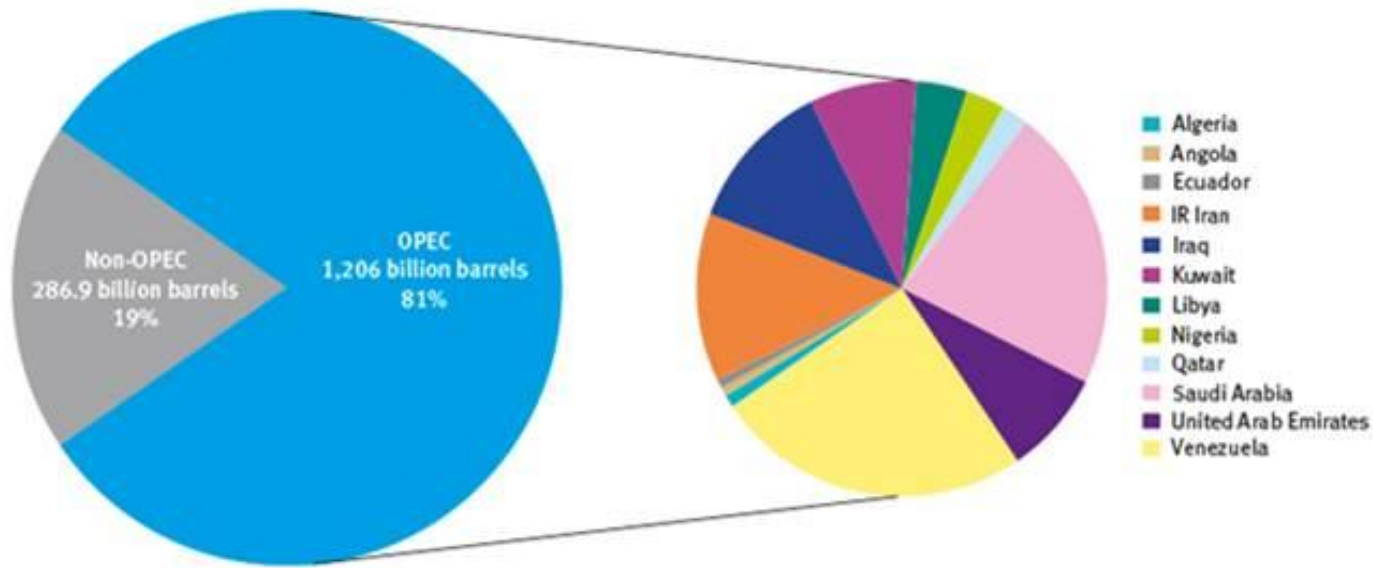
Sources: UNCTAD, IMF, EIA, CIA World Factsheet, Financial Times, Stratfor, KPMG, Statistics Norway, Canadian Government

Strategic Trends 2016 (Center for Security Studies, ETH Zurich)



Background (3)

OPEC share of world crude oil reserves, 2014



OPEC proven crude oil reserves, at end of 2014 (billion barrels, OPEC share)

Venezuela	299.95	24.9%	Iraq	143.07	11.9%	Libya	48.36	4.0%	Algeria	12.20	1.0%
Saudi Arabia	266.58	22.1%	Kuwait	101.50	8.4%	Nigeria	37.07	3.1%	Angola	8.42	0.7%
IR Iran	157.53	13.1%	UAE	97.80	8.1%	Qatar	25.24	2.1%	Ecuador	8.27	0.7%

Source: OPEC Annual Statistical Bulletin 2015.

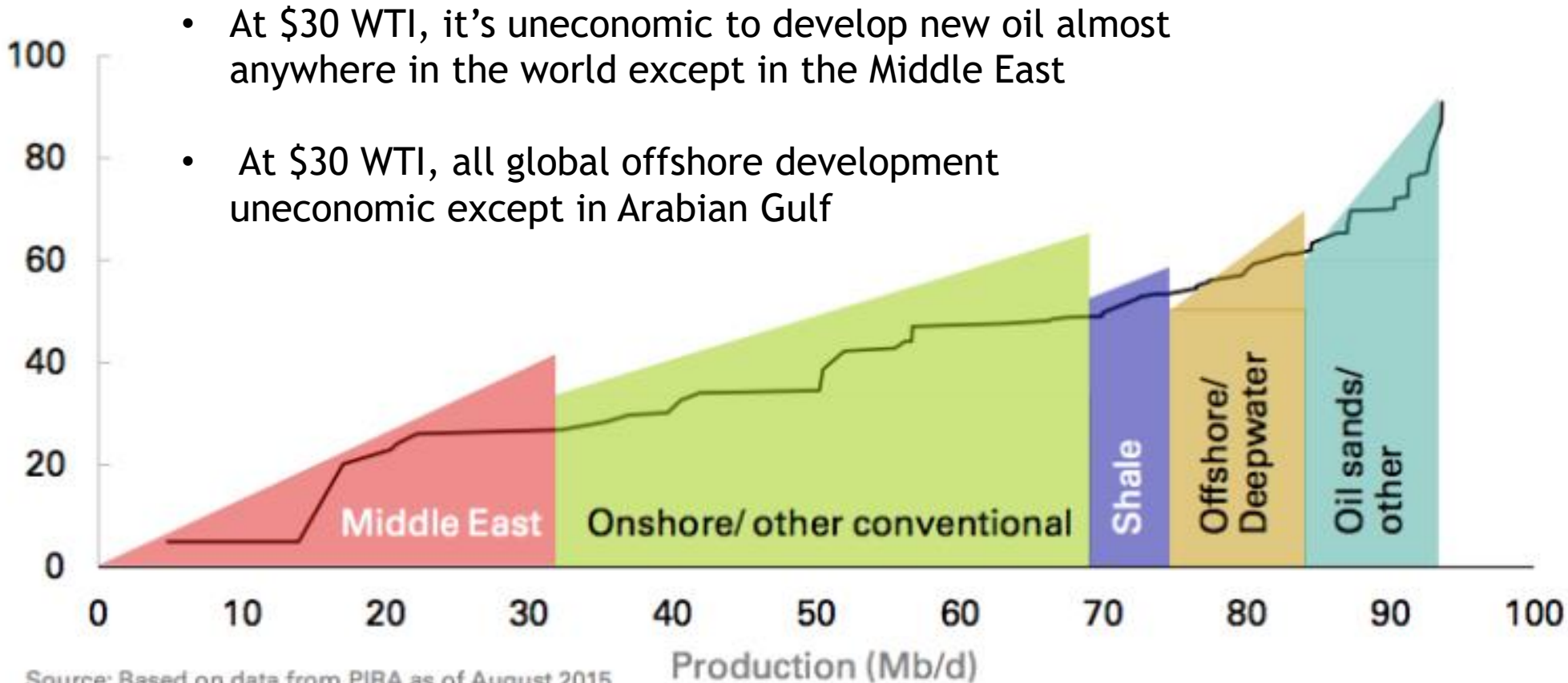
Rank	Country	Production (bbl/day)
1	United States	13,973,000
2	Saudi Arabia (OPEC)	11,624,000
3	Russia	10,853,000
4	China	4,572,000
5	Canada	4,383,000
6	United Arab Emirates (OPEC)	3,471,000
7	Iran (OPEC)	3,375,000
8	Iraq (OPEC)	3,371,000
9	Brazil	2,950,000
10	Mexico	2,812,000
11	Kuwait (OPEC)	2,767,000
12	Venezuela (OPEC)	2,689,000
13	Nigeria (OPEC)	2,427,000
14	Qatar (OPEC)	2,055,000
15	Norway	1,904,000
16	Angola (OPEC)	1,756,000
17	Algeria (OPEC)	1,721,000
18	Kazakhstan	1,719,000
19	Colombia	1,016,000

Background (4)

