



قسم هندسة البترول والغاز الطبيعي – كلية الهندسة – جامعة الملك سعود
الرياض – المملكة العربية السعودية



Petroleum and Natural Gas Engineering Department,
College of Engineering, King Saud University - Riyadh - Saudi Arabia

Viewpoint Analysis of the Importance of the Middle East Oil and Natural Gas

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The Presentation Outlines:

- 1) Historical Overview on Oil and Natural Gas.**
- 2) Oil and Natural Gas Reserves and Geographic Distribution.**
- 3) Definition of the Arabian Tectonic Plate (The Middle East).**
- 4) Merits of Oil and Natural Gas in the Middle East.**
- 5) Prediction of the Future World's Oil Supply and Demand.**
- 6) Conclusions and Recommendations.**



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Discovery and utilization of oil and natural gas goes back hundreds of years when oil pits were known since 450 BC and used by the Egyptians, Babylons and Chinese for flaming torches, medicine and water proofing.

In 1859, Colonel Edwin Drake produced oil from the first modern oil well drilled using rotary drilling technique in Pennsylvania.

Oil was discovered in many parts of the world: in Venezuela 1878, in Indonesia 1885, in Iran 1908, in Mexico 1910, in Bahrain 1932, in Kuwait and Saudi Arabia 1938. In 1956, oil was discovered in Algeria and Nigeria and in 1969, oil was discovered in North Sea.



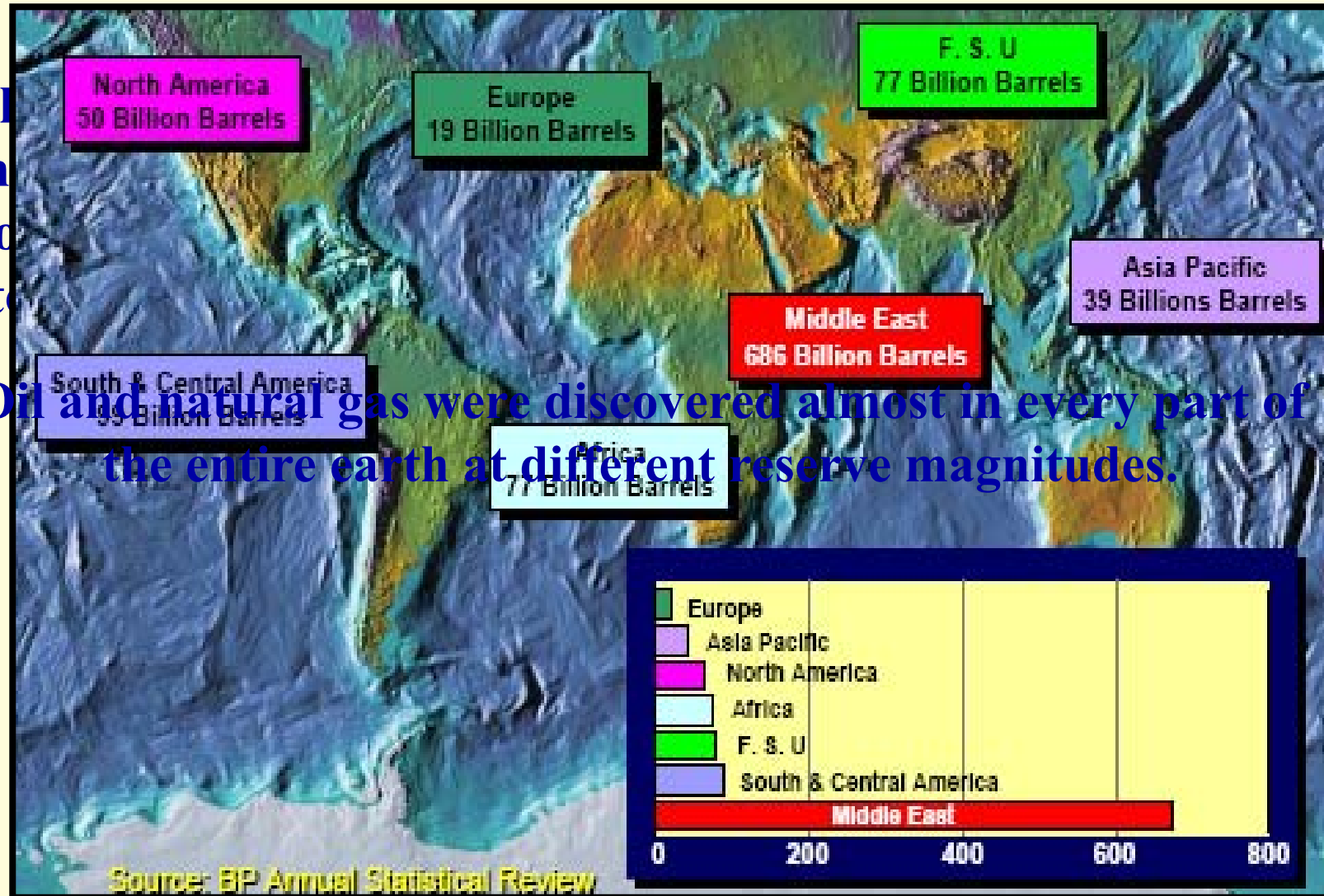
The importance of oil and natural gas as main energy sources comes from the fact that there are no other competitive and widely available energy sources.

