

석유, 가스, 석탄 40년 후 고갈되면 어쩌나?

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- ◆ 당신은 왜 이 수업을 듣는가?
- ◆ 당신은 왜 서울대학교에 다니는가?
- ◆ 당신은 왜 사는가(vision statement)?



Contents

- ◆ History of Petroleum
- ◆ Importance of energy
- ◆ Common misunderstandings
- ◆ Reserves
- ◆ Development of Oil and Gas
- ◆ Important statistics
- ◆ Offshore gas field

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Our History = Oil History?

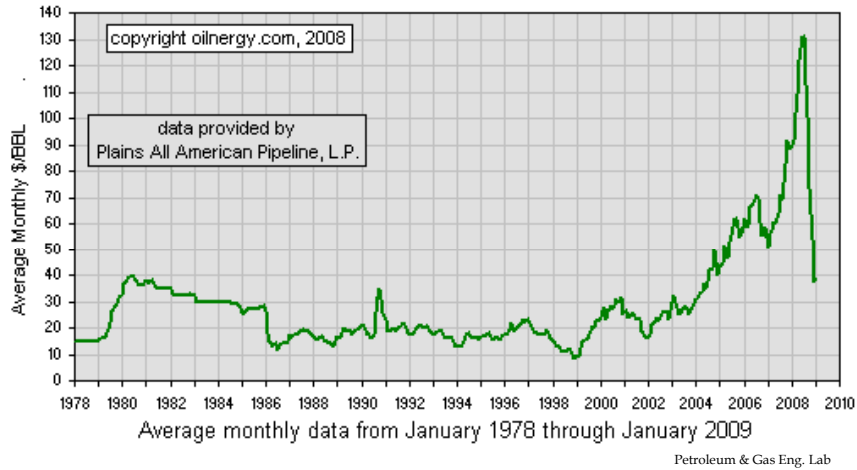
- ◆ “석유공학의 초기 역사” (최종근, 석유협회보, 2000년 1·2월호)
 - August 27, 1859: First oil well by E. Drake
 - Jan. 1870: Standard Oil Company by J.D. Rockefeller
 - 3% Ohio(1870), 80% Ohio(1873), 90% US(1900)
 - Jan. 1901: Spindletop oil field discovery
 - 1911: Break up of Standard Oil Company
 - Seven sisters
 - Sept. 9, 1960: OPEC 결성
 - 1973 ~ 1974: First Oil Shock
 - 1978 ~ 1979: Second Oil Shock
 - 1980 ~ 1990: Low oil price period
 - 2000+: High oil price period

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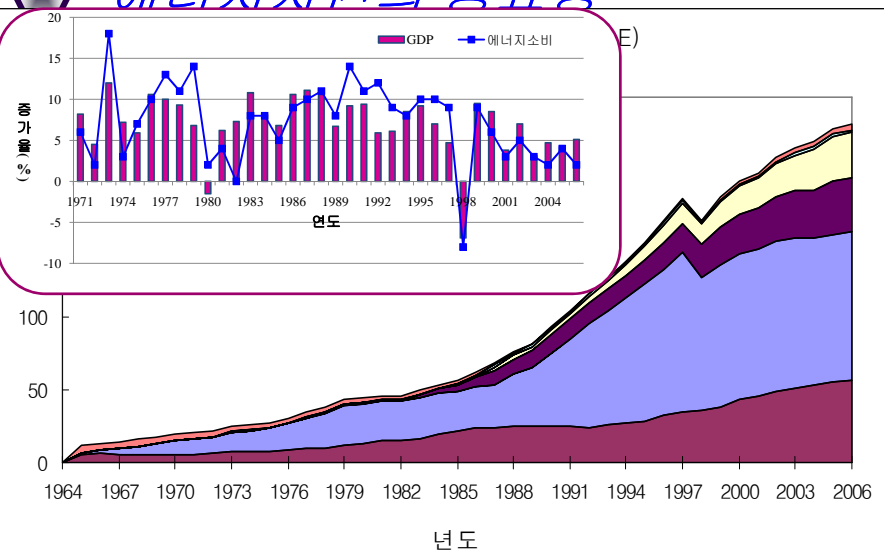