Stylised oil production cost curve



\$/bbl, Brent equivalent

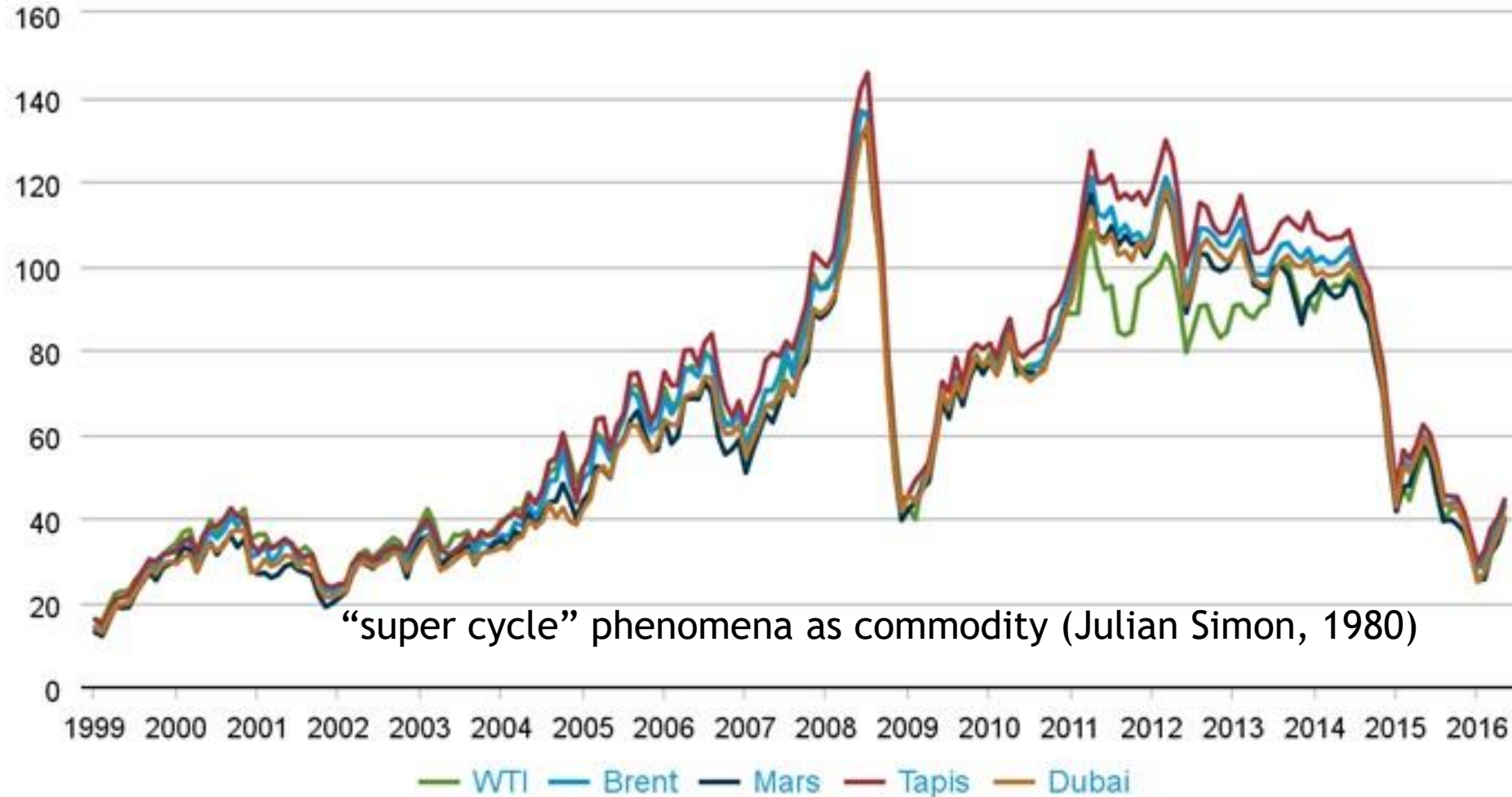


Source: Based on data from PIRA as of August 2015

Oil price crash history

World crude oil prices

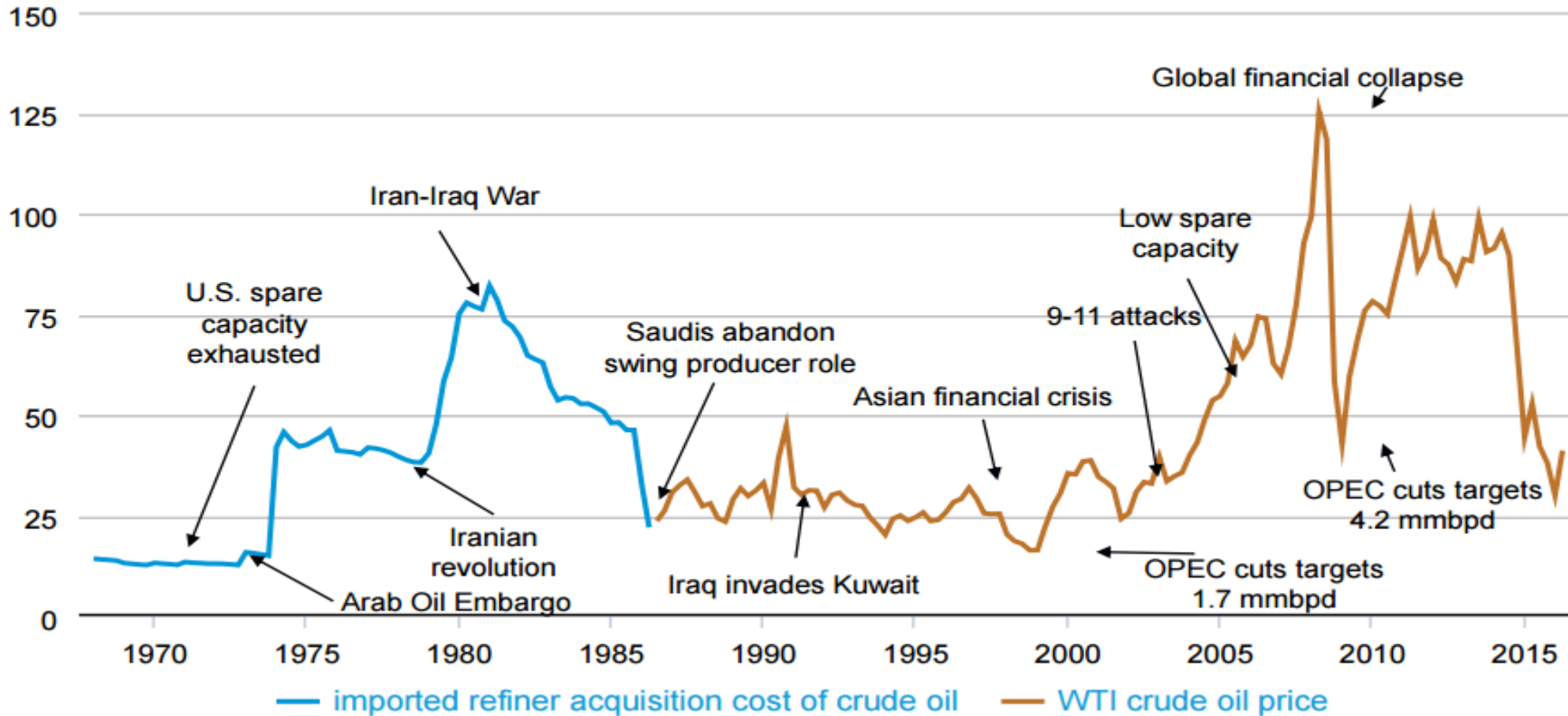
\$/bbl (real 2010 dollars, monthly average)



“super cycle” phenomena as commodity (Julian Simon, 1980)

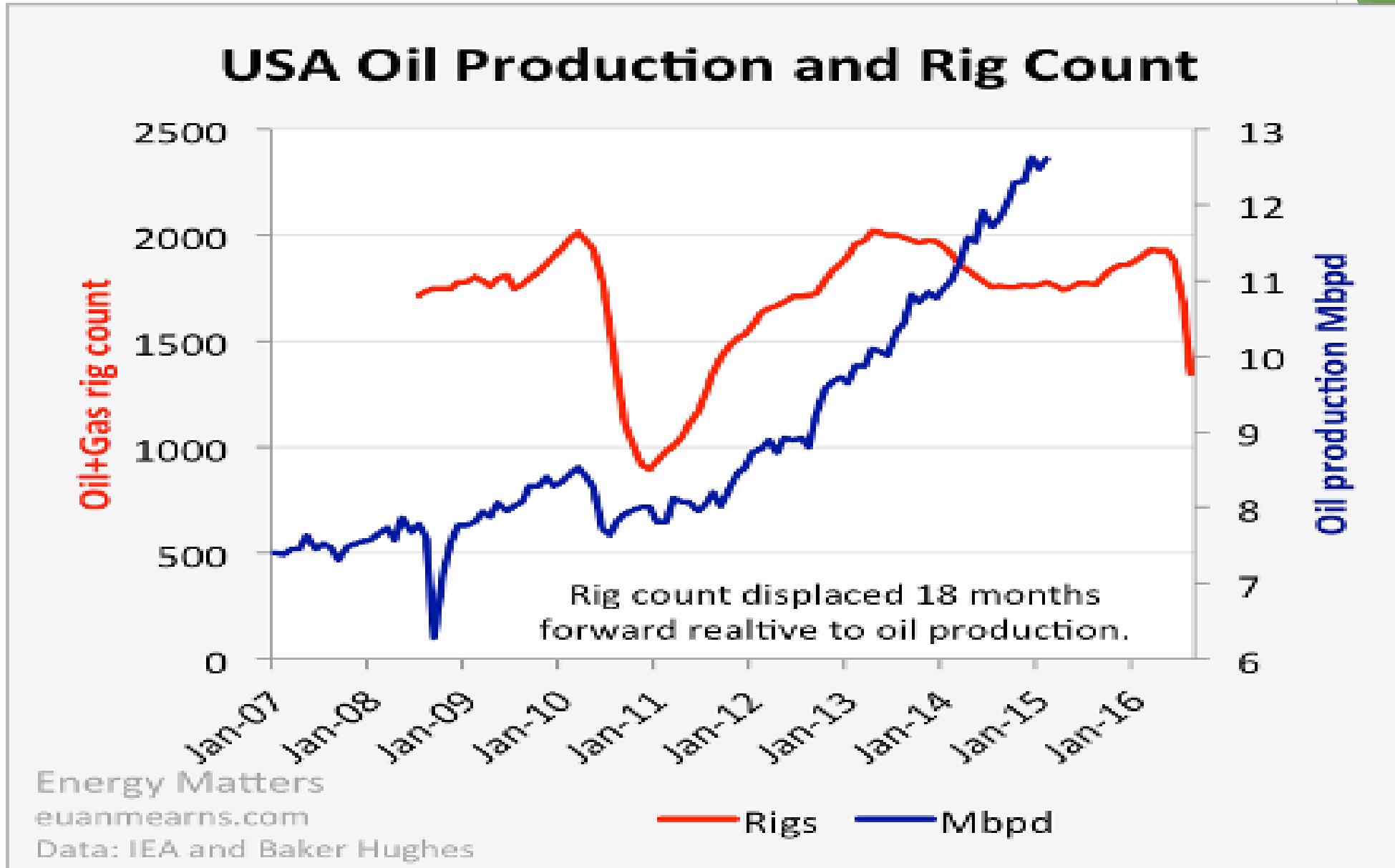
Crude oil prices react to a variety of geopolitical and economic events

price per barrel (real 2010 dollars)



Sources: U.S. Energy Information Administration, Thomson Reuters

US Production Trend



Expectation

Monthly West Texas Intermediate and Brent crude oil prices (2013-18)
dollars per barrel



Brent
West Texas
Intermediate

Likely 2016-2017 Oil Balance

- Global demand growing at 1.2 million BPD
 - US oil growth $\sim(0.6)$ million BPD
 - Other non-OPEC $\sim(0.3)$ million BPD
 - Rest of world oil growth ~ 0.5 million BPD (Iran)
- Net 1.6 million BPD tighter market