Energy sources available nowadays

Energy source	Percentage usage, %			
Crude oil	42.1	65.9	89.2	100
Natural gas	23.8			
Coal	23.3	10.8		
Nuclear	7.0			
Hydro	3.5			
Others	0.3			



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Worldwide oil reserves

39 times

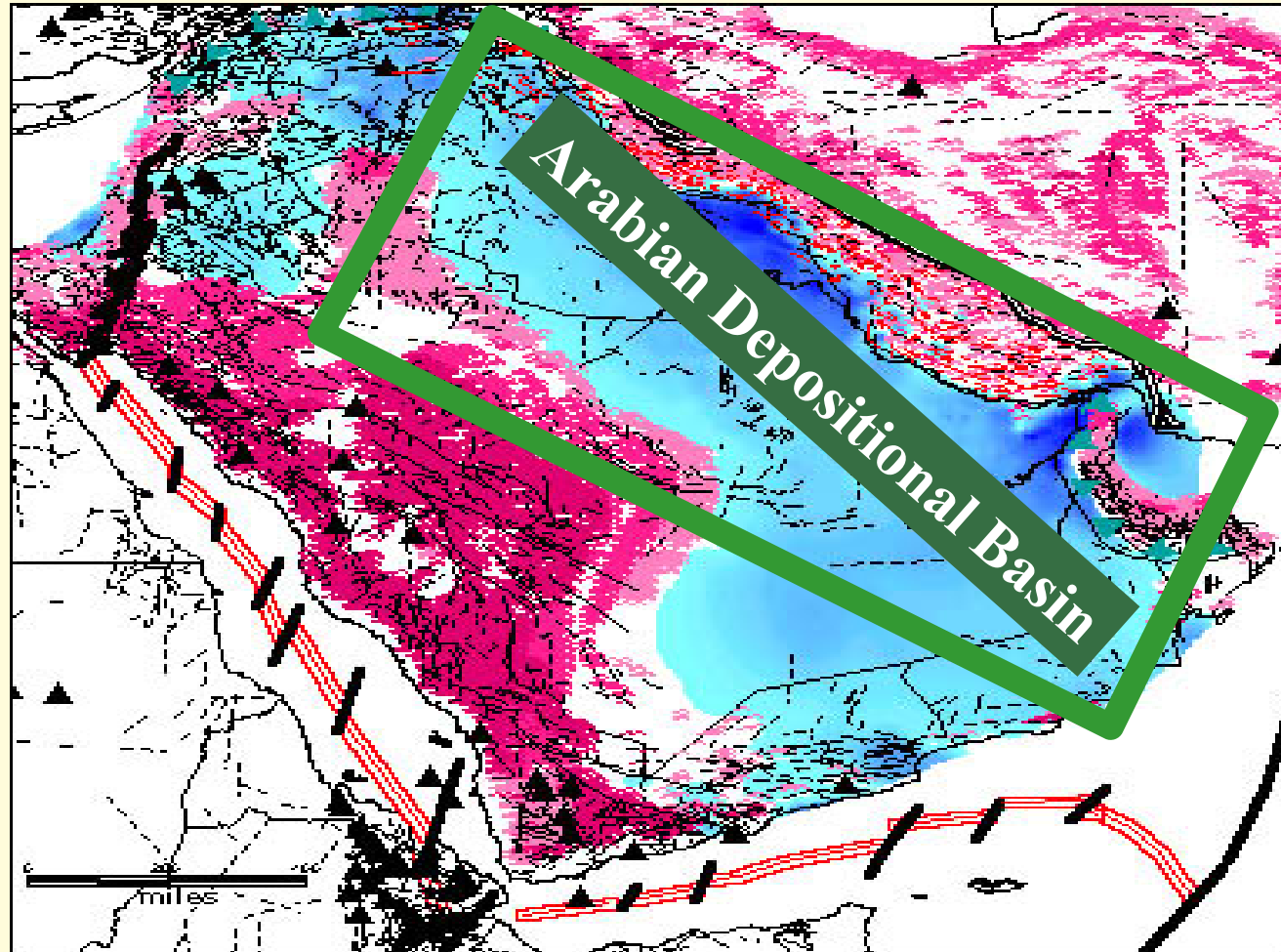
Location	Oil Reserves, Billion bbl	%
Middle East	686	65.5
Asia	30	3.7
USSR	77	7.4
Europe	19	1.7
Africa	77	7.4
North America	50	4.8
Central and South America	99	9.5
World total	1047	100