Monthly Oil Price, \$/bbl

Plains All American L.P.'s WTI Crude - Posted Price



에너지자원의 중요성





정부정책

✓ 제3차 해외자원개발 기본계획('07~'16)」을 수립 (2007. 08)

- 석유·가스 포함 6대 전략광종 자주개발을 목표를 대폭 상향조정

광종	2006년	2008년	2013년	2016년
석유·가스	3.2%	5.7%	20%	28%
유연탄	38.0%	41%	49%	50%
우라늄	-	-	2%	15%
철광	11.8%	14%	27%	30%
동광	2.0%	7%	23%	35%
아연	31.0%	29%	37%	40%
니켈	-	15%	29%	30%



Common Misunderstandings

- ◆ 석유는 40년 후 고갈되나요?
- ◆ 땅속 큰 웅덩이 같은 곳에 석유가 모여 있나요?
- ◆ 석유를 생산하면 땅이 꼭 꺼지나요?
- ◆ 서부텍사스 중질유는 품질이 중간인가요?
 - West Texas Intermediate, Brent, Dubai
 - $SG = 141.5 / (131.5 + API)$
- ◆ LNG와 LPG는 같은가요?
- ◆ 석유가 없어도 도로구간 200m를 포장할 수 있나요?
- ◆ 해외석유사업을 하면 떼돈을 버나요?
- ◆ 석유탐사는 확률게임이고 성공률이 1% 이하인가요?

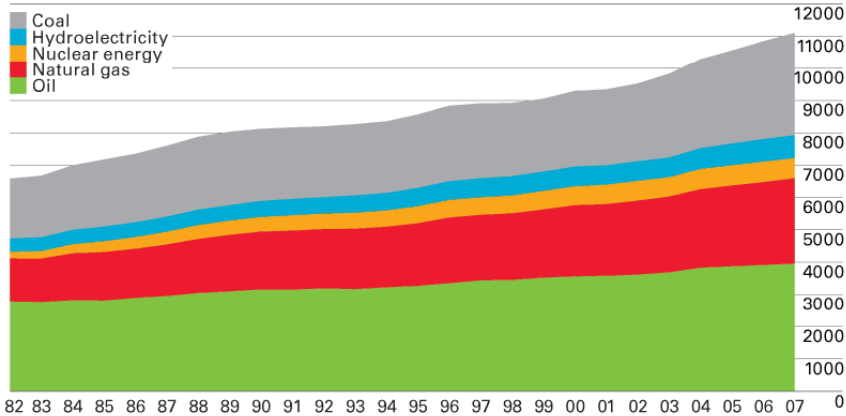


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World Primary Energy

World consumption
Million tonnes oil equivalent



World primary energy consumption slowed in 2007, but growth of 2.4% was still above the 10-year average. Coal remained the fastest-growing fuel, but oil consumption grew slowly. Oil is still the world's leading fuel, but has lost global market share for six consecutive years, while coal has gained market share for six years.

BP Statistical Review of World Energy 2008

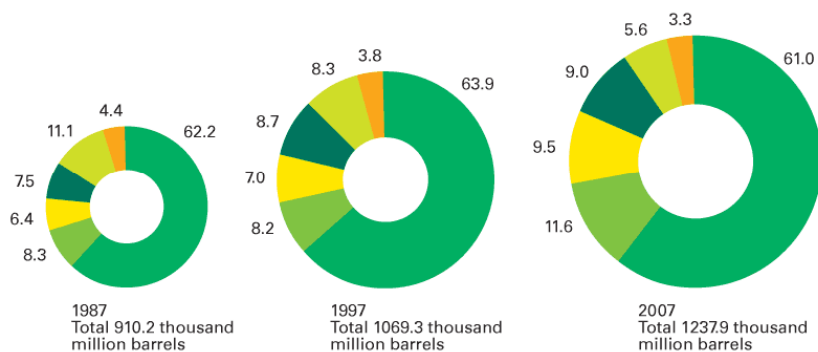


Proved Oil Reserves

Distribution of proved reserves in 1987, 1997 and 2007
Percentage



Reserves are those quantities of petroleum which are anticipated to be commercially recovered from known accumulation.