US - Production will grow again if prices $>\$50-60$

Likely no shale oil outside North America for 5 - 10 years

Price Prediction 2017-2018

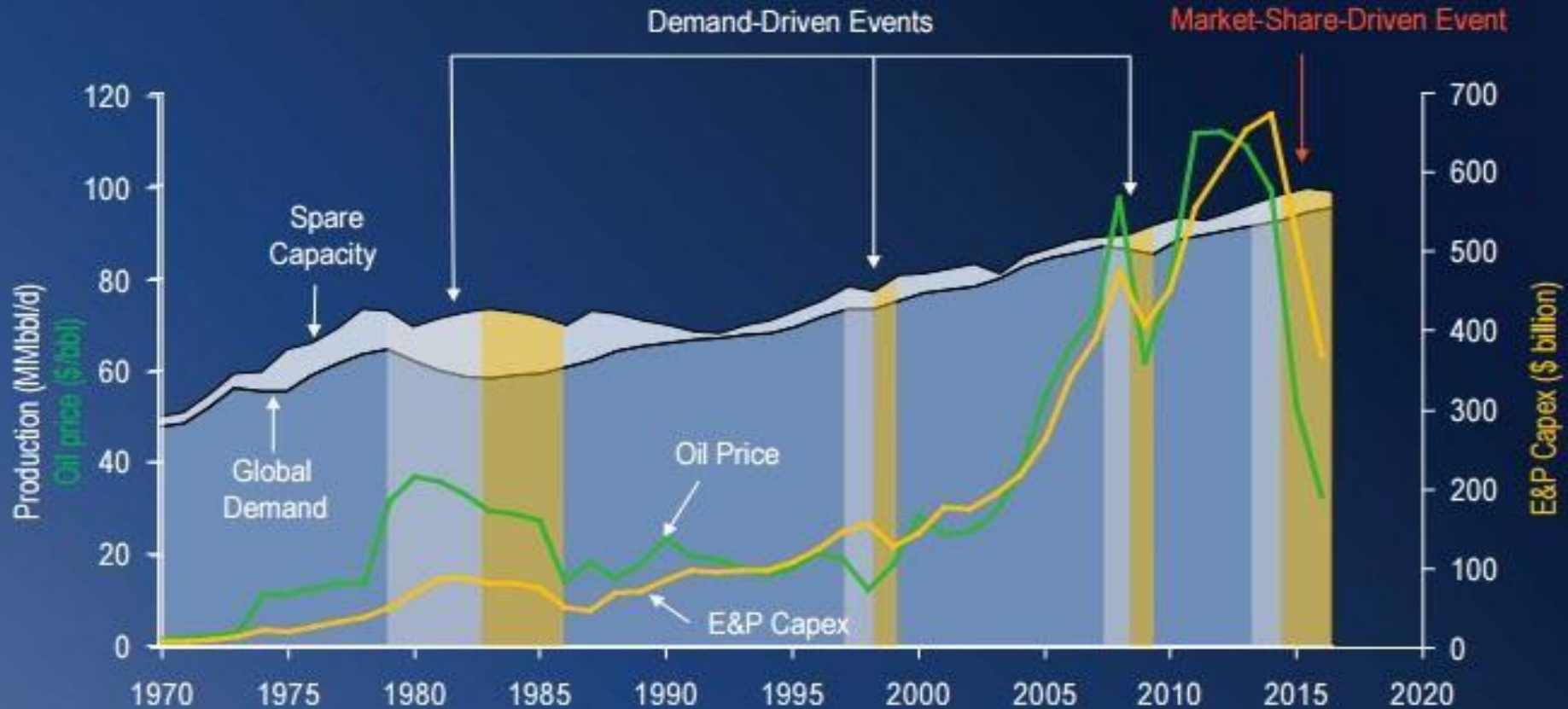
- ▶ Prices will likely no rise within 1-2 years a head
- ▶ Stable price is likely \$60
- ▶ Long Term \$90-\$100 prices unlikely
- ▶ Long Term below \$40 price unlikely

E&P Perspective: Short and Mid Term Impact on Industry

- ▶ Biggest industry restructuring since 1986
- ▶ Every company is selling properties - who is buying?
- ▶ Highly leveraged E&P's will likely disappear
- ▶ Service industry will become more concentrated

Service Company Perspective: Other Implications

E&P Industry Macro – Managing Downturns



Note: 2016 data based on averages to date and latest estimates for Capex
Source: BP Statistical Review, IEA, EIA, Barclays, Morgan Stanley and SLB analysis

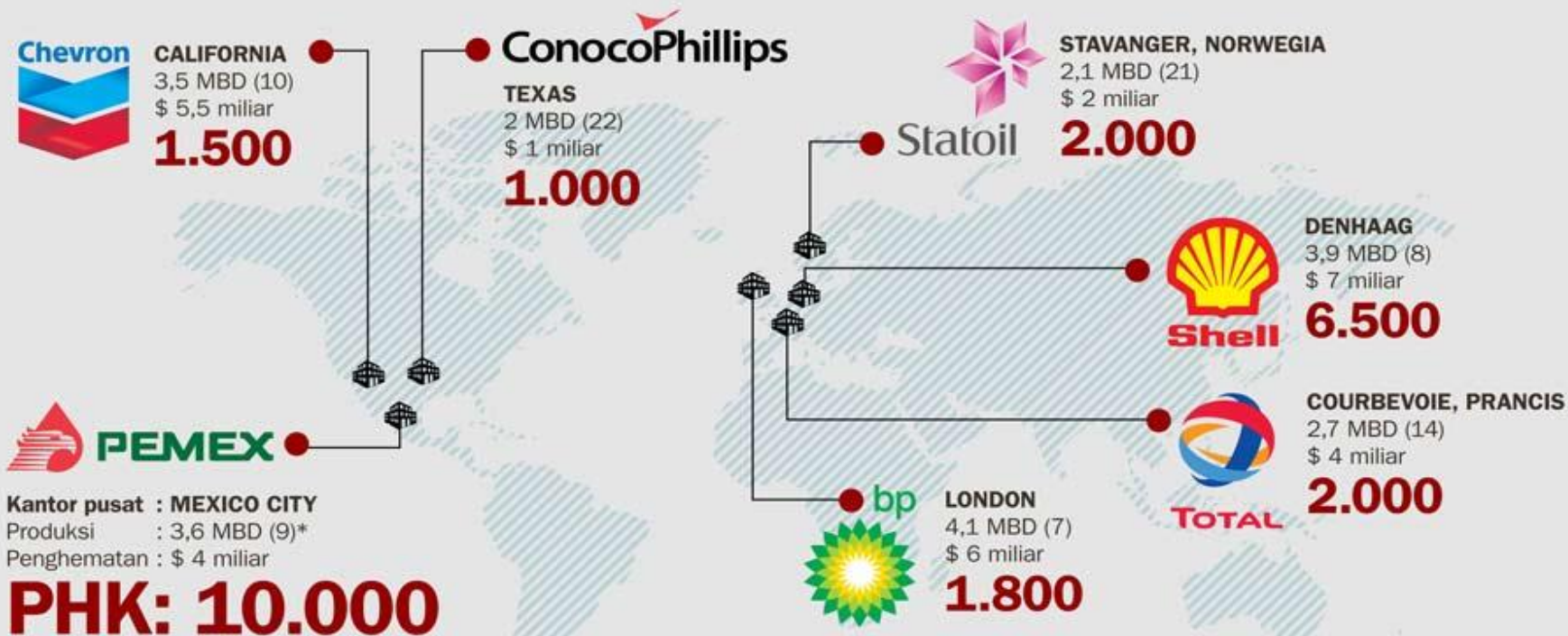
MUSIM PHK PEKERJA MIGAS



Raksasa migas Belanda, Shell, mengumumkan rencana pemangkasannya 6.500 karyawan, pada Kamis (30/7). Pengurangan tersebut merupakan realisasi pemotongan belanja modal 2015 menyusul ambruknya harga minyak dunia sejak Juli tahun lalu. Opsi pemutusan hubungan kerja dan penghematan juga diambil oleh perusahaan besar lainnya.

"Ini adalah periode yang penuh tantangan bagi industri migas. Kami mengambil langkah yang sangat penting dan menentukan."