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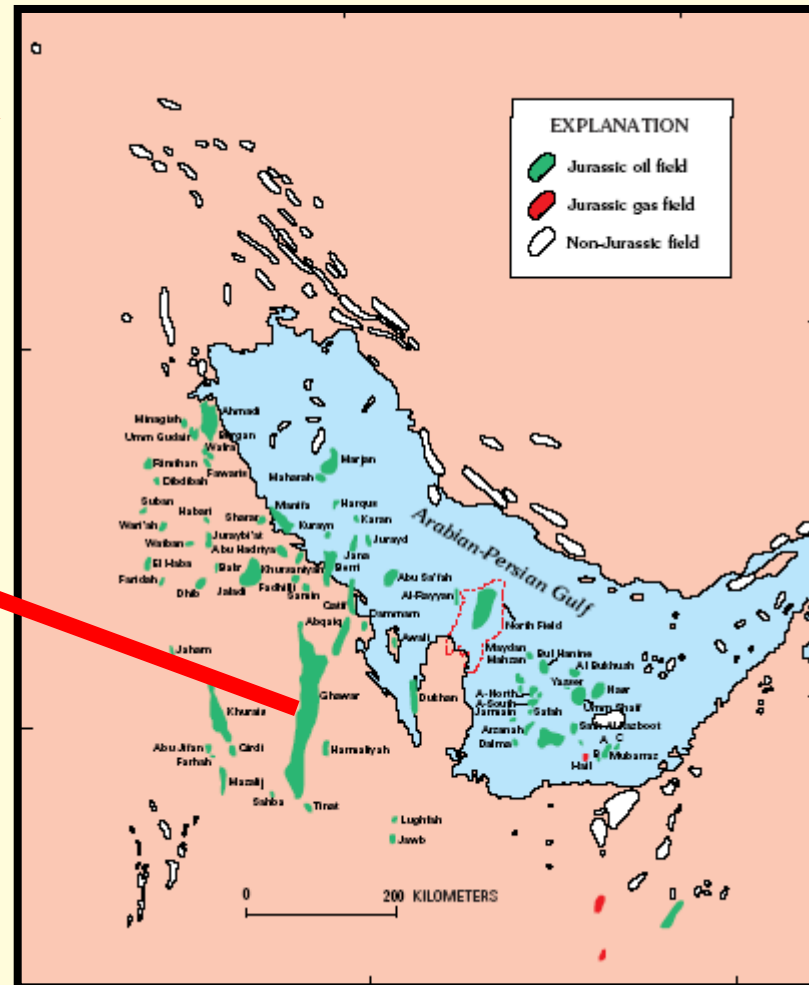
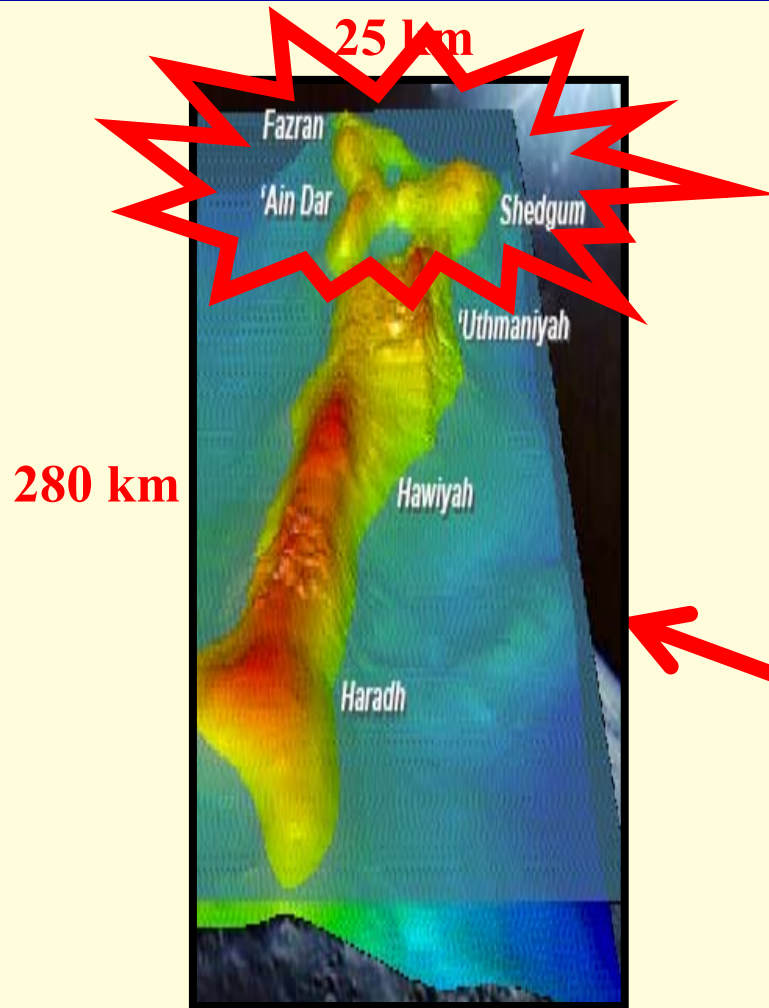
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Arabian Tectonic Plate (The Middle East)