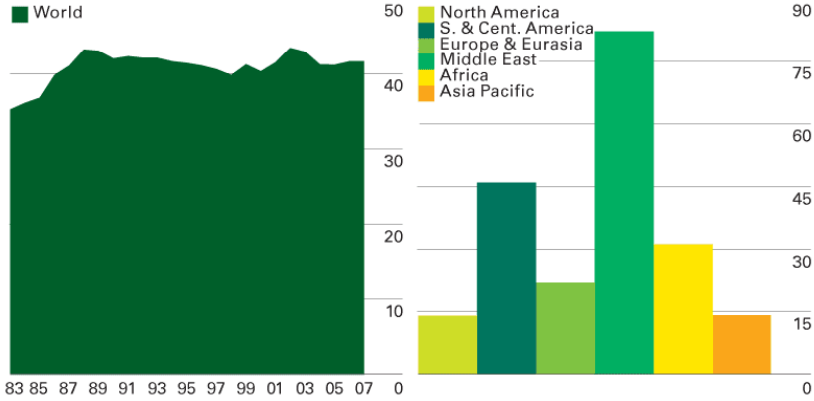


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Oil Reserves-to-Production (R/P) Ratios

Reserves-to-production (R/P) ratios
Years



The world's proved oil reserves edged lower in 2007 and the R/P ratio of 41.6 years was unchanged in the face of declining oil production. The level of reserves fell by 1.6 billion barrels in 2007 due to declines in Mexico, Syria, Qatar and Norway, which were partly offset by increases in Brazil, Egypt and Russia.

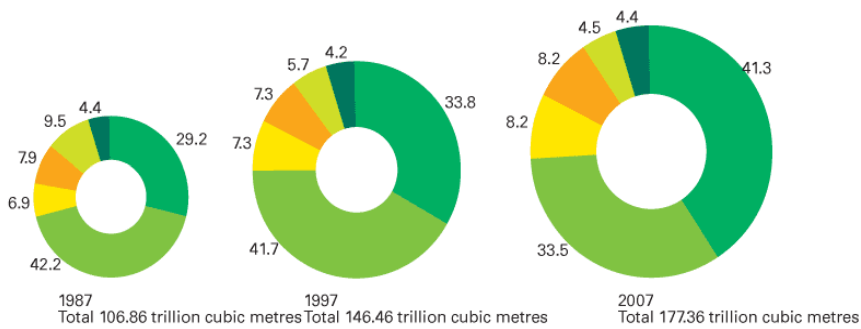
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Proved Natural Gas Reserves

Distribution of proved reserves in 1987, 1997 and 2007
Percentage

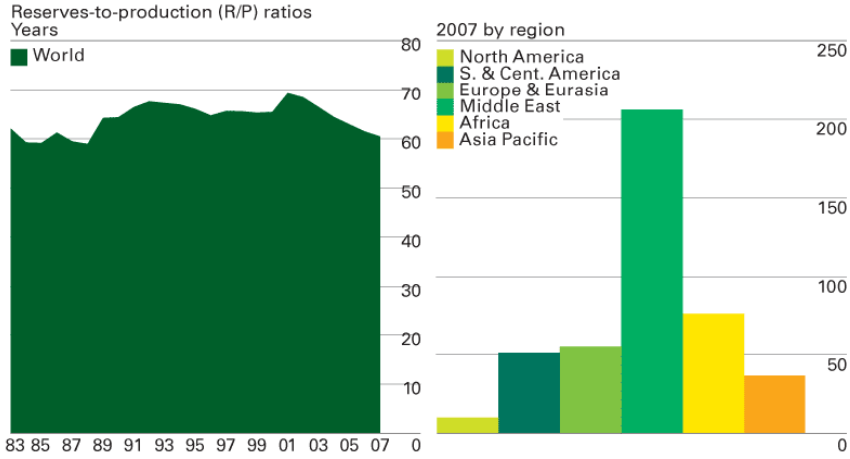
■ Middle East
■ Europe & Eurasia
■ Africa
■ Asia Pacific
■ North America
■ S. & Cent. America