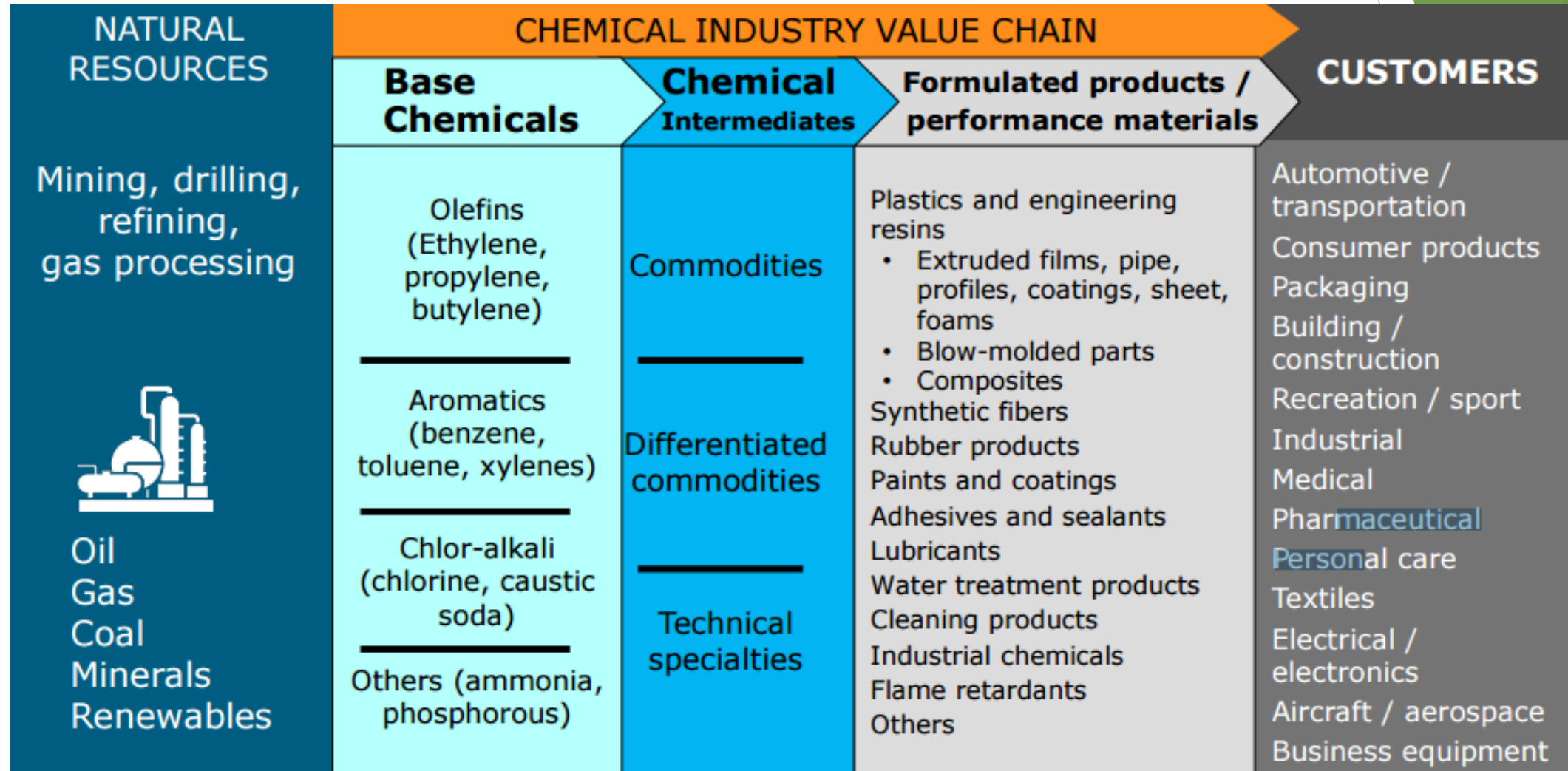
—Ben van Beurden, CEO Shell



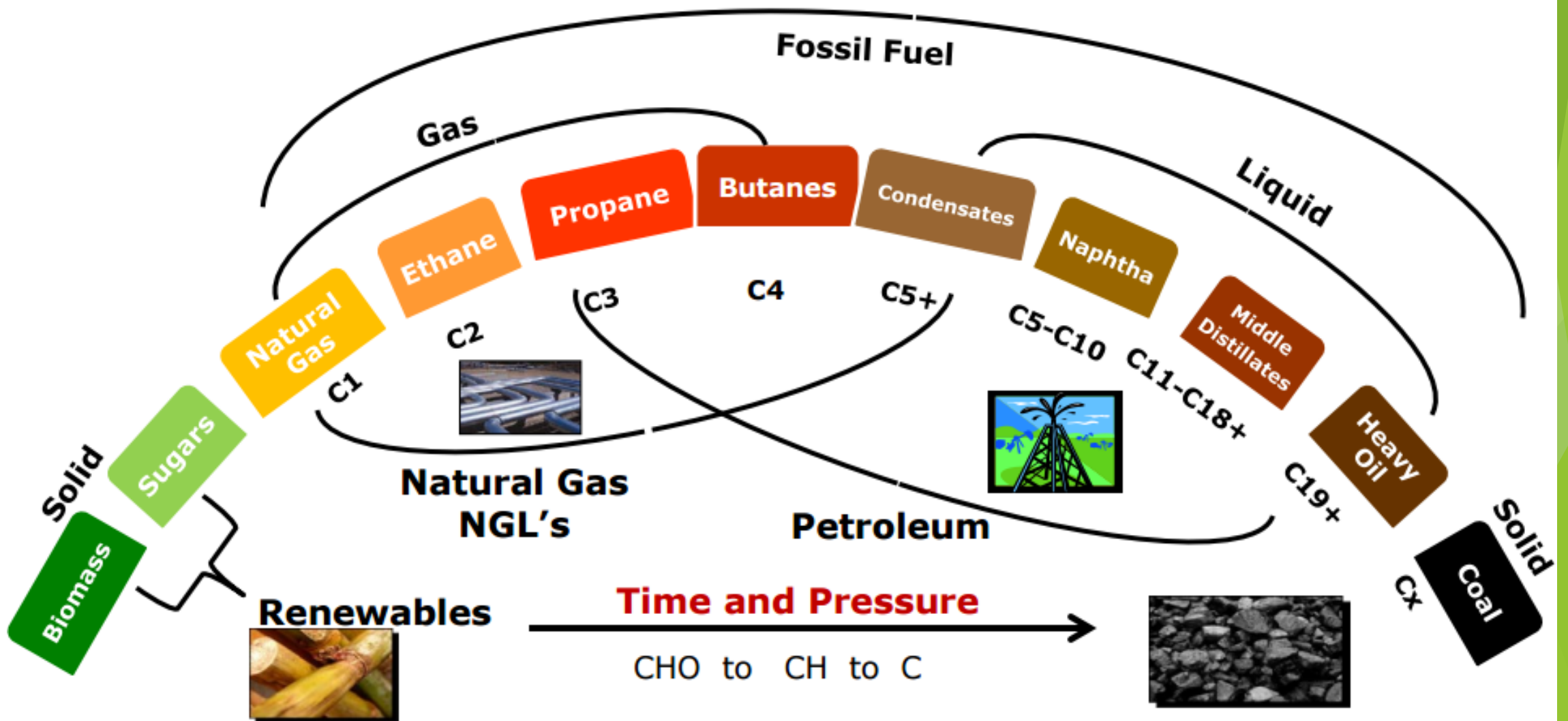
*PERINGKAT BERDASARKAN PRODUKSI HARIAN YANG DIRILIS FORBES, DALAM JUTA BAREL PER HARI (MBD).