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**Ghawar Super Giant Oil Field,
KSA, 66 Billion bbl**



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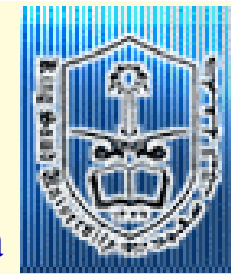
The importance of the Arabian Tectonic plate (Middle East) comes from the following merits:

- About 68% of oil reserves and 38% of natural gas are located in this area.
- Giant and super-giant oil and natural gas reservoirs are located in this area.
- All the reservoirs in this area produce at maximum productivity.
- All the reservoirs in this area produce naturally from medium depth wells.



The importance of the Arabian Tectonic plate (Middle East) comes from the following merits:

- **High quality oil and natural gas are produced from this area.**
- **Production cost per barrel is the minimum in the global.**
- **All types of oil and natural gas are available in this area.**
- **This area has a strategic location relative to consumers**
- **This area is tectonically stable and away from tornados and earthquakes.**



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History of oil and natural gas discovery in the Middle East

Country	Oil discovery		Country total proved reserves, Billion bbl (% of World)	Free Natural Gas discovery		Country total proved reserves, Trillion ft ³ (% of World)
	Year	Location (field)		Year	Location (field)	
Iran	1908	Masjid-i-Sulaiman	137 (13%)	1988	South Pars	940 (10.1%)
Iraq	1923	Naft Khaneh	115 (10.9%)	2001	NA	110 (11.8%)
Bahrain	1932	Awali	0.1 (0.01%)	1932	NA	0.29 (0.03%)
KSA	1938	Dammam	264.2 (25%)	1967	Kidan	243.5 (2.7%)
Kuwait	1938	Burqan	101.5 (8.5%)	2000	Raudhatain	101.5 (1.1%)
Qatar	1939	Dukhan	15.2 (1.27%)	1971	North Dome	910 (9.80%)
UAE	1950	Ra's Sadr	97.8 (8.14%)	1999	Abu Rabah	212.1 (2.3%)
Syria	1956	Karachuk	3.0 (0.255%)	1999	NA	19.95 (0.2%)
Oman	1960	Natih	5.6 (0.47%)	1998	Habeebad-2	35.1 (0.37%)
Yemen	1984	Mareb/Jawf	2.9 (0.24%)	1984	Mareb/Jawf	3.0 (0.03%)



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		Country	No. of Giant Oil Fields	Relative Productivity, %	Production, Million bbl/day
		OPEC	The Middle East	Saudi Arabia	7
Iran	10			51	3.7
Iraq	5			96	2.55
UAE	7			95	2.2
Kuwait	3			89	1.8
Qatar	3			77	0.65
Rest of OPEC				Nigeria, Ecuador, Gabon	NA
		Libya	7	65	1.3
		Algeria	2	44	0.8
		Venezuela	10	59	2.9
		Indonesia	2	33	1.2
Rest of the World		North America	17	32	11.4
		Europe	10	31	6.4
		Former USSR	12	27	7.9
		Rest of Asia	7	44	6.3
		Latin and South America	4	32	2.8
		Rest of the Middle East	4	26	1.9
		Africa	5	32	2.8