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Natural Gas Reserves-to-Production Ratios

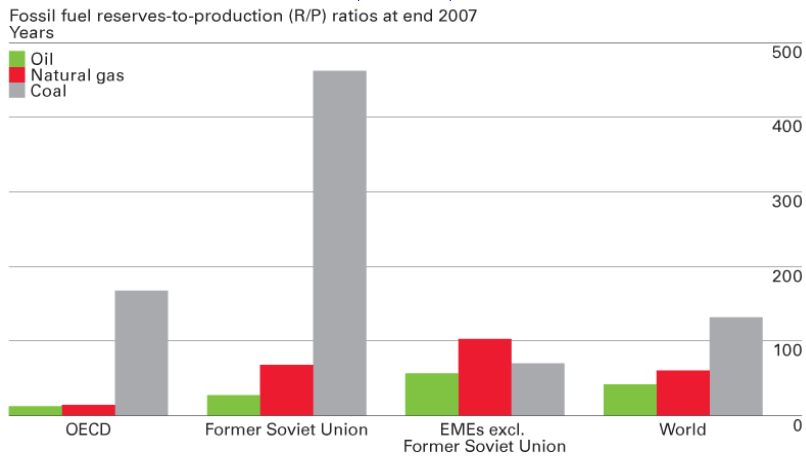


The world's natural gas R/P ratio declined to 60.3 years in 2007, even though reserves increased by more than 1 trillion cubic metres. Increases in Indonesia, Iran and China accounted for most of the growth.

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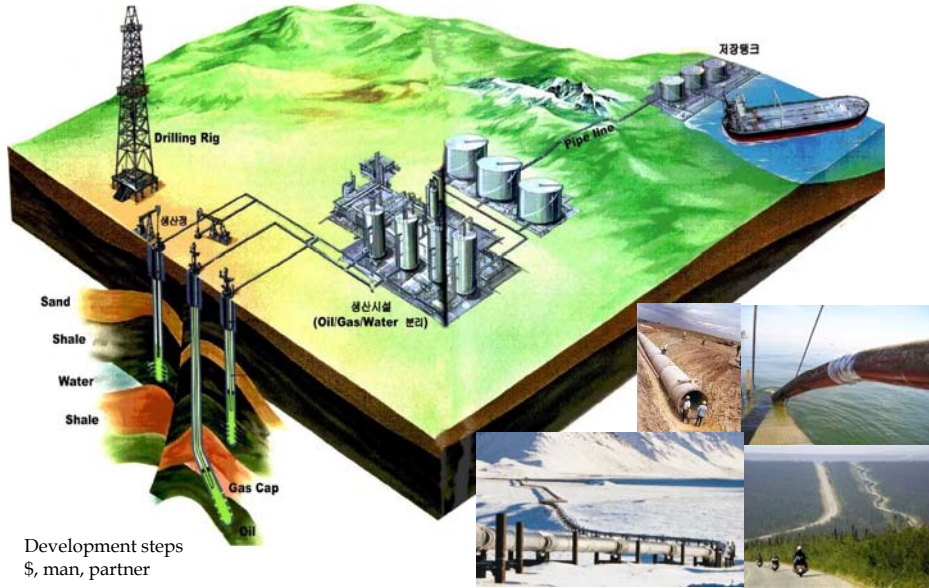
Fossil Fuel Reserves-to-Production (R/P) Ratios



Coal remains the world's most abundant fossil fuel, with an R/P ratio of more than 130 years. In addition to being cost-competitive, coal has emerged as the world's fastest-growing fuel in part because reserves are located in key consuming countries.