SUMBER: WALL STREET JOURNAL, FINANCIAL TIMES, DAILY MAIL, CNBC, BLOOMBERG, PETROGLOBALNEWS | NASKAH: REDAKSI

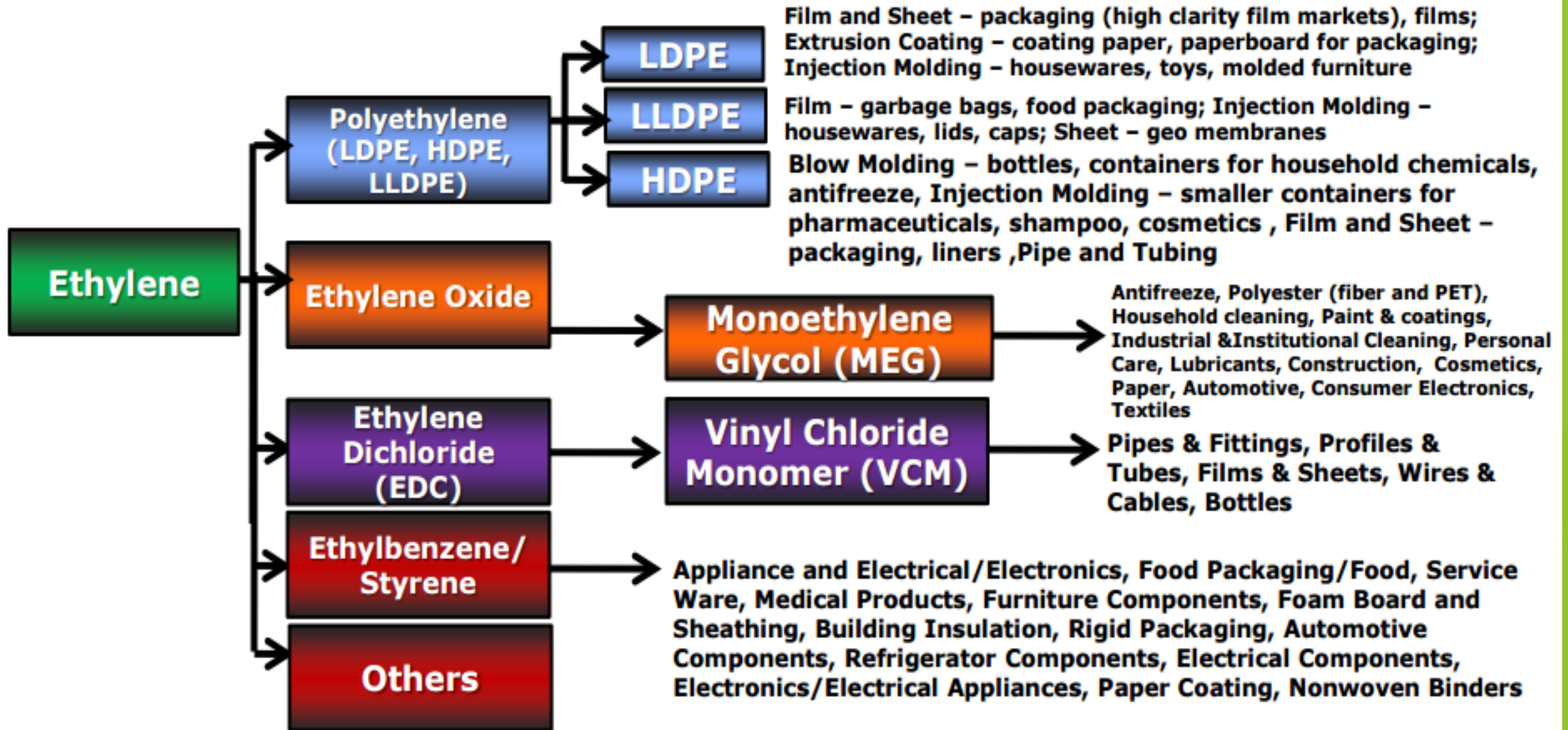
GLOBAL CHEMICAL INDUSTRY



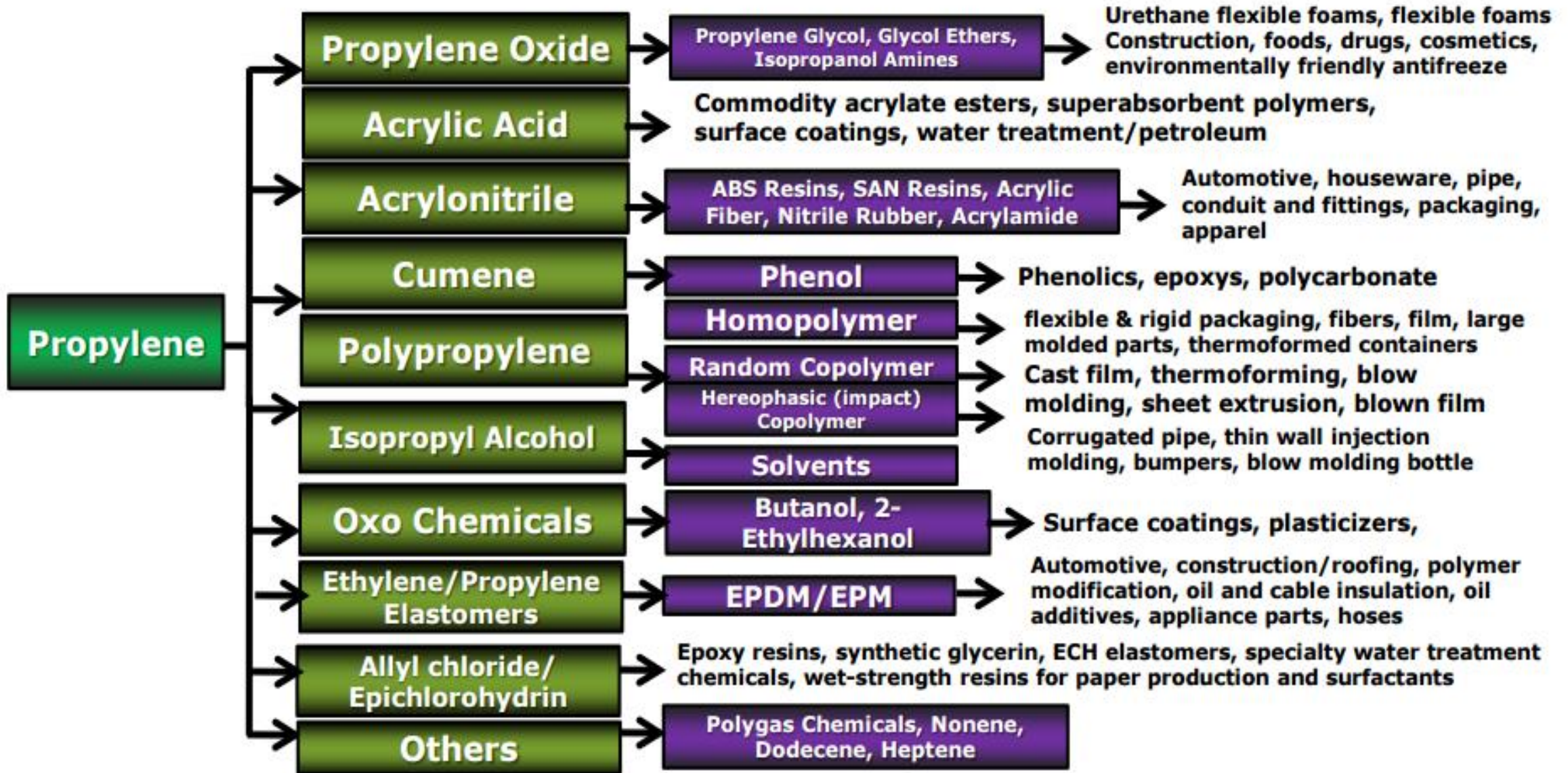
Petrochemical Feedstock



Ethylene Value Chain



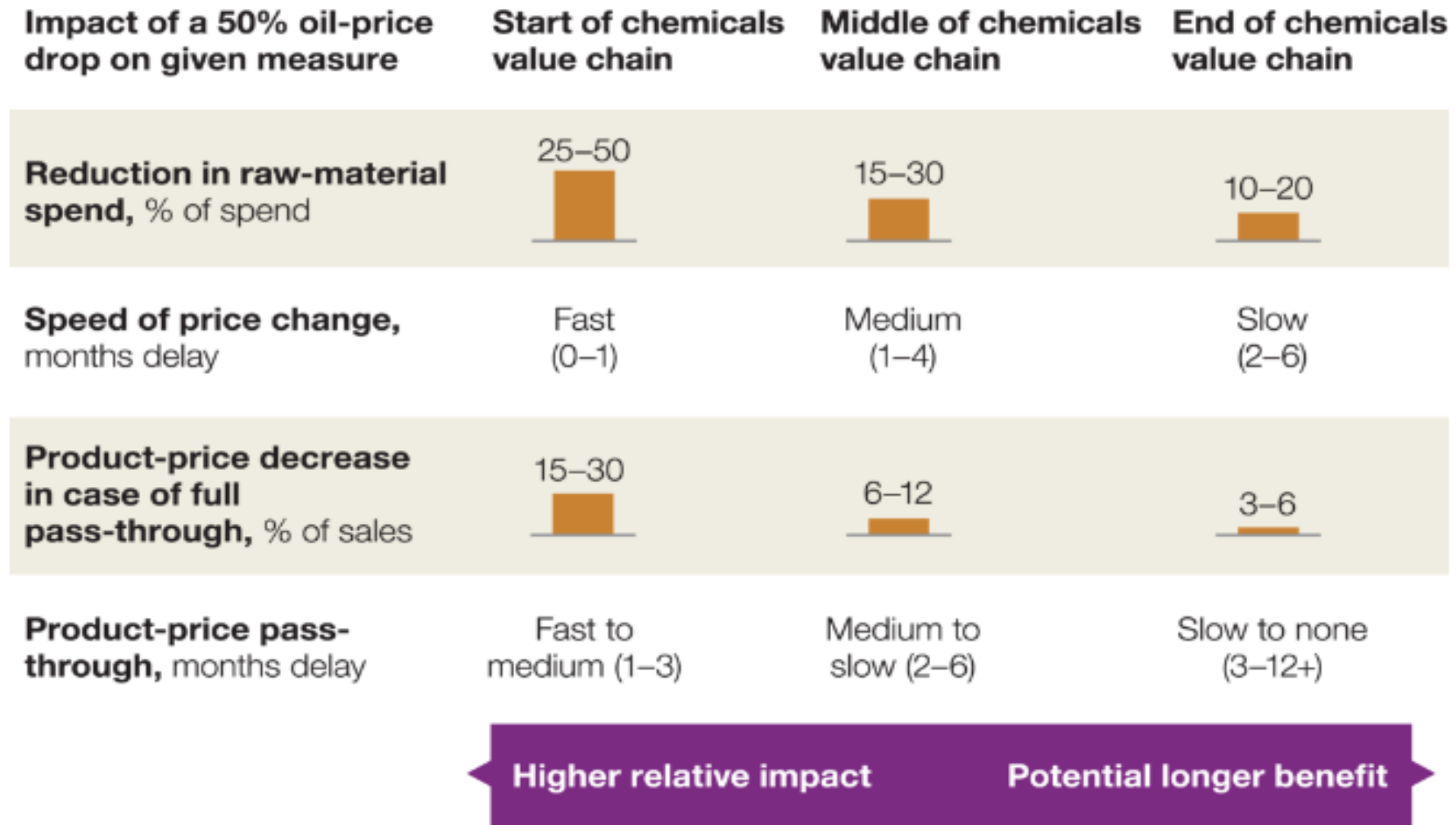
Propylene Value Chain



Investment Drivers for Base Chemical/ Petrochemical

- ▶ Crude oil/energy price trends
- ▶ Global economic growth
- ▶ Geo-political considerations
- ▶ North American energy market
- ▶ State of industry profit cycle
- ▶ China structural changes
- ▶ Non-conventional technology
- ▶ Sustainability
- ▶ Levels of integration
- ▶ Regional CAPEX differentials
- ▶ Logistics investments
- ▶ Evolving Technology and Impact on Consumer Products & Markets

The impact of the oil-price drop is differentiated along the chemicals value chain.



Petrochemical Growth?

Beyond 2020...Where Will The Next Wave Of Capacity Be Built?