World's Giant and Super Giant Oil Fields

Oil Field	Country	Discovery Date	Productivity		
			Million bbl/day	%	
1	Ghawwar	Saudi Arabia	1948	4.50	30
2	Karkuk	Iraq	1927	0.90	6.1
3	Langonela	Venezuela	1926	0.94	6.4
4	Burgan	Kuwait	1938	1.20	8.1
5	Abgeeg	Saudi Arabia	1946	0.60	5.2
6	Gash saran	Iran	1928	0.88	4.1
7	Maroon	Iran	1964	0.90	6.1
8	Aga Jarri	Iran	1938	0.20	1.4
9	Saffania	Saudi Arabia	1951	0.50	4.6
10	Bashakiro	Venezuela	1930	0.74	3.4

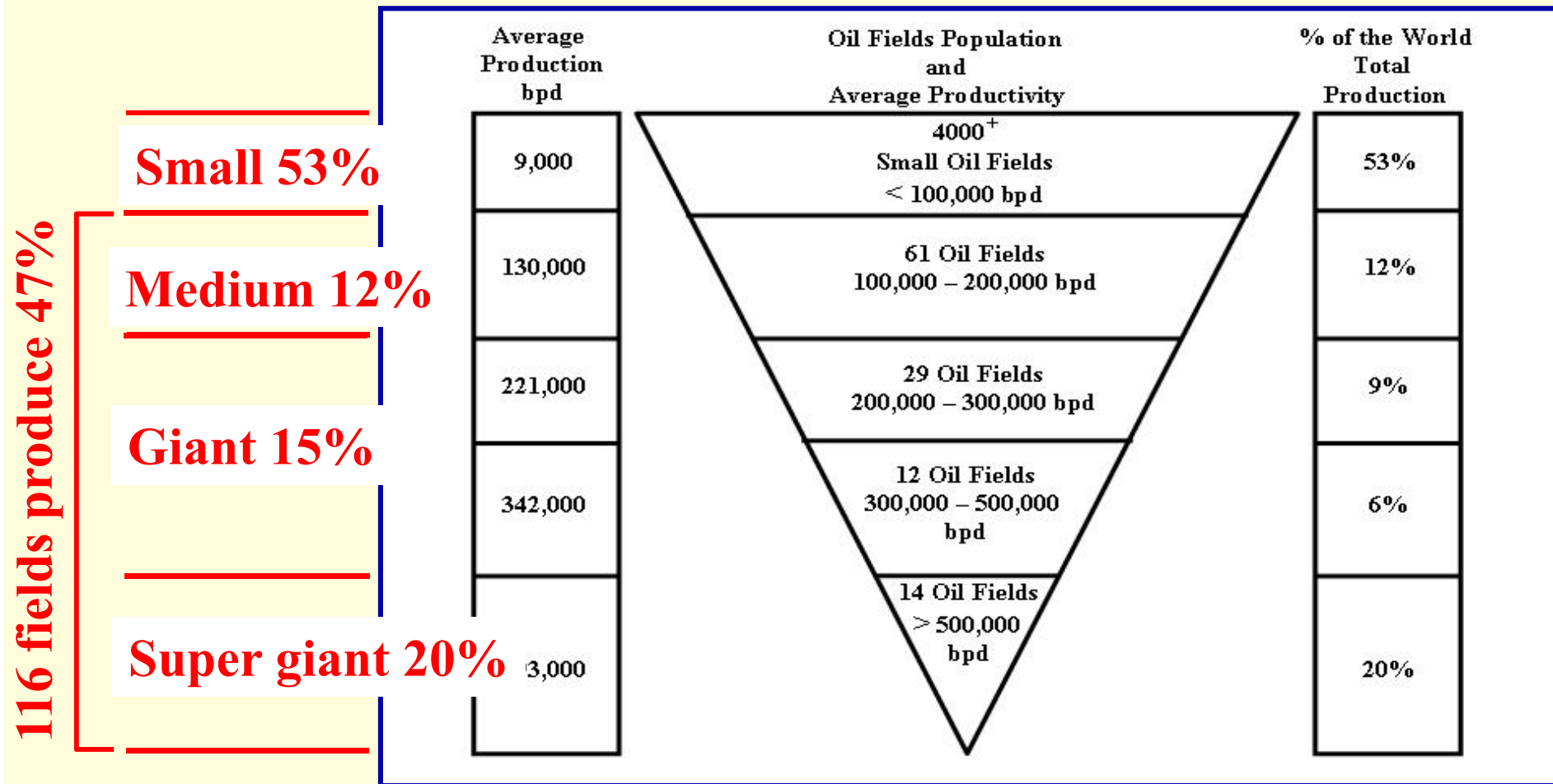


World's Giant and Super Giant Oil Fields

Oil Field	Country	Discovery Date	Productivity		
			Million bbl/day	%	
11	Murban	UAE	1960	0.54	3.1
12	Rumailah	Iraq	1953	1.20	3.7
13	Bebi Hakeemah	Iran	1961	0.12	.81
14	Sareer	Libya	1961	0.20	2.6
15	Minas	Indonesia	1944	0.20	1.4
16	Hasi Masaood	Algeria	1956	0.19	1.3
17	Tia Juana	Venezuela	1928	0.10	.68
18	Nasser (Zalton)	Libya	1959	0.40	2.7
19	Sasan	Iran	1966	0.40	2.7
20	Gialo	Libya	1961	0.10	.68