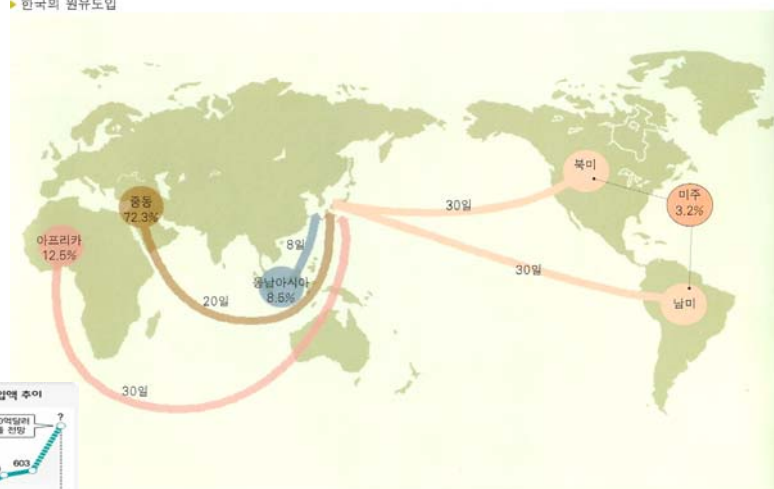
BP Statistical Review of World Energy 2008

Development and Transportation



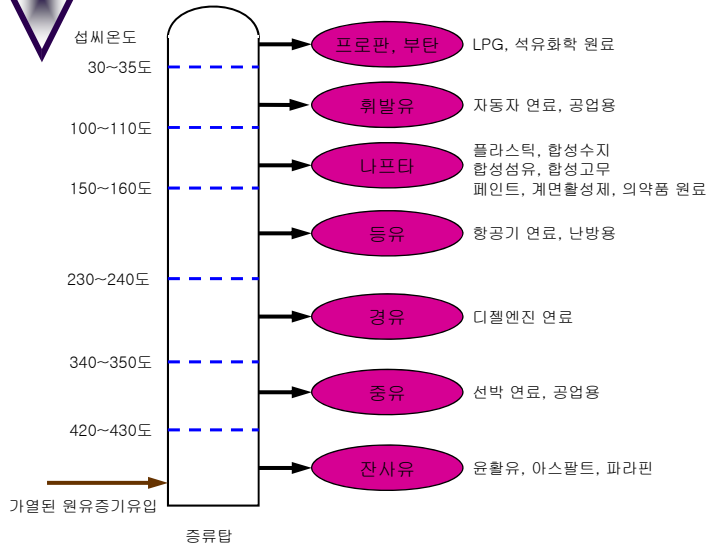
원유의 수송

▶ 한국의 원유도입





정제와 그 산물

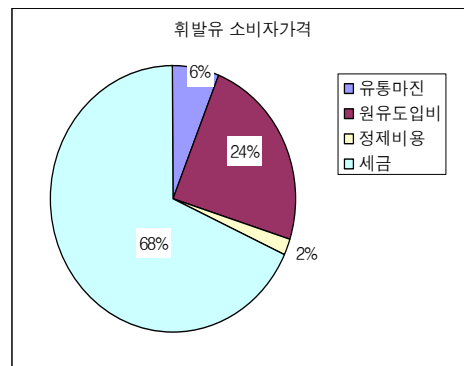


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석유제품의 가격구성 요소

- ◆ 원유도입비
원유비용, 선적비용, 운임과 보험료, 수입부대비, 금융비용
- ◆ 정제비
순 정제비, 정유사 허용이윤
- ◆ 세금
- ◆ 유통비용