Total Basic Chemical* Capacity
(Million Metric Tons)

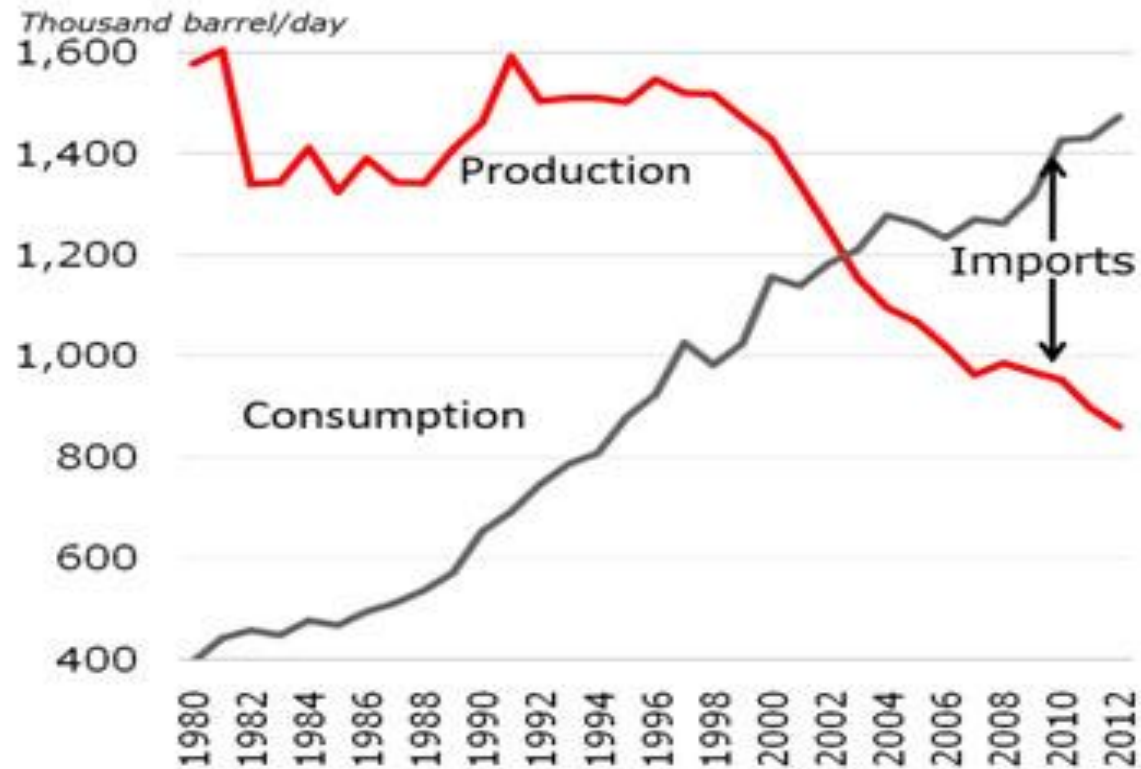
Region	2015	2025	Delta
North America	90	137	47
South America	24	26	2
Europe	89	101	12
Middle East / Africa	77	119	42
Asia/India (less China)	130	163	33
China	172	241	69
Total	582	787	205

* Ethylene, Propylene, Methanol, Benzene, Paraxylene, Chlorine

Current Indonesian Oil and Gas Issue

- ▶ We are not a rich oil and gas country!
- ▶ To increase reserves, aggressive exploration is essential and EOR is important
- ▶ Minister Regulation (Permen ESDM No.8/2017) on Gross Split PSC effective : January 16th, 2017
- ▶ The first Gross Split PSC Contract ---> PHE ONWJ (February 2017)
- ▶ The successful implementation of the Gross Split PSC requires more cost efficient contractor and less complicated government business process.
- ▶ At the end, How attractive is the GS Model? - Market will tell... “We will know it when we see it...”.

Konsumsi BBM meroket, produksi minyak melorot, impor kian menganga, siap menerkam perekonomian

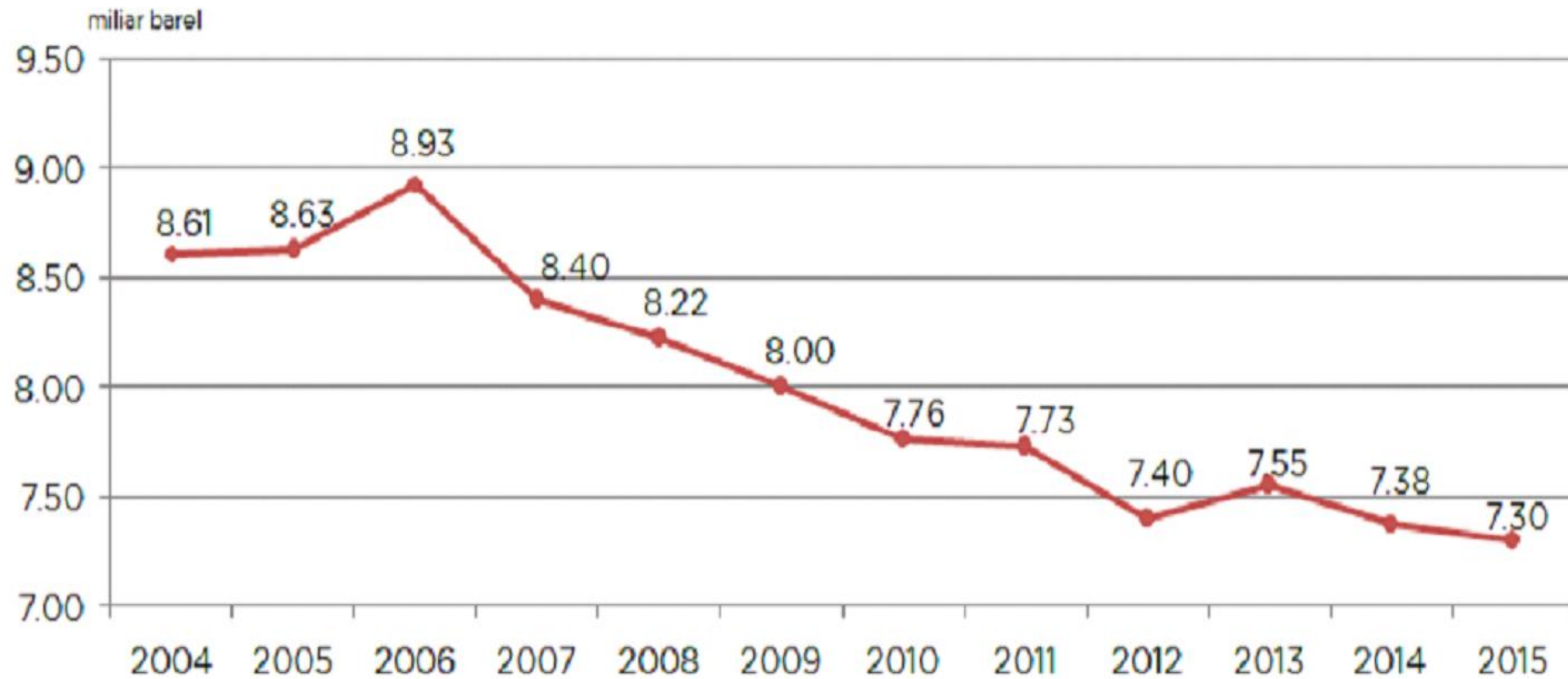


Source: United States Energy Information Administration, for oil production; and BP Statistical Review of World Energy, for oil consumption

Oil production: A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

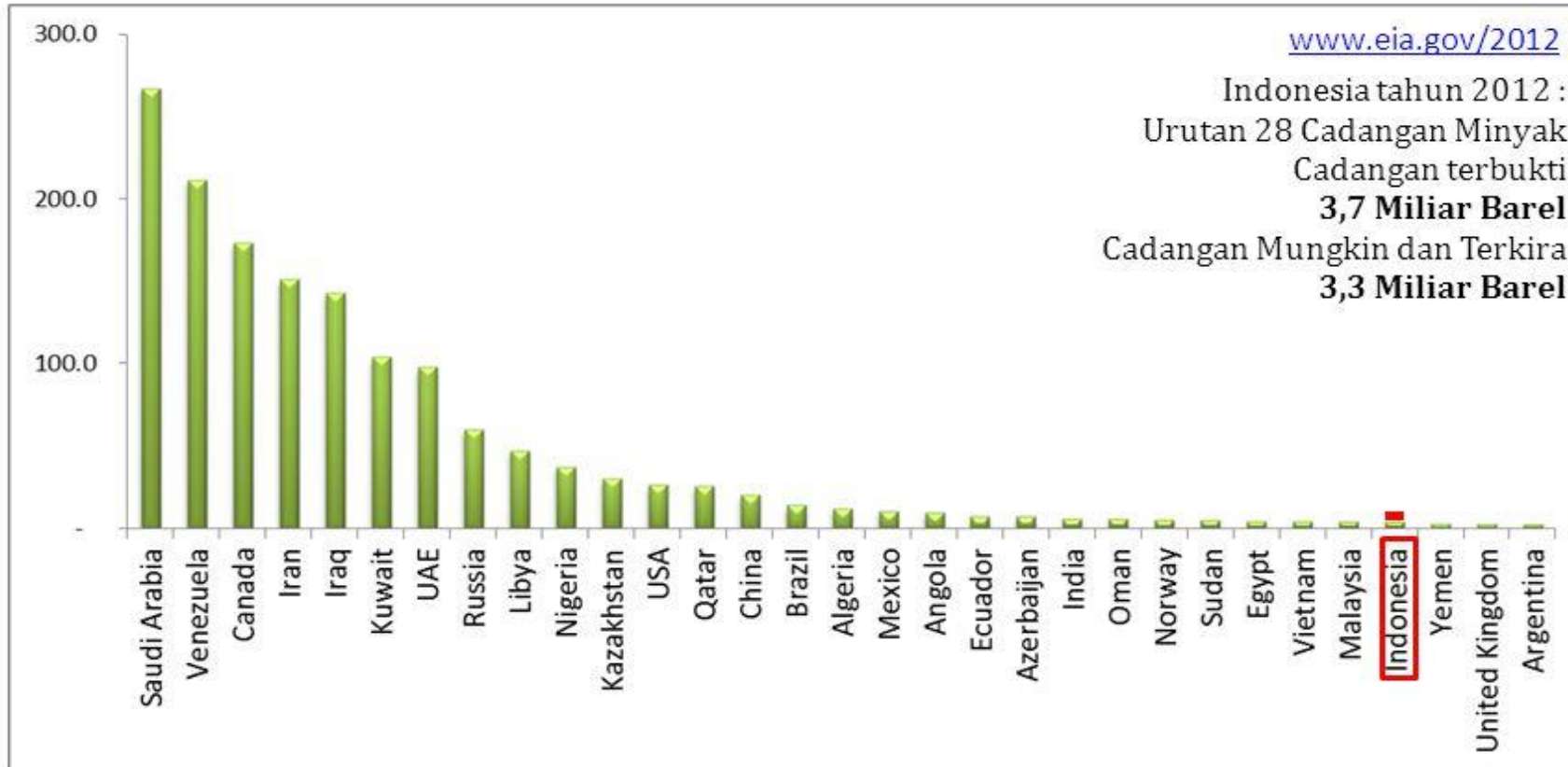
Oil consumption: inland demand plus aviation and marine bunkers and refinery fuel and loss. Consumption of fuel ethanol and biodiesel is also included.