Numbers and Productivity of Worldwide Oil Fields





Worldwide Average Well Productivity

Country	Average Well Productivity, bbl/day	Country	Average Well Productivity, bbl/day
1 Saudi Arabia	5623	9 Iraq	1252
2 Norway (North Sea)	5140	10 Libya	947
3 Iran	3221	11 Nigeria	940
4 Kuwait	2278	12 Mexico	875
5 U.K. (North Sea)	1728	13 Algeria	642
6 UAE (Abu Dhabi)	1595	14 Venezuela	200
7 Indonesia	1592	15 China	44
8 UAE (Dubai)	1578	16 USA	11



Worldwide Oil Production and Consumption

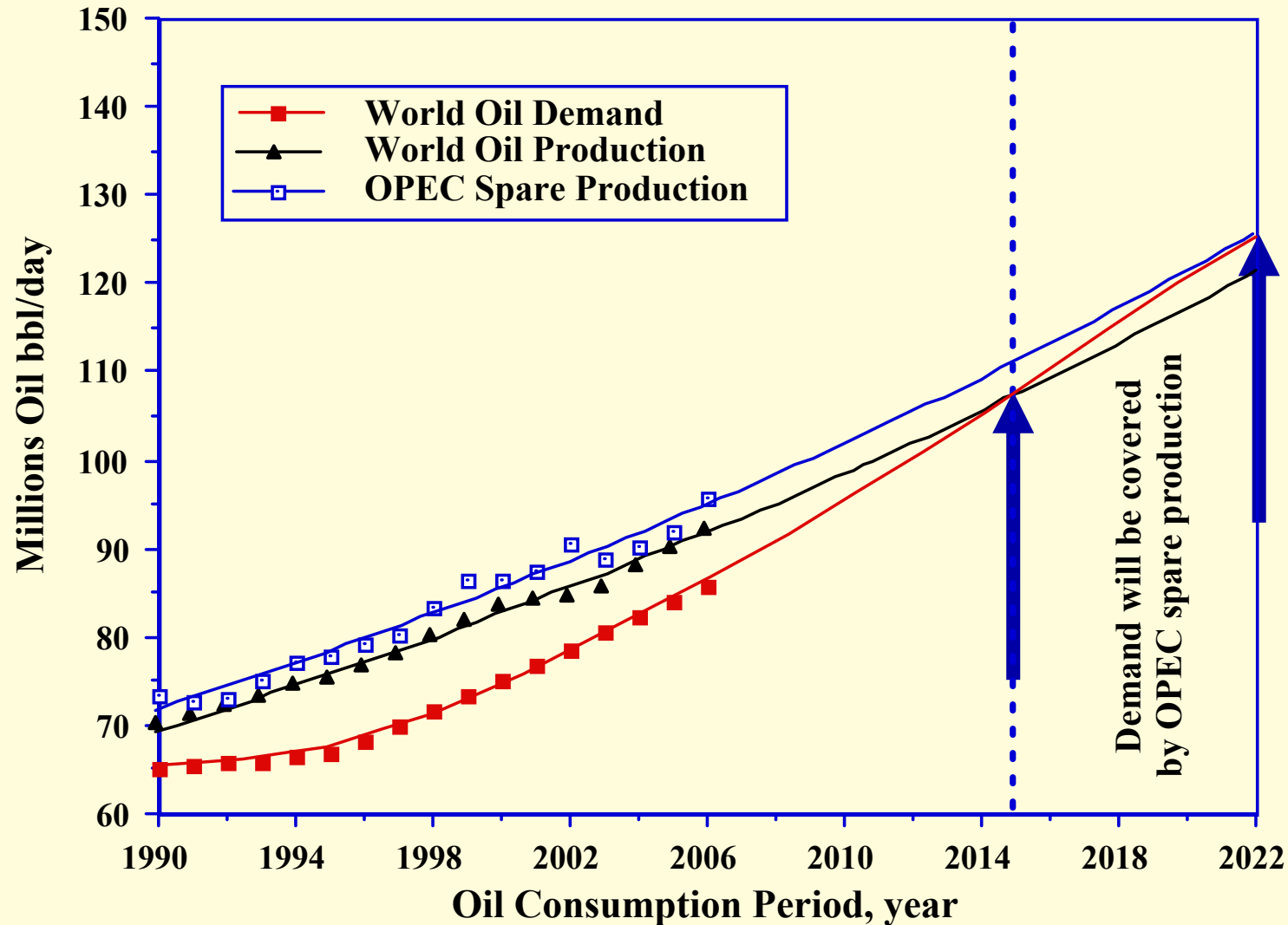
Country	Reserve, %	Production, %	Consumption, %	Net, %
OPEC	79	41	7	+34
USA	2	9	26	-17
Rest of the World	19	50	67	-17