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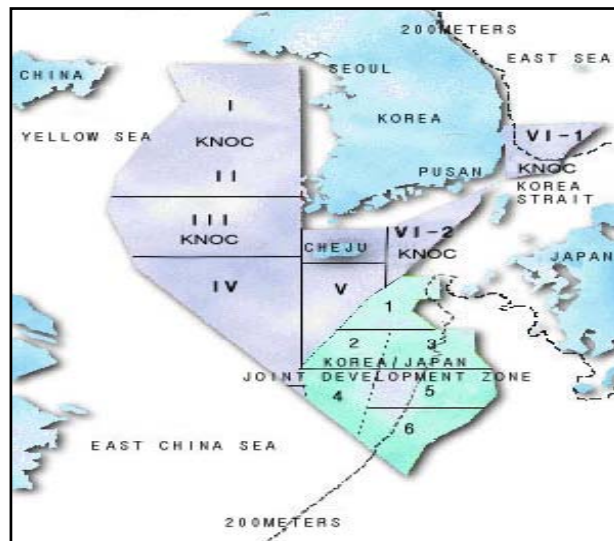


주요국의 석유관련 위치 (2007 자료)

단위 : Thousand barrels daily								
Rank	Oil proved reserves (10억 배럴)	Oil production	Crude Oil Imports	Total Imports of Refined Petroleum Products	Crude Oil Exports	Total Exports of Refined Petroleum Products	Oil consumption	Oil refinery capacities
1	Saudi Arabia 264.3	Saudi Arabia 10859	United States 10088	United States 3057	Saudi Arabia 7143	Netherlands 1522	USA 20589	USA 17455
2	Iran 137.5	Russian Fed. 9769	Japan 4049	Netherlands 1426	Russian 5211	Russia 1413	China 7445	China 7029
3	Iraq 115.0	USA 6871	China 2449	Japan 1377	Norway 2682	Saudi Arabia 1411	Japan 5164	Russian Fed. 5491
4	Kuwait 101.5	Iran 4343	S. Korea 2271	Singapore 948	Iran 2556	Singapore 1073	Russian Fed. 2735	Japan 4542
5	U.A.E. 97.8	China 3684	Germany 2218	China 911	Nigeria 2176	United States 1021	Germany 2622	India 2992
6	Venezuela 80.0	Mexico 3663	India 1912	Germany 735	U.A.E. 2172	Canada 937	India 2575	S. Korea 2633
7	Russian Fed. 79.5	Canada 3147	Italy 1762	France 666	Mexico 2118	United Kingdom 733	S. Korea 2312	Germany 2390
8	Libya 41.5	U.A.E. 2969	France 1718	S. Korea 559	Iraq 1600	Kuwait 721	Canada 2222	Italy 2359
9	Kazakhstan 39.8	Venezuela 2824	Spain 1197	United Kingdom 530	Venezuela 1587	Venezuela 705	Brazil 2097	Saudi Arabia 2100
10	Nigeria 36.2	Norway 2778	United Kingdom 1124	Spain 517	Kuwait 1479	S. Korea 644	Saudi Arabia 2005	Canada 1968



국내 대륙붕 광구



Any Questions?

johnchoe@snu.ac.kr



자원개발특성화 대학

- ◆ 장학금 지원
- ◆ 교육 및 연구관련 지원
 - 졸업논문 연구지원: 10개 팀, 300만원 내외
 - 연구보조 인건비 지원: 10명, 300만원 내외
 - Internship 지원:
 - 국내: 정액 지원
 - 국외: 항공료 + 체재비 일부 지원
 - 현장견학, 현장실습 지원
 - 대학에서 시행하는 각종 연수 프로그램 지원
- ◆ 부탁 사항



Let's call it for today

- ◆ Questions?
- ◆ 최대석유재벌?



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Homework

- ◆ Write an essay
 - Due March 10, 2009
- ◆ Read three articles assigned:
 - Max. 1 page summary
 - At least 10 lists of information learned from the articles
 - Revision of an abstract
- ◆ Grading guidelines
 - Due date (typically in a week)
 - Max. 1 page and at least 10 lists
 - Work done by yourself (with your signature)

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