Data Cadangan Minyak Indonesia



Sumber: Kementerian ESDM

CADANGAN MINYAK DUNIA

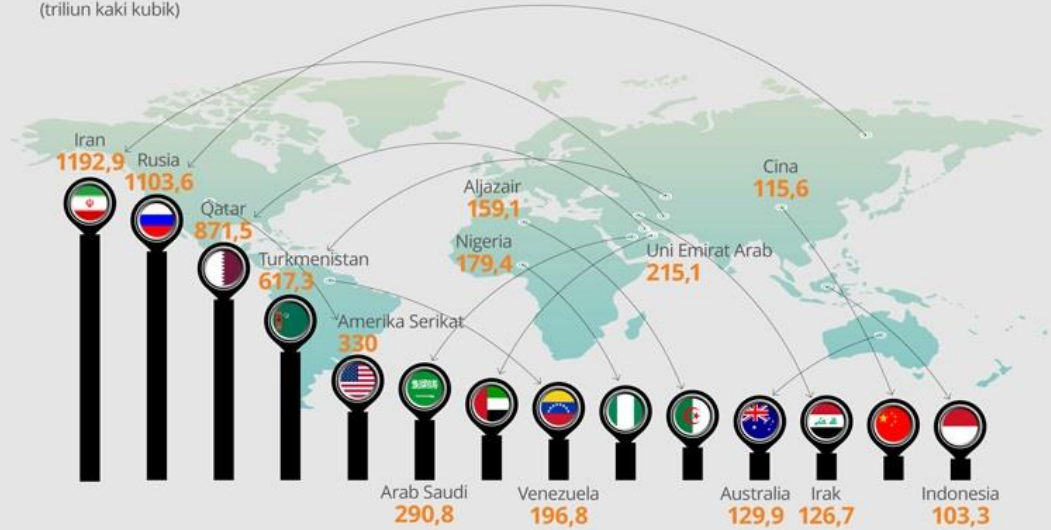


Data	Indonesia	Venezuela	Perbandingan
Cadangan Minyak	3,7	211,2	Tidak lebih dari 5%
Luas Negara	1,904,569 km ²	916,445 km ²	2 x lebih luas
Jumlah Penduduk	237,424,363	28,946,101	Hampir 10 x lipat

Cadangan Gas Indonesia Terbesar ke-14 Dunia

INDONESIA menempati posisi ke-14 sebagai negara pemilik cadangan gas alam terbesar di dunia. Data *BP Statistics 2014* menunjukkan cadangan gas alam terbukti Indonesia mencapai 103,3 triliun kaki kubik (TCF).

Cadangan Gas Terbukti Dunia (triliun kaki kubik)



17 %
Meski punya cadangan besar, konsumsi gas masih kecil, hanya sekitar 17 persen dari total energi nasional.

50 Tahun
Dengan tingkat produksi seperti sekarang, cadangan gas alam terbukti Indonesia bisa bertahan untuk jangka waktu 50 tahun.

574 TCF
Selain memiliki cadangan gas alam konvensional, Indonesia juga memiliki potensi cadangan gas non-konvensional, yakni shale gas sebesar 574 TCF

453 TCF
Potensi cadangan gas non-konvensional lainnya adalah gas metana batubara (CBM) sebesar 453 TCF.

Konsumsi Energi Indonesia 2012



COLLEGE MAJORS WITH THE HIGHEST/LOWEST EARNINGS

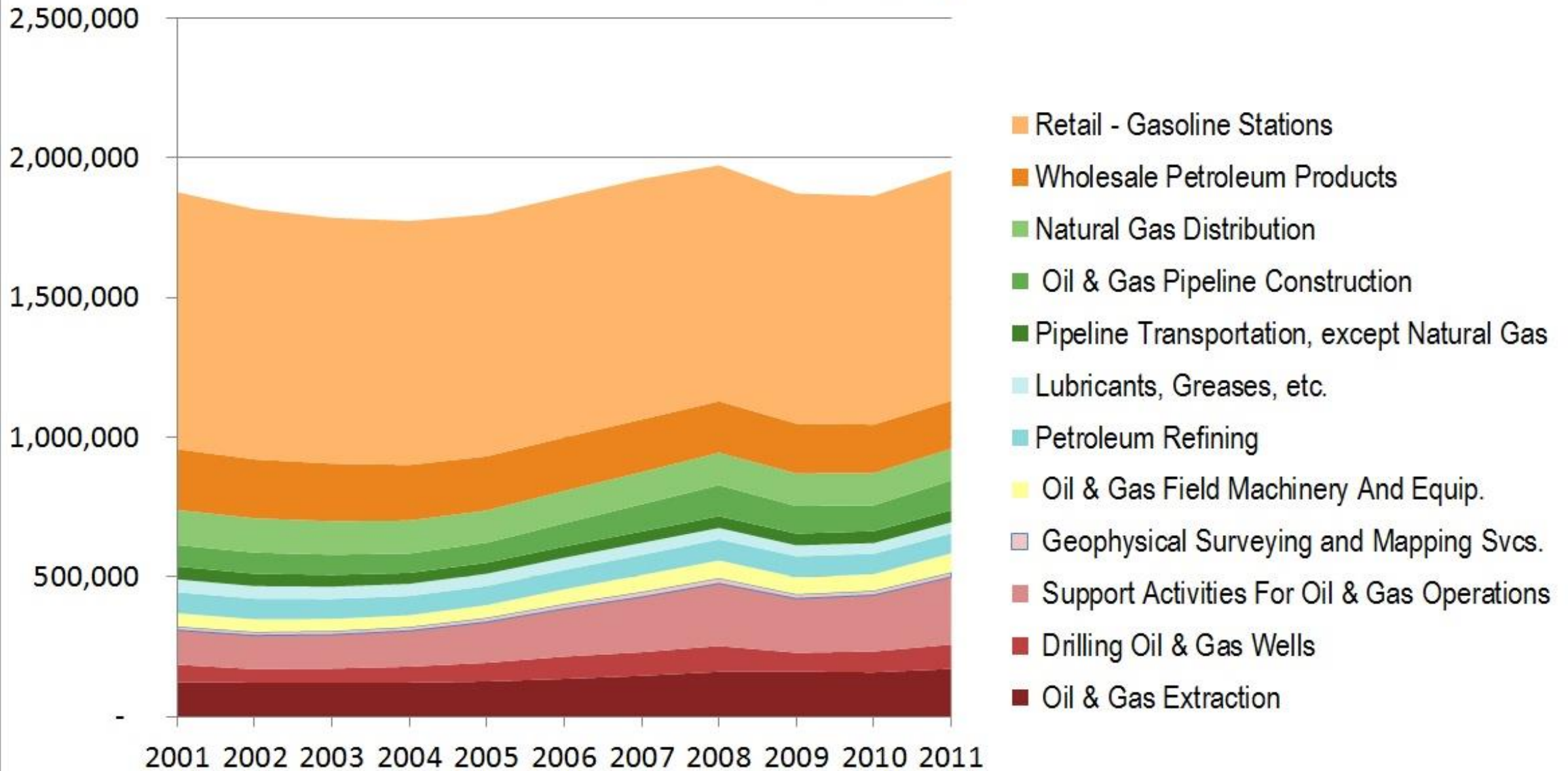
MAJORS W/ HIGHEST EARNINGS	MEDIAN EARNINGS	PERCENT FEMALE
Petroleum engineering	\$136K	14%
Pharmacy, pharmaceutical sciences	\$113K	59%
Metallurgical engineering	\$98K	23%
Mining and mineral engineering	\$97K	13%
Chemical engineering	\$96K	32%
Electrical engineering	\$93K	12%
Aerospace engineering	\$90K	14%
Mechanical engineering	\$87K	12%
Computer engineering	\$87K	10%
Geological/geophysical engineering	\$87K	40%

MAJORS W/ LOWEST EARNINGS	MEDIAN EARNINGS	PERCENT FEMALE
Early childhood education	\$39K	96%
Human/community services	\$41K	85%
Studio arts	\$42K	69%
Social work	\$42K	88%
Teacher education	\$42K	82%
Visual/performing arts	\$42K	67%
Theology/religious vocations	\$43K	32%
Elementary education	\$43K	91%
Drama/theater arts	\$45K	63%
Family/consumer sciences	\$45K	90%

SOURCE: JEC.senate.gov; National Center for Education Statistics; 2014 Digest of Education Statistics; US Census Bureau; American Community Service micro data (2009–2013); Georgetown University Center