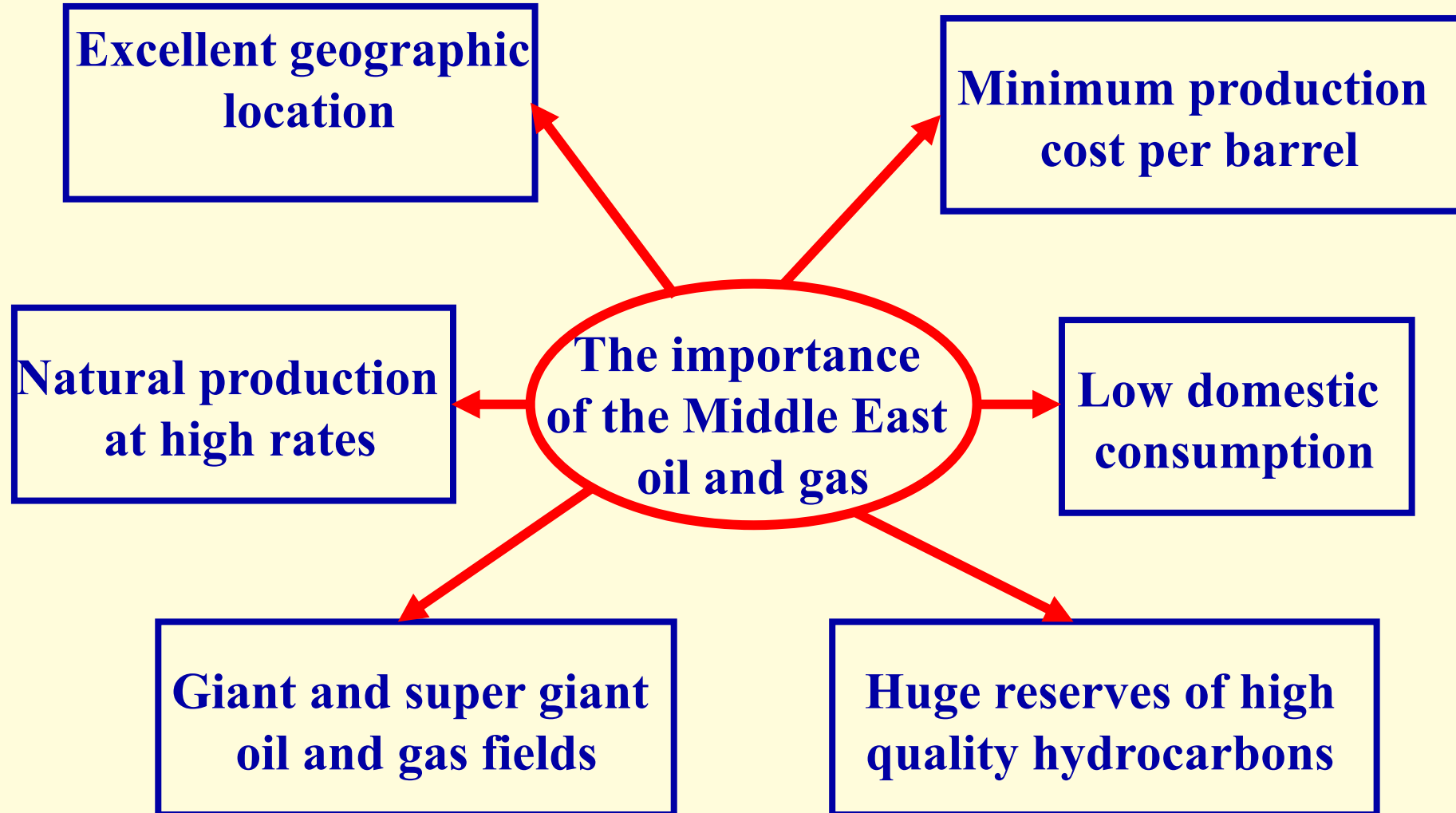
World oil demand is increasing annually in the range of 2.5% corresponding to 1.8 to 2.0 million bbl/day and the world production is increased in the same rate so far **For how long ?**

OPEC spare oil production capacity of 3 to 5 million bbl/day satisfies any future lack in world oil production **For how long ?**



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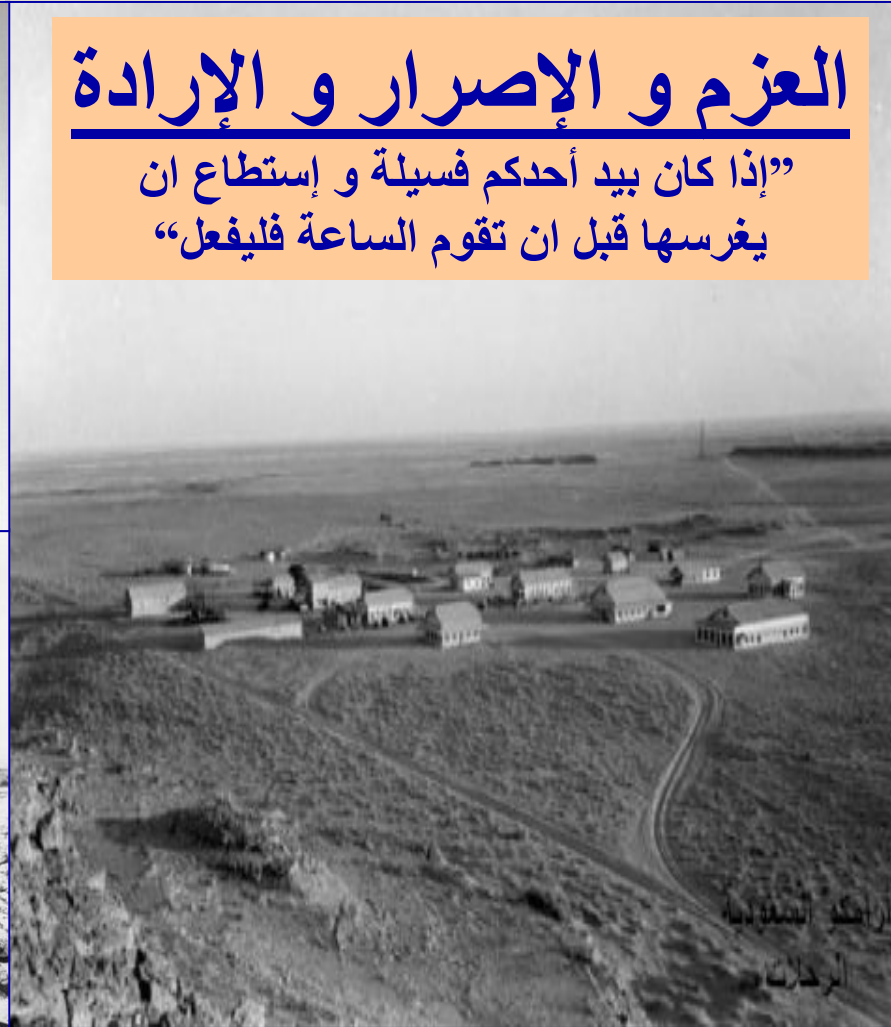
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العزم و الإصرار و الإرادة

”إذا كان بيد أحدكم فسيلة و إستطاع ان
يغرسها قبل ان تقوم الساعة فليفل“





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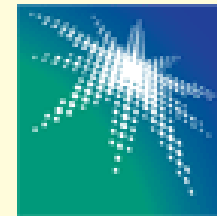




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Conclusions and Recommendation

Currently, there is no readily available source of energy other than oil and natural gas that the world can rely on.

The utilization of other energy sources available today costs a lot. This unaffordable cost is needed to convert current technology equipment to utilize any alternative energy sources.

Oil production from the giant and super giant oil fields (most of them are located in the Middle East) represent 47% of the total world oil production.

The Middle East will provide the world with the necessary oil currently and in the future. This is because there are numerous undeveloped fields and unexplored areas especially in Saudi Arabia and Iraq.



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Conclusions and Recommendation

Current increase in oil prices is not influenced by supply and demand, but it could be due to oil exchange markets, political issues, weather fluctuation or disasters, etc.

Oil fields productivity can be increased tremendously, if new production technologies are developed.

It is possible to increase current world oil reserves by developing effective enhanced oil recovery techniques (EOR or IOR).

Producing oil fields above its critical production rate will damage or decrease its productivity.