BUSINESS INSIDER

Oil and Gas Related Employment



Source: U.S. Bureau of Labor Statistics

What we can do as oil student, academic and professional

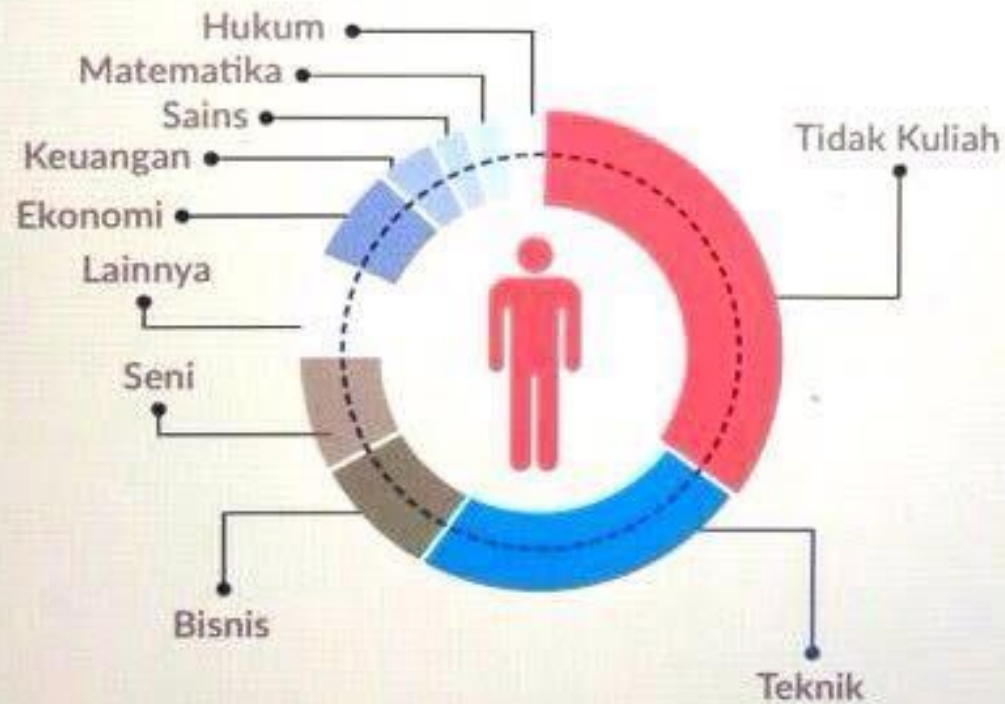


Career Development

- ▶ Career Opportunity in Energy Industry: **To Stay or Not?**
- ▶ **Skill (graduate)** → Critical Skill (employment) → **Expert**
- ▶ Sinergy: Academic & Industry
- ▶ Develop Digital skills
- ▶ New requirements:
 - ▶ Creative, flexible and mobile
 - ▶ Agile thinking ability
 - ▶ Interpersonal and communication skills
 - ▶ Global skills
 - ▶ Entrepreneurship

Fun part.....
Ready?

LATAR BELAKANG PENDIDIKAN 100 ORANG TERKAYA DUNIA VERSI FORBES



Tidak Kuliah	: 32 %
Teknik	: 22 %
Bisnis	: 12 %
Seni	: 9 %
Ekonomi	: 8 %
Keuangan	: 3 %
Sains	: 2 %
Matematika	: 2 %
Hukum	: 2 %
Lainnya	: 8 %

Workshop Practice: GET ACTION NOW

1. Success VS Happiness
2. Identify our needs
3. Identify our **STRENGTH** and **WEAKNESS**
4. Team Project

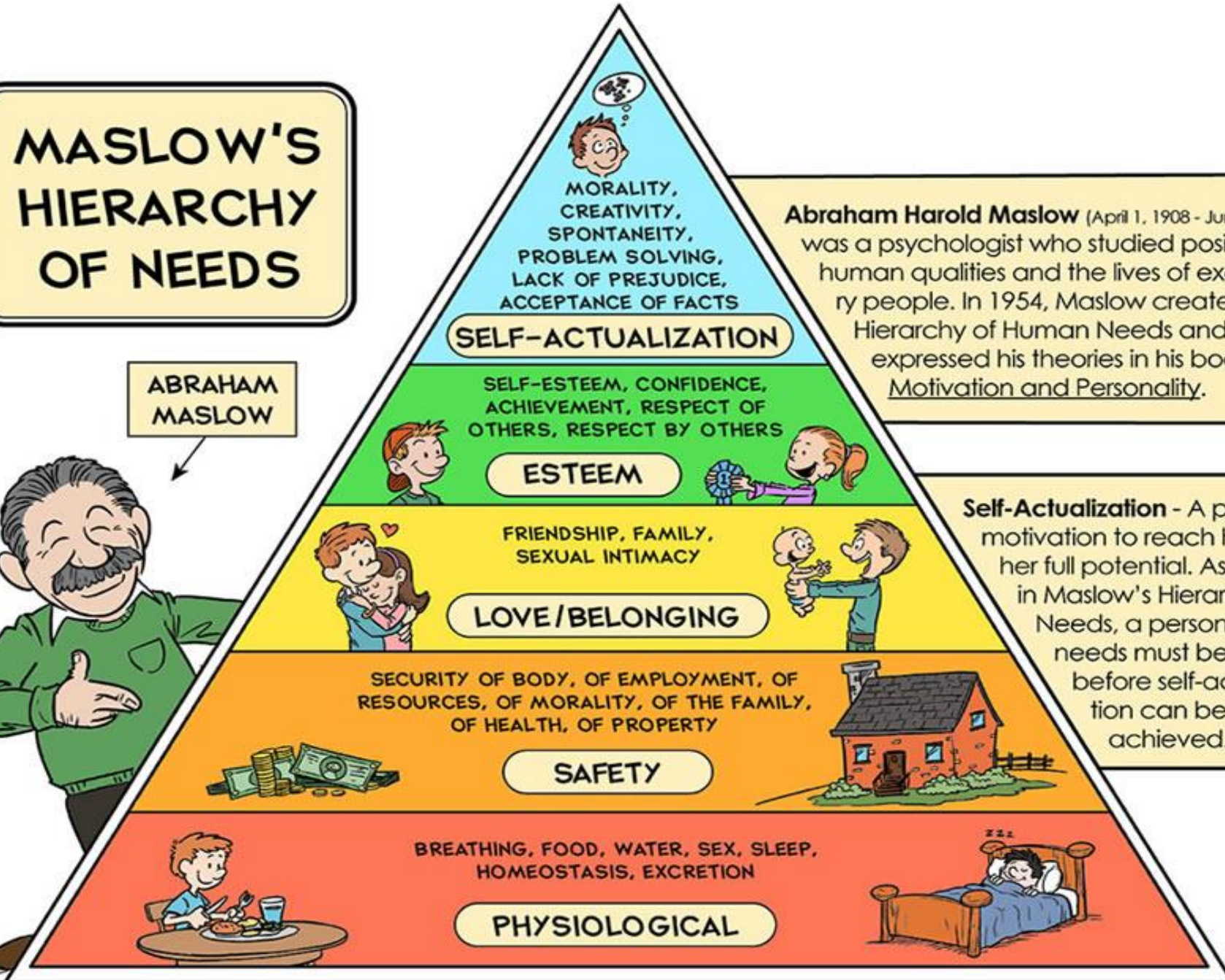
Success & Happiness

- ▶ “Success is getting what you want; happiness is wanting what you get.”- Ingrid Bergman
- ▶ Success is an achievement, but happiness is the only achievement.
- ▶ Success should come as a byproduct of happiness — a factor that comes from happiness, derives from it.

- ▶ Success is all the money in the world; happiness is having people to spend it on.
- ▶ Success is measurable; happiness is limitless.
- ▶ Success is a fancy car; happiness is a great ride.
- ▶ Success is working hard; happiness is loving the work.
- ▶ Success is the fame; happiness is the rise.
- ▶ Success is the race; happiness is the finish line.
- ▶ Success is being right; happiness is being true.
- ▶ Success is earned, happiness is achieved.
- ▶ Success is awards; happiness is its own reward.
- ▶ Success is money in the bank; happiness can't be deposited.
- ▶ Success is private jets; happiness is flying high.
- ▶ Success is never easy; happiness will never feel difficult.
- ▶ Success is money; happiness is value.
- ▶ Success is sacrifice; happiness is plentiful.
- ▶ Success is second homes; happiness is always home.
- ▶ Success is material things; happiness is in the materials.
- ▶ Success is pursuing your dreams; happiness is living your dreams.
- ▶ Success is reaching the top; happiness has no ceiling.
- ▶ Success is all the money in the world; happiness is needing none of it.
- ▶ Success is doing what you love; happiness is loving what you do.
- ▶ Success is just ahead; happiness was never behind.
- ▶ Success is envied; happiness is shared.

MASLOW'S HIERARCHY OF NEEDS

ABRAHAM MASLOW



Abraham Harold Maslow (April 1, 1908 - June 8, 1970) was a psychologist who studied positive human qualities and the lives of exemplary people. In 1954, Maslow created the Hierarchy of Human Needs and expressed his theories in his book, *Motivation and Personality*.

Self-Actualization - A person's motivation to reach his or her full potential. As shown in Maslow's Hierarchy of Needs, a person's basic needs must be met before self-actualization can be achieved.

Strength VS Weakness

Strength

- ▶ Enthusiasm
- ▶ Trustworthiness
- ▶ Creativity
- ▶ Discipline
- ▶ Patience
- ▶ Respectfulness
- ▶ Determination
- ▶ Dedication
- ▶ Honesty
- ▶ Versatility

Weakness

- ▶ Being too critical of yourself
- ▶ Attempting to please everyone
- ▶ Being unfamiliar with the latest software

Team Project (1 month)

“you are not an engineer if you can not write a technical report”

► Work in a group - Project Title:

1. A review of latest H₂S removal technology in oil and gas industry
2. A review of current Indonesia petrochemical project
3. A review of EOR technology application in Middle East and Canada: what is the different?
4. A review of latest technology in industrial water treatment
5. A review of mercury removal technology from natural gas in Indonesia
6. A review of latest Syngas technology
7. A review of GTL technology in Qatar
8. A review of latest soap manufacturing process technology
9. A review of gold mining process and technology in Africa
10. A review of geothermal project in Indonesia: what is the challenges?
11. A review of renewable energy project in China
12. A review of ice cream process manufacturing: what we can improve?

The roles

- ▶ Make it in 3 pages max. report (Bahasa Indonesia/ Inggris)
- ▶ Methodology:
 - ▶ literature study (library, internet, book, journal, magazines, etc)
 - ▶ questionnaire to industry,
 - ▶ make a summary and share the opinion
- ▶ Within 1 month of study. Submit to: Ardian Nengkoda, PhD. Via email: petroche@gmail.com
- ▶ Meet the date line and comply with the methodology.
- ▶ Successful team will receive project certificate